

Chapter 15. Root Crop Production¹

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Beet, Carrot, Radish, and Sweetpotato Botany and Planting

Beet—*Beta vulgaris*, Chenopodiaceae

Radish—*Raphanus sativus*, Brassicaceae (Cruciferae)

Sweetpotato/Boniato—*Ipomoea batatas*, Convolvulaceae

Carrot—*Daucus carota*, Apiaceae (Umbelliferae)

Table 1. Planting information for beet, carrot, radish, and sweetpotato/boniato.

Planting Dates	Beet	Carrot	Radish	Sweetpotato/Boniato
North Florida	Aug–Feb	Aug–Mar	Sept–Mar	Mar–June
Central Florida	Sept–Feb	Aug–Mar	Sept–Mar	Feb–June
South Florida	Oct–Jan	Sept–Mar	Oct–Mar	Dec–Sept (orange flesh type) Year-round (boniato/batatas type)
Planting Information				
Distance between rows (in)	12–30	10–12	6	36–48
Distance between plants (in)	2–4	1–3	1	10–12
Seeding depth (in)	0.5–1.0	0.25	0.25	3–4
Seed per acre (lb)	10–15	2–4	10–20	9,000–15,000
Days to maturity from seed	50–70	70–120	20–30	85–130
Plant population (acre)	261,360	630,000	1 million+	9,000–15,000

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Cultivars

Table 2. Common cultivars of beet, carrot, and sweetpotato/boniato.

Beet	Carrot	Radish	Sweetpotato/Boniato
Bohan	Apache	Diego	Beauregard
Boro	Choctaw	Escala F ¹	Covington
Bulls Blood (tops)	Navajo	Fuego ¹	Evangeline
Golden Beets (yellow)	Top Notch	Red Castle	Hernandez
Green Top		Red Pearl	Picadito (Boniato)
Pacemaker III		Red Satin F ¹	
Red Ace		Red Silk ²	
Red Cloud		Rudi	

¹ Resistant to yellows; tolerant to black root and rhizoctonia scurf.
² Resistant to pithing; intermediate resistance to black root, yellows, clubroots, rhizoctonia scurf.

Tropical Root Crops

Tropical root crops are planted primarily for their edible roots, tubers, corms, or cormels. In this regard, tropical root crops require a longer period of time to mature than many other vegetable crops. Some root crops take as long as 14 months to reach maturity. Some people also eat the edible leaves of sweetpotato/boniato, cassava, and taro. In the case of these crops, plants grown for edible leaves can be grown in cooler locations than would otherwise be possible. For pest control products, these crops are included in root and tuber vegetables.

Botany and Planting

Table 3. Planting information for cassava, taro, and malanga.

Planting Dates	Cassava	Taro	Malanga
Miami-Dade County	Year-round (mainly February to April)	Year-round	Year-round
Planting Information			
Distance between rows (in)	48	52	52
Distance between plants (ft)	2	1	1
Planting depth (in)	3–4	4–6	4–6
Propagules needed per acre	5,445	2,420–3,630	2,420–3,630
Minimum propagule size	10"–12" stick or micropropagules	2 oz	2 oz
Bedded	No	Yes	Yes
Months to harvest from planting	8–12	6–10	9–14
Plant populations (acre)	5,445	10,052	10,052

Cultivars

Cassava—Known over the world by a variety of names, including manioc, yuca, mandioca, balinghoy, kamoteng, kahoy (Philippines), mogo (Africa), tapioca root (India), and manioc root in its native South America. Though the exact origins of cassava are unknown, it was likely domesticated between 7,000 and 9,000 years ago in the Amazon. This root crop is grown throughout the tropics and has become an important dietary staple in many parts of the world.

Varieties are often separated based of their cyanogenic glucoside (HCN) content into either low HCN, a.k.a. “sweet,” or high HCN, a.k.a. “bitter,” types. The term “bitter” comes from a bitter flavor that is commonly believed to accompany the HCN. Though no named varieties are currently known in southern Florida, ‘Senorita’ was locally popular in the 1980s, and attempts were made to introduce the CIAT variety ‘Mantiqueira’ at that time because it produced acceptable yields even with high levels of root-knot nematode infestation. The range of local genotypes covers a few unnamed clones that have been imported from various Caribbean basin countries. However, federal regulations prohibit further importation of cuttings or botanical seed.

Root development may occur as early as 28 days after planting, though it may take about six weeks before fibrous roots begin to thicken rapidly with starch granules. There does not appear to be any specific trigger to root thickening, but the number of roots that will eventually thicken is determined early in the life of the crop, with little change in the number of thickened roots after three months. A soil fertility analysis is conducted as a routine practice to ensure an adequate amount of potassium is maintained in the soil to improve root development for improved yield. The amount of nitrogen available to the crop is often limited because excessive nitrogen increases vegetative growth rather than the root development.

For people who are able to find cuttings, follow the technique developed by scientists at the International Institute for Tropical Agriculture (IITA) in Ibadan, Nigeria, where one makes two-node cuttings, or ministakes, which can provide a five-fold increase in the production of propagules from each parent cassava plant. According to IITA, “[t]hese ministakes are easily moved and protected in plastic sacks until they can be grown on and hardened in individual plastic bags or nursery beds before being planted in the field.”

It takes 8–12 months for cassava roots to reach maturity. Plants are often cut back two weeks prior to harvest, resulting in increased tuber size and yields about 10% higher.

Preferences for specific varieties of cassava used for edible leaves may exist among consumers, though the ability to satisfy these requests is very limited, given the very small number of varieties currently grown in the United States.

Tannia is widely grown and used in the tropics. It has been grown since 1963 on a limited commercial scale in south Florida, where it is typically planted in the spring because the crop requires 9–10 months to reach maturity and can be injured by frosts. Tannia can be propagated by several methods: (1) plant the top (head), (2) plant the whole main tuber, (3) plant pieces of the main tuber, or (4) plant individual secondary tubers. Propagative materials should be set 3–5 inches below the surface. ‘South Dade White’ produces white-fleshed cormels; ‘Malanga Amarilla’ produces a yellow-fleshed edible corm. ‘Vinola’ produces purple-fleshed cormels.

Taro—‘Malanga Isleña’ produces one large white-fleshed central corm; a few unnamed Polynesian types are grown for the Asian market. The name “taro” is generally used to refer to *Colocasia esculenta*, one of several major root crops in the Araceae (Aroid) family.

There are several important crops throughout the tropical regions of the world related to taro and grown in certain Florida locations. These include the giant swamp taro, the giant taro, and cocoyam. Each of these Aroids has several other common names in different regions of the world.

Information about taro in Florida is limited due to a small acreage. However, taro can be cultivated under both wetland and dryland conditions, with the latter referred to as “dasheens” in Florida. Most will mature in 6–10 months, with corms being dug up with modified potato harvesters in commercial production. The corms are washed of soil, sorted by size, and packed. The recommended cold room temperature for prolonged storage is 45°F–50°F with a relative humidity of 85.

Tropical sweetpotato or boniato—‘Picadito’ is the main variety grown in Miami-Dade County. Sweetpotato usually has shallow-lobed leaves and wine-colored skin with orange flesh. However, boniato, which is predominantly grown in Miami-Dade County, has deeply lobed leaves and wine-colored skin with white flesh.

It is illegal to import sweetpotato/boniato into the United States due to soil pests, such as sweetpotato weevils, and there is no program to produce disease-free planting material of ‘Picadito’ in Florida. Other sweetpotato growing states have developed red-skinned, white-fleshed sweetpotatoes, which may grow well in Florida and may be available from those plant breeders or through certified slip producers.

In regard to other tropical root crops, such as daikon radish or turmeric, readers may refer to [chapter 5](#), “Ethnic Vegetable Production.”

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 4. Herbicides approved for managing weeds in beet. Contact: Peter J. Dittmar, UF/IFAS Horticultural Sciences Department.

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.			
*** PREEMERGENCE ***			
Carfentrazone up to 0.031	(Aim) 2 EC up to 2 fl oz	14	Apply as a preplant burndown for emerged broadleaf weeds. Use crop oil concentrate, methylated seed oil, or nonionic surfactant at recommended rates. Maximum rate of 0.096 lb a.i./A per season. No pretransplant interval.
Glyphosate	(various formulations) consult labels	9	Emerged broadleaf and grass weeds. Apply as a preplant burndown. Consult labels for individual product directions.
Pelargonic acid	(Scythe) 4.2 EC 3%–10% v/v	27	Emerged broadleaf and grass weeds. Apply as a preplant burndown treatment. Scythe is a contact and nonresidual herbicide and can be tank-mixed with residual preemergence herbicides to lengthen control.
Pyraflufen ethyl 0.001–0.003	(ET Herbicide) 0.208 EC 0.5–2.0 fl oz	14	Emerged broadleaf weeds and grass weeds. Apply as a preplant burndown treatment.
*** POSTEMERGENCE ***			
Carfentrazone up to 0.031	(Aim) 2 EC up to 2 fl oz	14	Emerged broadleaf weeds. Apply as a hooded application to row middles only. Use crop oil concentrate or nonionic surfactant at recommended rates. May be tank-mixed with other herbicides. Do not exceed 6.1 fl oz per cropping season. PHI 0 days.
Clethodim 0.09–0.13 0.07–0.25	(Arrow) 2 EC 6–8 fl oz (Select Max) 1 EC 9–16 fl oz	1	Perennial and annual grass weeds. In fields with heavy grass pressure or larger grass weeds, use higher rates or repeat application 14 days apart. Use a crop oil concentrate at 1% v/v in the finished spray volume. Consult the label for necessary surfactant. PHI 30 days.
Pelargonic acid	(Scythe) 4.2 EC 3%–10% v/v	27	Emerged broadleaf and grass weeds. Direct spray to row middles. Product is a contact, nonselective, foliar-applied herbicide with no residual control. May be tank-mixed with several soil residual compounds.
Sethoxydim 0.28–0.47	(Poast) 1.5 EC 1.5–2.5 pt	1	Emerged grass weeds. A maximum of 5 pt/A applied in 1 season. Include a crop oil concentrate. Unsatisfactory results may occur if applied to grasses under stress. PHI 60 days.
S-metolachlor	(Dual Magnum) 7.62 EC	15	Grass and broadleaf weeds and nutsedge. Label is a Third-Party Registration (TPR, Inc.). Use without a signed authorization and waiver of liability is a misuse of the product.

Table 5. Herbicides approved for managing weeds in carrot. Contact: Peter J. Dittmar, UF/IFAS Horticultural Sciences Department.

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.			
*** PREEMERGENCE ***			
Carfentrazone up to 0.031	(Aim) 2 EC up to 2 fl oz	14	Apply as a preplant burndown for emerged broadleaf weeds. Use crop oil concentrate, methylated seed oil, or nonionic surfactant at recommended rates. Maximum rate of 0.096 lb a.i./A per season. No pretransplant interval.
Glyphosate	(various formulations) consult labels	9	Emerged broadleaf and grass weeds. Apply as a preplant burndown. Consult label for individual product directions.
Linuron 0.5–1.0	(Lorox DF) 50 DF 1–2 lb	7	A single application after planting and before crop emergence. Plant seed at least 0.5 inches deep. Preemergence and postemergence application should not exceed 4 lb/A per season.
Paraquat 0.5–1.0	(Gramoxone) 2 SL 2.0–4.0 pt (Firestorm) 3 SL 1.3–2.7 pt	22	Emerged broadleaf and grass weeds. Apply as a preplant burndown treatment. Apply before crop emergence. Use a nonionic surfactant.
Pelargonic acid	(Scythe) 4.2 EC 3%–10% v/v	27	Emerged broadleaf and grass weeds. Apply as a preplant burndown treatment. Scythe is a contact and nonresidual herbicide and can be tank-mixed with a residual preemergence herbicide to lengthen time of control.
Pendimethalin 0.95	(Prowl H2O) 3.8 2.0 pt	3	Broadleaf and grass control. Apply within 2 days of planting before the emergence of the crop. PHI 60 days.
Prometryn 1.0–2.0	(Caparol) 4 L 2–4 pt	5	Most annual broadleaf and grass weeds. Do not exceed 1 application. Consult label for rotational crop restrictions.
Pyraflufen ethyl 0.001–0.003	(ET Herbicide) 0.208 EC 0.5–2.0 fl oz	14	Emerged broadleaf and grass weeds. Apply as a preplant burndown treatment.
Trifluralin 0.5	(Treflan, Trifluralin) 4 EC 1 pt (Treflan TR-10) 5 lb	3	Annual broadleaf and grass weeds. Do not apply to muck soils. Mineral soils with 2%–5% organic material, apply 0.75 lb a.i./A. Incorporate 4 inches or less with 8 hr of application. PHI 60 days.
POSTEMERGENCE			
Carfentrazone Up to 0.031	(Aim) 2 EC up to 2 fl oz	14	Emerged broadleaf weeds. Apply as hooded application to row middles only. Use crop oil concentrate or nonionic surfactant at recommended rate. May be tank-mixed with other herbicides. Do not exceed 6.1 fl oz per cropping season. PHI 0 days.
Clethodim 0.09–0.13 0.07–0.13	(Arrow) 2 EC 6–8 fl oz (Select max) 1 EC 9–16 fl oz	1	Perennial and annual grass weeds. In fields with heavy grass pressure or larger grass weeds, use higher rates or repeat applications 14 days apart. Use a crop oil concentrate at 1% v/v in the finished spray volume. Nonionic surfactant with Select Max. PHI 30 days.
Fluazifop 0.188	(Fusilade DX) 2 EC 12 fl oz	1	Actively growing grass weeds. Maximum is 48 fl oz/A per growing season. Withhold field flooding 45–60 days following application. In Palm Beach and Hendry Counties a 60-day interval must be observed for flooding. PHI 45 days.
Linuron 0.5–1.0	(Lorox DF) 50 DF 1–2 lb	7	Apply after carrots are 3 inches tall. Repeat applications may be made but do not exceed 4 lb/A. Can be applied following Stoddard Solvent provided that the applications are at least 1 day apart. Do not tank-mix with Stoddard Solvent.
Metribuzin 0.25	(Metribuzin, Metri, Tricor) 75 DF 0.3 lb (Metri, Tricor) 4 F 0.5 pt	5	Broadleaf and grass control. Total amount applied in a season should not exceed 0.5 lb a.i./A. Apply after carrots have 5–6 true leaves and weeds are less than 1 inch in height. If needed, a second application may be made after an interval of at least 3 weeks. PHI 60 days.
Pelargonic acid	(Scythe) 4.2 EC 3%–10% v/v	27	Emerged broadleaf and grass weeds. Direct spray to row middles. Product is a contact, nonselective, foliar-applied herbicide with no residual control. May be tank-mixed with several soil residual compounds.
Prometryn 1.0–2.0	(Caparol) 4 L 2–4 pt	5	Most annual broadleaf and grass weeds. Apply up to 6-leaf stage of carrot. 1 application of 4 pt/A or 2 applications of 2 pt/A. For POST control of weeds, include NIS or COC. Consult label for rotational crop restrictions. PHI 30 days.

Active Ingredient lb a.i./Acre	Trade Name Product/Acre	MOA Code	Weeds Controlled/Remarks
Sethoxydim 0.28–0.38	(Poast) 1.5 EC 1.5–2.0 pt	1	Emerged grass weeds. A maximum of 5 pt/A applied in one season. Include a crop oil concentrate. Unsatisfactory results may occur if applied to grasses under stress. PHI 30 days.
S-metolachlor	(Dual Magnum) 7.62 EC	15	Grass and broadleaf weeds and nutsedge. Label is a Third-Party Registration (TPR, Inc.). Use without a signed authorization and waiver of liability is a misuse of the product.

Table 6. Herbicides approved for managing weeds in radish. Contact: Peter J. Dittmar, UF/IFAS Horticultural Sciences Department.

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.			
PREPLANT/PREEMERGENCE			
Carfentrazone up to 0.031	(Aim) 2 EC up to 2 fl oz	14	Apply as a preplant burndown for emerged broadleaf weeds. Use crop oil concentrate, methylated seed oil, or nonionic surfactant at recommended rates. Maximum rate of 0.096 lb a.i./A per season. No pretransplant interval.
Glyphosate	(various formulation) consult labels	9	Emerged broadleaf and grass weeds. Apply as a preplant burndown. Consult label for individual product directions.
Pelargonic acid	(Scythe) 4.2 EC 3%–10% v/v	27	Emerged broadleaf and grass weeds. Apply as a preplant burndown before planting.
Pyraflufen ethyl 0.001–0.003	(ET Herbicide) 0.208 EC 0.5–2.0 fl oz	14	Emerged broadleaf weeds. Apply as a preplant burndown treatment.
S-metolachlor	(Dual Magnum) 7.62 EC	15	Grass, broadleaf weeds, and nutsedge. Label is a Third-Party Registration (TPR, Inc.). Use without a signed authorization and waiver of liability is a misuse of the product.
Trifluralin 0.5–0.75	(Treflan HFP, Trifluralin, Trilin) 4 EC 1.0–1.5 pt (Treflan) 4 L 1.0–1.5 pt	3	Annual broadleaf and grass weeds. Incorporate or irrigate 4 inches within 8 hr. Results in Florida are erratic on soils with low organic matter and clay contents.
POSTEMERGENCE			
Clethodim 0.09–0.13 0.07–0.13	(Arrow) 2 EC 6–8 fl oz (Select Max) 1 EC 9–16 fl oz	1	Emerged annual and perennial grass weeds. For repeat application, minimum of 14 days between applications. Do not exceed 0.25 lb a.i./A per season. PHI 15 days.
Sethoxydim 0.47	(Poast) 1.5 EC 2.5 pt	1	Emerged grass weeds. Do not exceed 3.0 pt/A per season. Include a crop oil concentrate. Head lettuce and radicchio PHI 30 days. Leaf lettuce and endive PHI 15 days.

Table 7. Herbicides approved for managing weeds in sweetpotato. Contact: Peter J. Dittmar, UF/IFAS Horticultural Sciences Department.

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 ***			
Carfentrazone up to 0.031	(Aim) 2 EC up to 2 fl oz	14	Apply as a preplant burndown for emerged broadleaf weeds. Use crop oil concentrate, methylated seed oil, or nonionic surfactant at recommended rates. Maximum rate of 0.096 lb a.i./A per season. No pretransplant interval.
Clomazone 0.49–0.75	(Command) 3 ME 1.3–2.0 pt	13	Annual broadleaf and grass weeds. Use lower rates on coarse soils. Apply within 5 days of transplanting.
Flumioxazin 0.096	(Valor) 51 WDG 3 oz	14	Annual broadleaf weeds. Do not use transplants that were harvested 2 days before application. Severe injury occurs if applied after transplanting. Apply 2–5 days before transplanting and minimize soil disturbance after application.
Glyphosate	(various formulations) consult labels	9	Emerged broadleaf and grass weeds. Apply as a preplant burndown. Consult labels for individual product directions.
Napropamide 1.0–2.0	(Devrinol DF XT) 50 DF 2.0–4.0 lb	15	Annual broadleaf and grass weeds. Apply immediately after transplanting. If rainfall does not occur within 24 hr after application, then incorporate or irrigate 2–4 inches deep.
Pelargonic acid	(Scythe) 4.2 EC 3%–10% v/v	27	Emerged broadleaf and grass weeds. Apply as a preplant burndown treatment. Scythe is a contact and nonresidual herbicide and can be tank-mixed with residual preemergence herbicides to lengthen control.
Pyraflufen 0.001–0.003	(ET Herbicide) 0.208 EC 0.5–2.0 fl oz	14	Emerged broadleaf weeds and grass weeds. Apply as a preplant burndown treatment.
*** POSTTRANSPLANT ***			
Carfentrazone up to 0.031	(Aim) 2 EC up to 2 fl oz	14	Emerged broadleaf weeds. Apply as a hooded application to row middles only. Use crop oil concentrate or nonionic surfactant at recommended rates. May be tank-mixed with other herbicides. Do not exceed 6.1 fl oz per cropping season. PHI 0 days.
Clethodim 0.09–0.25 0.07–0.25	(Select, Arrow) 2 EC 6–16 fl oz (Select Max) 1 EC 9–16	1	Perennial and annual grass weeds. In fields with heavy grass pressure or larger grass weeds, use higher rates or repeat application 14 days apart. Consult the label for the necessary surfactant. PHI 30 days.
Pelargonic acid	(Scythe) 4.2 EC 3%–10% v/v	27	Emerged broadleaf and grass weeds. Direct spray to row middles. Product is a contact, nonselective, foliar-applied herbicide with no residual control. May be tank-mixed with several soil residual compounds.
Sethoxydim 0.28–0.47	(Poast) 1.5 EC 1.5–2.5 pt	1	Emerged grass weeds. A maximum of 5 pt/A applied in 1 season. Include a crop oil concentrate. Unsatisfactory results may occur if applied to grasses under stress. PHI 60 days.
S-metolachlor	(Dual Magnum) 7.62 EC	15	Grass and broadleaf weeds and nutsedge. Label is a Third-Party Registration (TPR, Inc.). Use without a signed authorization and waiver of liability is a misuse of the product.

Table 8. Insecticides labeled for management of arthropod pests of carrot and beet. Contact: Julien Beuzelin, UF/IFAS Everglades Research and Education Center.

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Remarks ²
Labels change frequently. Be sure to read a current product label before applying any chemical. Please refer to chapter 19 for information on biopesticides, including materials labeled for certified organic production.						
Aphids	1B	Malathion 5EC (malathion)	1.5–2.0 pt	Beets: 12 Carrots: 24	7	Maximum number of applications is 3 for beets and 2 for carrots.
	1B	Malathion 8F (malathion)	1.25 pt	12	7	Beets only. Maximum number of applications is 3.
	3A	*Brigade 2EC (bifenthrin)	5.12–6.4 fl oz	12	Carrots: 21 Beets: 1	No more than 0.5 lb a.i./A per season for carrots or 0.4 lb a.i./A per season for beets. Apply no more than once every 7 days.
	3A	*Fastac CS (alpha-cypermethrin)	3.2–3.8 fl oz	12	1	Maximum of 11.4 fl oz/A per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	3.2–4.0 fl oz	12	1	Maximum of 24 fl oz/A per season. Leaves cannot be used for food or feed.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–18 fl oz	12	0	Pyrethrins degrade rapidly in sunlight. OMRI-listed. ²
	4A	Actara (thiamethoxam)	1.5–4.0 oz	12	7	Do not exceed 8 oz/A per season.
	4A	Admire Pro (imidacloprid)	Soil: 4.4–10.5 fl oz Foliar: 1.2 fl oz	12	Soil: 21 Foliar: 5	Limited to 1 soil application. If applied as a foliar spray, use no more than 3.7 fl oz/A per season. Leaves may be used for food.
	4A	Platinum 75SG (thiamethoxam)	1.7–4.0 oz	12	At planting	Maximum of 4.0 oz/A per season.
	4C	Transform WG (sulfoxaflor)	Leaf production: 0.75–1.0 oz Root production: 0.75–1.5 oz	24	7	Maximum of 8.5 oz/A per year.
	4D	Sivanto Prime (flupyradifurone)	7–14 fl oz	4	7	Maximum allowed per year: 28 fl oz. Minimum interval between applications: 10 days. Foliar application only.
	29	Beleaf 50 SG (flonicamid)	2.0–2.8 oz	12	3	Do not apply more than 3 times at high rate.
	-	Aza-Direct (azadirachtin)	1–2 pt, max 3.5 pt	4	0	Antifeedant, repellent, IGR (insect growth regulator). OMRI-listed. ²
	-	BotaniGard ES BoteGHA ES Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 qt	4	0	Apply in sufficient water to cover foliage, typically 5–100 gal/A. Compatible in tank mix with some fungicides. Mycotrol ESO OMRI-listed. ²
	-	Grandevo (<i>Chromobacterium subtsugae</i> strain PRAA4-1)	1–3 lb	4	0	Greens and roots. OMRI-listed. ²
	-	M-Pede (potassium salts of fatty acids)	1%–2% v/v	12	0	OMRI-listed. ²
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	Acts as IGR and feeding repellent. OMRI-listed. ²
	-	Trilogy (extract of neem oil)	0.5%–2.0% v/v	4	0	Apply morning or evening to reduce potential for leaf burn. OMRI-listed. ²

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Remarks ²
Beetles (includes blister beetles, cucumber beetles, flea beetles)	1A	Sevin 80S; XLR; 4F (carbaryl)	80S: 0.63–2.5 lb XLR, 4F: 0.5–2 qt	12	7	Repeat applications, as needed up to 6 times, at least 7 days apart.
	1B	Malathion 8F (malathion)	1.25 pt	12	7	Beets only. Maximum number of applications is 3.
	3A	*Baythroid XL (beta-cyfluthrin)	1.6–2.8 fl oz	12	0	Do not exceed 14 fl oz/A per season. Carrots only.
	3A	*Brigade 2EC (bifenthrin)	5.12–6.4 fl oz	12	Carrots: 21 Beets: 1	Do not apply more than 0.5 lb a.i./A per season for carrots or 0.4 lb a.i./A per season for beets. Apply no more than once every 7 days.
	3A	*Fastac CS (alpha-cypermethrin)	1.8–3.8 fl oz	12	1	Maximum of 11.4 fl oz/A per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	1.76–4.0 fl oz	12	1	Maximum of 24 fl oz/A per season. Leaves cannot be used for food or feed.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–18 fl oz	12	0	Pyrethrins degrade rapidly in sunlight. OMRI-listed. ²
	4A	Actara (thiamethoxam)	1.5–4.0 oz	12	7	Do not exceed 8 oz/A per season.
	4A	Admire Pro (imidacloprid)	Soil: 4.4–10.5 fl oz Foliar: 1.2 fl oz	12	Soil: 21 Foliar: 5	Limited to 1 soil application. If applied as a foliar spray, use no more than 3.7 fl oz/A per season. Leaves may be used for food.
	4A	Platinum 75SG (thiamethoxam)	1.7–4.0 oz	12	At planting	Maximum of 4.0 oz/A per season.
	5	Entrust SC (spinosad)	Roots: 3–6 fl oz Beet greens: 1.5–10 fl oz	4	3	Do not apply more than a total of 21 fl oz/A per crop (29 for beet greens) or apply more than 4 times. OMRI-listed. ²
	-	Aza-Direct (azadirachtin)	1–2 pt, max 3.5 pt	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
Caterpillars (includes beet armyworm, celery leaf-tier, corn earworm, cutworms, fall armyworm, loopers)	1A	Sevin 80S; XLR; 4F (carbaryl)	80S: 0.63–2.5 lb XLR, 4F: 0.5–2 qt	12	7	Repeat applications as needed up to 6 times, at least 7 days apart.
	1B	*Diazinon AG500 *Diazinon (diazinon)	AG500: 1–4 qt 50W: 2–8 lb	72	Preplant	Maximum 1 application per year.
	1B	Malathion 8F (malathion)	1.25 pt	12	7	Beets only. Maximum number of applications is 3.
	3A	*Baythroid XL (beta-cyfluthrin)	1.6–2.8 fl oz	12	0	Do not exceed 14 fl oz/A per season. Carrots only.
	3A	*Brigade 2EC (bifenthrin)	5.12–6.4 fl oz	12	Carrots: 21 Beets: 1	Do not apply more than 0.5 lb a.i./A per season for carrots or 0.4 lb a.i./A per season for beets. Apply no more than once every 7 days.
	3A	*Fastac CS (alpha-cypermethrin)	1.3–3.8 fl oz	12	1	Maximum of 11.4 fl oz/A per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	1.28–4.0 fl oz	12	1	Maximum of 24 fl oz/A per season. Leaves cannot be used for food or feed.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–18 fl oz	12	0	Pyrethrins degrade rapidly in sunlight. OMRI-listed. ²

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Remarks ²
	5	Entrust SC (spinosad)	Roots: 3–6 fl oz Beet greens: 1.5–10 fl oz	4	3	Do not apply more than a total of 21 fl oz/A per crop (29 for beet greens) or apply more than 4 times. OMRI-listed. ²
	5	Radiant SC (spinetoram)	Leaves: 5–10 fl oz Roots: 6–8 fl oz	4	3	Maximum of 4 applications per year. If roots will be harvested, lower rate must be used.
	11A	Agree WG (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5–2.0 lb	4	0	Apply when larvae are small for best control. Leaves and roots. OMRI-listed. ²
	11A	Biobit HP (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb	4	0	Treat when larvae are young. Good coverage is essential. Can be used in the greenhouse.
	11A	Crymax WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb	4	0	Use high rate for armyworms. Treat when larvae are young.
	11A	Deliver (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25–1.5 lb	4	0	Use higher rates for armyworms. OMRI-listed. ²
	11A	DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb	4	0	Treat when larvae are young. Good coverage is essential. Can be used for organic production.
	11A	Javelin WG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.12–1.50 lb	4	0	Treat when larvae are young. Thorough coverage is essential. OMRI-listed. ²
	11A	Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5–2.0 lb	4	0	Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic production.
	18	Intrepid 2F (methoxyfenozide)	Leaves: 4–16 fl oz Roots: 8–16 fl oz	4	Leaves: 1 Roots: 14	Do not apply more than 64 fl oz/A per season.
	22	Avant Evo (indoxacarb)	3.5–6.0 oz	12	7	Do not use adjuvants. Do not apply more than 24 oz/A per crop. Beets only.
	28	Coragen (chlorantraniliprole)	3.5–7.5 fl oz	4	1	Maximum of 15.4 fl oz/A, or 4 applications, or 0.2 lb a.i./A chlorantraniliprole per crop.
	28	Exirel (cyantraniliprole)	10–20.5 fl oz	12	1	Maximum of 0.4 lb a.i./A per year of cyantraniliprole, including all application types.
	28	Vantacor (chlorantraniliprole)	1.2–2.5 fl oz	4	1	Maximum of 5.1 fl oz/A, or 4 applications, or 0.2 lb a.i./A chlorantraniliprole per crop.
	28	Verimark (cyantraniliprole)	10–13.5 fl oz	4	At planting	Maximum of 0.4 lb a.i./A per year of cyantraniliprole, including all application types.
	32	Spear-Lep (GS-omega/kappa-Htx-Hv1a)	1–2 pt	4	0	Must be tank-mixed with a <i>Bacillus thuringiensis</i> (<i>Bt</i>) product. Maximum of 10 gal/A per year.
	-	Grandevo (<i>Chromobacterium subtsugae</i> strain PRAA4-1)	1–3 lb	4	0	Greens and roots. OMRI-listed. ²

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Remarks ²
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	Acts as IGR and feeding repellent. OMRI-listed. ²
Fire ants	3A	*Brigade 2EC (bifenthrin)	5.12–6.4 fl oz	12	Carrots: 21 Beets: 1	Do not apply more than 0.5 lb a.i./A per season for carrots or 0.4 lb a.i./A per season for beets. Apply no more than once every 7 days.
	7A	Extinguish Fire Ant Bait (S-methoprene)	1.0–1.5 lb	4	0	Slow-acting IGR.
Grasshoppers	3A	*Fastac CS (alpha-cypermethrin)	3.2–3.8 fl oz	12	1	Maximum of 11.4 fl oz/A per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	3.2–4.0 fl oz	12	1	Maximum of 24 fl oz/A per season. Leaves cannot be used for food or feed.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–18 fl oz	12	0	Pyrethrins degrade rapidly in sunlight. OMRI-listed. ²
Leafhoppers	1A	Sevin 80S; XLR; 4F (carbaryl)	80S: 0.63–2.5 lb XLR, 4F: 0.5–2 qt	12	7	Repeat applications as needed up to 6 times, at least 7 days apart.
	1B	Malathion 5EC (malathion)	1.5–2.0 pt	Beets: 12 Carrots: 24	7	Maximum number of applications is 3 for beets and 2 for carrots.
	3A	*Asana XL (esfenvalerate)	5.8–9.6 fl oz	12	7	Do not apply more than 0.5 lb a.i./A per season. Carrots only.
	3A	*Baythroid XL (beta-cyfluthrin)	1.6–2.8 fl oz	12	0	Do not exceed 14 fl oz/A per season. Carrots only.
	3A	*Fastac CS (alpha-cypermethrin)	1.8–3.8 fl oz	12	1	Maximum of 11.4 fl oz/A per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	1.76–4.0 fl oz	12	1	Maximum of 24 fl oz/A per season. Leaves cannot be used for food or feed.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–18 fl oz	12	0	Pyrethrins degrade rapidly in sunlight. OMRI-listed. ²
	4A	Actara (thiamethoxam)	1.5–4.0 oz	12	7	Do not exceed 8 oz/A per season.
	4A	Admire Pro (imidacloprid)	Soil: 4.4–10.5 fl oz Foliar: 1.2 fl oz	12	Soil: 21 Foliar: 5	Limited to 1 soil application. If applied as a foliar spray, use no more than 3.7 fl oz/A per season. Leaves may be used for food.
	4A	Platinum 75SG (thiamethoxam)	1.7–4.0 oz	12	At planting	Maximum of 4.0 oz/A per season.
	4C	Transform WG (sulfoxaflor)	1.5–2.75 oz	24	7	Maximum of 8.5 oz/A per year.
	4D	Sivanto Prime (flupyradifurone)	7–14 fl oz	4	7	Maximum allowed per year: 28 fl oz. Minimum interval between applications: 10 days. Foliar application only.
	-	Aza-Direct (azadirachtin)	1–2 pt, max 3.5 pt	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
	-	Grandevo (<i>Chromobacterium subtsugae</i> strain PRAA4-1)	1–3 lb	4	0	Greens and roots. OMRI-listed. ²

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Remarks ²
Leafminers	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–18 fl oz	12	0	Pyrethrins degrade rapidly in sunlight. OMRI-listed. ²
	5	Entrust SC (spinosad)	Roots: 3–6 fl oz Beet greens: 1.5–10 fl oz	4	3	Do not apply more than a total of 21 fl oz/A per crop (29 for beet greens) or apply more than 4 times. OMRI-listed. ²
	5	Radiant SC (spinetoram)	Leaves: 5–10 fl oz Roots: 6–8 fl oz	4	3	Maximum of 4 applications per year. If roots will be harvested, lower rate must be used.
	-	Aza-Direct (azadirachtin)	1–2 pt, max 3.5 pt	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
	-	M-Pede (potassium salts of fatty acids)	1%–2% v/v	12	0	OMRI-listed. ²
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	Acts as IGR and feeding repellent. OMRI-listed. ²
Mole crickets and wireworms	1B	*Diazinon AG500 *50W (diazinon)	AG500: 1–4 qt 50W: 2–8 lb	72	Preplant	Maximum of 1 application per year.
Plant bugs	3A	*Fastac CS (alpha-cypermethrin)	3.2–3.8 fl oz	12	1	Maximum of 11.4 fl oz/A per season.
	29	Beleaf 50 SG (flonicamid)	2.0–2.8 oz	12	3	Do not apply more than 3 times at high rate.
Stink bugs	1A	Sevin 80S; XLR; 4F (carbaryl)	80S: 0.63–2.5 lb XLR, 4F: 0.5–2 qt	12	7	Repeat applications as needed up to 6 times, at least 7 days apart.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–18 fl oz	12	0	Pyrethrins degrade rapidly in sunlight. OMRI-listed. ²
	-	Aza-Direct (azadirachtin)	1–2 pt, max 3.5 pt	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
Tarnished plant bug	1A	Sevin 80S; XLR; 4F (carbaryl)	80S: 0.63–2.5 lb XLR, 4F: 0.5–2 qt	12	7	Repeat applications as needed up to 6 times, at least 7 days apart.
	3A	*Mustang Maxx (zeta-cypermethrin)	3.2–4.0 fl oz	12	1	Maximum of 24 fl oz/A per season. Leaves cannot be used for food or feed.
Weevils	3A	*Asana XL (esfenvalerate)	9.6 fl oz	12	7	Do not apply more than 0.5 lb a.i./A per season. Carrots only.
	3A	*Baythroid XL (beta-cyfluthrin)	1.6–2.8 fl oz	12	0	Do not exceed 14 fl oz/A per season. Carrots only.
	3A	*Fastac CS (alpha-cypermethrin)	1.8–3.8 fl oz	12	1	Maximum of 11.4 fl oz/A per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	1.76–4.0 fl oz	12	1	Maximum of 24 fl oz/A per season. Leaves cannot be used for food or feed.
	-	Aza-Direct (azadirachtin)	1–2 pt, max 3.5 pt	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²

¹ Mode of Action (MOA) codes for plant pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v. 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 a similar mode of action. This information must be considered for the insecticide resistance management decisions. - = unknown, or a mode of action that has not been classified yet.

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

***Restricted use insecticide.**

Table 9. Insecticides labeled for management of arthropod pests of radish. Contact: Julien Beuzelin, UF/IFAS Everglades Research and Education Center.

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Remarks ²
Labels change frequently. Be sure to read a current product label before applying any chemical. Please refer to chapter 19 for information on biopesticides, including materials labeled for certified organic production.						
Aphids	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5 pt 8F: 1.0 pt	12	7	Maximum of 3 applications per year.
	3A	*Brigade 2EC (bifenthrin)	5.12–6.4 fl oz	12	21	Do not apply more than 0.5 lb a.i./A per season.
	3A	*Fastac CS (alpha-cypermethrin)	3.2–3.8 fl oz	12	1	Maximum of 11.4 fl oz/A per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	3.2–4.0 fl oz	12	1	Maximum of 24 fl oz/A per season.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–15.6 fl oz	12	0	Pyrethrins degrade rapidly in sunlight. OMRI-listed. ²
	3A + -	BotaniGard Maxx (pyrethrins + <i>Beauveria bassiana</i> strain GHA)	Ground: 0.25–2.00 qt Aerial: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
	4A	Actara (thiamethoxam)	1.5–3.0 oz	12	7	Maximum of 4 oz/A per year.
	4A	Admire Pro (imidacloprid)	Foliar: 1.2 fl oz Soil: 4.4–10.5 fl oz	12	Foliar: 7 Soil: 21	Maximum of 1.2 fl oz/A (foliar) or 10.5 fl oz/A (soil) per year.
	4A	Platinum 75 SG (thiamethoxam)	1.7–2.17 oz	12	At planting	Maximum of 2.17 oz/A per crop.
	4C	Transform WG (sulfoxaflor)	Leaf production: 0.75–1.0 oz Root production: 0.75–1.5 oz	24	7	Maximum of 8.5 oz/A per year.
	4D	Sivanto Prime (flupyradifurone)	7–14 fl oz	4	7	Maximum of 28 fl oz/A per year.
	28	Exirel (cyantraniliprole)	13.5–20.5 fl oz	12	1	Maximum of 0.4 lb a.i./A per year of cyantraniliprole, including all application types. For best performance, use an adjuvant.
	29	Beleaf 50 SG (flonicamid)	2.0–2.8 oz	12	3	Maximum of 8.4 oz/A per season.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 if needed	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
	-	BotaniGard ES BoteGHA ES Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 qt	4	0	Apply in sufficient water to cover foliage, typically 5–100 gal/A. Compatible in tank mix with some fungicides. Mycotrol ESO OMRI-listed. ²
	-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed. ²
	-	M-Pede (potassium salts of fatty acids)	1%–2% v/v	12	0	OMRI-listed. ²
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	OMRI-listed. ²

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Remarks ²
	-	SuffOil-X Sun Spray 98.8% others (oil, insecticidal)	1–2 gal/100 gal	4	0	SuffOil-X OMRI-listed. ²
	-	Trilogy (extract of neem oil)	1.0%–2.0% v/v	4	0	Apply morning or evening to reduce potential for leaf burn. OMRI-listed. ²
Beetles (includes cucumber beetle, flea beetles) and weevils	1A	Sevin 4F, XLR Plus (carbaryl)	0.5–1.0 qt	12	7	Maximum of 6 qt/acre per year.
	1B	Malathion 8F (malathion)	1.0 pt	12	7	Maximum of 3 applications per year. Flea beetles only.
	3A	*Asana XL (esfenvalerate)	5.8–9.6 fl oz	12	7	Do not apply more than 0.1 lb a.i./A (19.2 oz) per season.
	3A	*Baythroid XL (beta-cyfluthrin)	1.6–2.8 fl oz	12	0	Do not consume tops. Maximum of 14.0 fl oz/A per season.
	3A	*Brigade 2EC (bifenthrin)	5.12–6.4 fl oz	12	21	Do not apply more than 0.5 lb a.i./A per season.
	3A	*Fastac CS (alpha-cypermethrin)	1.8–3.8 fl oz	12	1	Maximum of 11.4 fl oz/A per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	1.76–4.0 fl oz	12	1	Maximum of 24 fl oz/A per season.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–15.6 fl oz	12	0	Pyrethrins degrade rapidly in sunlight. OMRI-listed. ²
	3A + -	BotaniGard Maxx (pyrethrins + <i>Beauveria bassiana</i> strain GHA)	Ground: 0.25–2.00 qt Aerial: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
	4A	Actara (thiamethoxam)	1.5–3.0 oz	12	7	Maximum of 4 oz/A per year. Flea beetles only.
	4A	Admire Pro (imidacloprid)	1.2 fl oz	12	7	Maximum of 1.2 fl oz/A per year.
	4A	Platinum 75 SG (thiamethoxam)	1.7–2.17 oz	12	At planting	Do not exceed 2.17 oz/A per crop.
	5	Entrust SC (spinosad)	3–6 fl oz	4	3	3 applications per year. No more than 18 fl oz/A per crop. OMRI-listed. ²
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 if needed	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	Does not kill adult insects. IGR and feeding repellent. OMRI-listed. ²
Caterpillars (includes cutworms, armyworms, corn earworm, hornworm, loopers, webworms, saltmarsh caterpillar)	1A	*Lannate SP, *LV (methomyl)	SP: 0.5 lb LV: 1.5 pt	48	3	SLN [24(c)] label for Florida.
	1A	Sevin 4F, XLR Plus (carbaryl)	1–2 qt	12	7	Maximum of 6 qt/A year.
	1B	*Diazinon AG-500 *Diazinon 50W (diazinon)	AG500: 2–4 qt 50W: 4–8 lb	72	preplant	No more than 1 application per year.
	3A	*Asana XL (esfenvalerate)	5.8–9.6 fl oz	12	7	Do not apply more than 0.1 lb a.i./A (19.2 oz/A) per season.
	3A	*Baythroid XL (beta-cyfluthrin)	1.6–2.8 fl oz	12	0	Do not consume tops. Maximum of 14.0 fl oz/A per season.
	3A	*Brigade 2EC (bifenthrin)	5.12–6.4 fl oz	12	21	Do not apply more than 0.5 lb a.i./A per season.

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Remarks ²
	3A	*Mustang Maxx (zeta-cypermethrin)	1.28–4.0 fl oz	12	1	Maximum of 24 fl oz/A per season.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–15.6 fl oz	12	0	Pyrethrins degrade rapidly in sunlight. OMRI-listed. ²
	3A + -	BotaniGard Maxx (pyrethrins + <i>Beauveria bassiana</i> strain GHA)	Ground: 0.25–2.00 qt Aerial: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
	5	Entrust SC (33pinosad)	3–6 fl oz	4	3	3 applications per year. No more than 18 fl oz/A per crop. OMRI-listed. ²
	5	Radiant SC (spinetoram)	Foliage harvest: 5–10 fl oz Root harvest: 6–8 fl oz	4	3	Maximum of 34 fl oz/A (foliage harvest) or 24 fl oz/A (root harvest) per year.
	11A	Agree WG (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5–2.0 lb	4	0	Apply when larvae are small for best control. OMRI-listed. ²
	11A	Biobit HP (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb	4	0	Treat when larvae are young. Good coverage is essential. Can be used in the greenhouse. Can be used in organic production.
	11A	Crymax WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb	4	0	Use high rate for armyworms. Treat when larvae are young. Not for organic production.
	11A	Deliver (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25–1.5 lb	4	0	Use higher rates for armyworms. OMRI-listed. ²
	11A	DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb	4	0	Treat when larvae are young. Good coverage is essential. Can be used in organic production.
	11A	Javelin WG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.12–1.5 lb	4	0	Treat when larvae are young. Thorough coverage is essential. OMRI-listed. ²
	11A	Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5–2.0 lb	4	0	Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic production.
	18	Intrepid 2F (methoxyfenozide)	Leaves: 4–16 fl oz Roots: 8–16 fl oz	4	Leaves: 1 Roots: 14	Do not apply more than 64 fl oz/A season.
	28	Coragen (chlorantraniliprole)	3.5–7.5 fl oz	4	1	Maximum of 15.4 fl oz/A, or 4 applications, or 0.2 lb a.i./A chlorantraniliprole per crop.
	28	Exirel (cyantraniliprole)	10.0–20.5 fl oz	12	1	Maximum of 0.4 lb a.i./A per year of cyantraniliprole, including all application types. For best performance, use an adjuvant.
	28	Vantacor (chlorantraniliprole)	1.2–2.5 fl oz	4	1	Maximum of 5.1 fl oz/A, or 4 applications, or 0.2 lb a.i./A chlorantraniliprole per crop.
	28	Verimark (cyantraniliprole)	10–13.5 fl oz	4	At planting	Maximum of 0.4 lb a.i./A per year of cyantraniliprole, including all application types.
	32	Spear-Lep (GS-omega/kappa-Hvtx-Hv1a)	1–2 pt	4	0	Must be tank-mixed with a <i>Bacillus thuringiensis</i> (Bt) product. Maximum of 10 gal/A per year.

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Remarks ²
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 if needed	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
	-	Grandevo (<i>Chromobacterium subtsugae</i> strain PRAA4-1)	1–3 lb	4	0	OMRI-listed. ²
	-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed. ²
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	Does not kill adult insects. IGR and feeding repellent. OMRI-listed. ²
Fire ants	3A	*Brigade 2EC (bifenthrin)	5.12–6.4 fl oz	12	21	Do not apply more than 0.5 lb a.i./A per season.
	7A	Extinguish (S-methoprene)	1–1.5 lb	4	0	Slow-acting IGR. Best applied early spring and fall where crop will be grown. Colonies will be reduced after 3 weeks and eliminated after 8–10 weeks. May be applied by ground equipment or aerially.
Grasshoppers, mole crickets	1B	*Diazinon AG-500 *Diazinon 50W (diazinon)	AG500: 1 qt 50W: 2 lb	72	Preplant	No more than 1 application per year.
	3A	*Mustang Maxx (zeta-cypermethrin)	3.2–4.0 fl oz	12	1	Maximum of 24 fl oz/A per season.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–15.6 fl oz	12	0	Pyrethrins degrade rapidly in sunlight. OMRI-listed. ²
	3A + -	BotaniGard Maxx (pyrethrins + <i>Beauveria bassiana</i> strain GHA)	Ground: 0.25–2.00 qt Aerial: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
Leafhoppers	1A	Sevin 4F, XLR Plus (carbaryl)	0.5–1.0 qt	12	7	Maximum of 6 qt/acre per year.
	1B	Malathion 8F (malathion)	1.0 pt	12	7	Maximum of 3 applications per year.
	3A	*Baythroid XL (beta-cyfluthrin)	1.6–2.8 fl oz	12	0	Do not consume tops. Maximum of 14.0 fl oz/A per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	1.76–4.0 fl oz	12	1	Maximum of 24 fl oz/A per season.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–15.6 fl oz	12	0	Pyrethrins degrade rapidly in sunlight. OMRI-listed. ²
	3A + -	BotaniGard Maxx (pyrethrins + <i>Beauveria bassiana</i> strain GHA)	Ground: 0.25–2.00 qt Aerial: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
	4A	Actara (thiamethoxam)	1.5–3.0 oz	12	7	Maximum of 4 oz/A per year.
	4A	Admire Pro (imidacloprid)	Foliar: 1.2 fl oz Soil: 4.4–10.5 fl oz	12	Foliar: 7 Soil: 21	Maximum of 1.2 fl oz/A (foliar) or 10.5 fl oz/A (soil) per year.
	4A	Platinum 75 SG (thiamethoxam)	1.7–2.17 oz	12	At planting	Do not exceed 2.17 oz/A per crop.
	4C	Transform WG (sulfoxaflor)	1.5–2.75 oz	24	7	Maximum of 8.5 oz/A per year.

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Remarks ²
	4D	Sivanto Prime (flupyradifurone)	7–14 fl oz	4	7	Maximum of 28 fl oz/A per year.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 if needed	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
	-	Grandevo (<i>Chromobacterium subtsugae</i> strain PRAA4-1)	1–3 lb	4	0	OMRI-listed. ²
	-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed. ²
	-	M-Pede (potassium salts of fatty acids)	1%–2% v/v	12	0	OMRI-listed. ²
	-	SuffOil-X Sun Spray 98.8% others (oil, insecticidal)	1–2 gal/100 gal	4	0	SuffOil-X OMRI-listed. ²
Leafminers	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–15.6 fl oz	12	0	Pyrethrins degrade rapidly in sunlight. OMRI-listed. ²
	3A + -	BotaniGard Maxx (pyrethrins + <i>Beauveria bassiana</i> strain GHA)	Ground: 0.25–2.00 qt Aerial: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank-mix with some fungicides. May not be compatible with adjuvants.
	5	Entrust SC (spinosad)	3–6 fl oz	4	3	3 applications per year. No more than 18 fl oz/A per crop. OMRI-listed. ²
	5	Radiant SC (spinetoram)	Foliage harvest: 6–10 fl oz Root harvest: 6–8 fl oz	4	3	Maximum of 34 fl oz/A (foliage harvest) or 24 fl oz/A (root harvest) per year.
	-	Aza-Direct (azadirachtin)	1-2 pt, up to 3.5 if needed	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	Does not kill adult insects. IGR and feeding repellent. OMRI-listed. ²
	-	Sun Spray 98.8%, others (oil, insecticidal)	1–2 gal/100 gal	4	0	
Mites: carmine spider mite, two-spotted spider mite	3A	*Brigade 2EC (bifenthrin)	5.12–6.4 fl oz	12	21	Do not apply more than 0.5 lb a.i./A per season.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–15.6 fl oz	12	0	Pyrethrins degrade rapidly in sunlight. OMRI-listed. ²
	3A + -	BotaniGard Maxx (pyrethrins + <i>Beauveria bassiana</i> strain GHA)	Ground: 0.25–2.00 qt Aerial: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 if needed	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
	-	M-Pede (potassium salts of fatty acids)	1%–2% v/v	12	0	OMRI-listed. ²

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Remarks ²
	-	SuffOil-X Sun Spray 98.8% others (oil, insecticidal)	1–2 gal/100 gal	4	0	SuffOil-X OMRI-listed. ²
	-	Trilogy (extract of neem oil)	1.0%–2.0% v/v	4	0	Apply morning or evening to reduce potential for leaf burn. OMRI-listed. ²
Stink bugs, plant bugs, meadow spittlebug	1A	Sevin 4F, XLR Plus (carbaryl)	1–2 qt	12	7	Maximum of 6 qt/acre per year.
	3A	*Fastac CS (alpha-cypermethrin)	3.2–3.8 fl oz	12	1	Maximum of 11.4 fl oz/A per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	3.2–4.0 fl oz	12	1	Maximum of 24 fl oz/A per season.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–15.6 fl oz	12	0	Pyrethrins degrade rapidly in sunlight. OMRI-listed. ²
	3A + -	BotaniGard Maxx (pyrethrins + <i>Beauveria bassiana</i> strain GHA)	Ground: 0.25–2.00 qt Aerial: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 if needed	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
Thrips (check label for species controlled)	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–15.6 fl oz	12	0	Pyrethrins degrade rapidly in sunlight. OMRI-listed. ²
	3A + -	BotaniGard Maxx (pyrethrins + <i>Beauveria bassiana</i> strain GHA)	Ground: 0.25–2.00 qt Aerial: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank-mix with some fungicides. May not be compatible with adjuvants.
	4A	Admire Pro (imidacloprid)	4.4–10.5 fl oz	12	Soil: 21	Maximum of 10.5 fl oz/A (soil) per year.
	5	Entrust SC (spinosad)	3–6 fl oz	4	3	3 applications per year. No more than 18 fl oz/A per crop. OMRI-listed. ²
	5	Radiant SC (spinetoram)	Foliage harvest: 6–10 fl oz Root harvest: 6–8 fl oz	4	3	Maximum of 34 fl oz/A (foliage harvest) or 24 fl oz/A (root harvest) per year.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 if needed	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
	-	BotaniGard ES BoteGHA ES Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 qt	4	0	Apply in sufficient water to cover foliage, typically 5–100 gal/A. Compatible in tank mix with some fungicides. Mycotrol ESO OMRI-listed. ²
	-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed. ²
	-	M-Pede (potassium salts of fatty acids)	1%–2% v/v	12	0	OMRI-listed. ²
	-	SuffOil-X Sun Spray 98.8% others (oil, insecticidal)	1–2 gal/100 gal	4	0	SuffOil-X OMRI-listed. ²

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Remarks ²
	-	Trilogy (extract of neem oil)	1.0%–2.0% v/v	4	0	Apply morning or evening to reduce potential for leaf burn. OMRI-listed. ²
Whiteflies	3A	*Brigade 2EC (bifenthrin)	5.12–6.4 fl oz	12	21	Do not apply more than 0.5 lb a.i./A per season.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–15.6 fl oz	12	0	Pyrethrins degrade rapidly in sunlight. OMRI-listed. ²
	3A + -	BotaniGard Maxx (pyrethrins + <i>Beauveria bassiana</i> strain GHA)	Ground: 0.25–2.00 qt Aerial: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank-mix with some fungicides. May not be compatible with adjuvants.
	4A	Actara (thiamethoxam)	3.0–4.0 oz	12	7	Maximum of 4 oz/A per year.
	4A	Admire Pro (imidacloprid)	Foliar: 1.2 fl oz Soil: 4.4–10.5 fl oz	12	Foliar: 7 Soil: 21	Maximum of 1.2 fl oz/A (foliar) or 10.5 fl oz/A (soil) per year.
	4A	Platinum 75 SG (thiamethoxam)	1.7–2.17 oz	12	At planting	Do not exceed 2.17 oz/A per crop.
	4C	Transform WG (sulfoxaflor)	2–2.75 oz	24	7	Maximum of 8.5 oz/A per year.
	4D	Sivanto Prime (flupyradifurone)	10.5–14.0 fl oz	4	7	Maximum of 28 fl oz/A per year.
	29	Beleaf 50 SG (flonicamid)	2.8 oz	12	3	Maximum of 8.4 oz/A per season.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 if needed	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
	-	BotaniGard ES BoteGHA ES Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 qt	4	0	Apply in sufficient water to cover foliage, typically 5–100 gal/A. Compatible in tank-mix with some fungicides. Mycotrol ESO OMRI-listed. ²
	-	Grandevo (<i>Chromobacterium subtsugae</i> strain PRAA4-1)	1–3 lb	4	0	OMRI-listed. ²
	-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed. ²
	-	M-Pede (potassium salts of fatty acids)	1%–2% v/v	12	0	OMRI-listed. ²
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	Does not kill adult insects. IGR and feeding repellent. OMRI-listed. ²
	-	SuffOil-X Sun Spray 98.8% others (oil, insecticidal)	1–2 gal/100 gal	4	0	SuffOil-X OMRI-listed. ²
	-	Trilogy (extract of neem oil)	1.0%–2.0% v/v	4	0	Apply morning or evening to reduce potential for leaf burn. OMRI-listed. ²
Wireworms	1B	*Diazinon AG-500 *Diazinon 50 W (diazinon)	AG500: 2–4 qt 50W: 4–8 lb	72	preplant	Maximum of 1 application per year.

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Remarks ²
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. 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 a 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 10. Insecticides labeled for management of arthropod pests of sweetpotato. Contact: Julien Beuzelin, UF/IFAS Everglades Research and Education Center.

Insects	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes ²
Labels change frequently. Be sure to read a current product label before applying any chemical. Please refer to chapter 19 for information on biopesticides, including materials labeled for certified organic production.						
Aphids	3A	*Fastac CS (alpha-cypermethrin)	3.2–3.8 fl oz	12	1	Maximum of 11.4 fl oz/A per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	3.2–4.0 fl oz	12	1	Maximum of 24 fl oz/A per season. Leaves cannot be used for food or feed.
	3A	*Warrior II (lambda-cyhalothrin)	1.28–1.92 fl oz	24	7	Maximum of 7.68 fl oz/A per crop. Many other brands with same active ingredient are available.
	3A + 28	*Besiege (lambda-cyhalothrin + chlorantraniliprole)	5–9 oz	24	14	Do not apply more than 27.0 fl oz/A per season.
	4A	Actara (thiamethoxam)	1.5–3.0 oz	12	14	Do not use after Platinum.
	4A	Admire Pro (imidacloprid)	Soil: 4.4–10.5 fl oz Foliar: 1.2 fl oz	12	Soil: 125 Foliar: 7	1 application to soil per season. If using as a foliar spray, no more than 3.7 fl oz/A per season.
	4A	Assail 30SG (acetamiprid)	1.5–4.0 oz	12	7	Whiteflies not on label for sweetpotatoes but are for other crops on label. No more than 4 applications per season.
	4A	Belay (clothianidin)	In-furrow or side-dress: 9–12 fl oz Foliar: 2–3 fl oz	12	Foliar: 14	In-furrow or side-dress application, including chemigation up to 50% ground cover. Do not apply more than 12 fl oz/A per year.
	4A	Platinum 75SG (thiamethoxam)	1.66–2.67 oz	12	Applied at planting	To manage resistance, avoid using other Group 4A insecticides in conjunction with Platinum.
	4C	Transform WG (sulfoxaflor)	Leaf production: 0.75–1.0 oz Root production: 0.75–1.5 oz	24	7	Maximum of 8.5 oz/A per year.
	4D	Sivanto Prime (flupyradifurone)	7–14 fl oz	4	7	Minimum interval between applications = 7 days. Maximum allowed per year = 28 fl oz/A.

Insects	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes ²
	9B	Fulfill (pymetrozine)	2.75–5.5 oz	12	14	Allow a minimum of 7 days between applications. Do not exceed 11 oz/A per season.
	9B	PQZ (pyrifluquinazon)	2.4–3.2 fl oz	12	7	7 days before reapplication. Maximum of 9.6 fl oz rate per season.
	23	Movento (spirotetramat)	4.0–5.0 fl oz	24	7	Maximum of 10 fl oz/A per season.
	28	Verimark (cyantraniliprole)	6.75–13.5 fl oz	4	At planting	Maximum of 0.4 lb a.i./A per year of cyantraniliprole, including all application types.
	29	Beleaf 50 SG (flonicamid)	2.0–2.8 oz	12	7	Do not apply more than 8.4 oz/A per season.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt if needed	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
	-	BotaniGard ES BoteGHA ES Mycotrol 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. Compatible in tank mix with some fungicides. Mycotrol ESO OMRI-listed. ²
	-	Grandevo (<i>Chromobacterium subtsugae</i> strain PRAA4-1)	1–3 lb	4	0	OMRI-listed. ²
	-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed. ² Antifeedant, repellent, IGR.
	-	M-Pede (potassium salts of fatty acids)	1%–2% v/v	12	0	OMRI-listed. ²
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	Does not kill adult insects. IGR and feeding repellent. OMRI-listed. ²
	-	SuffOil-X (oil, insecticidal)	1%–2% v/v	4	0	OMRI-listed. ²
	-	Trilogy (extract of neem oil)	0.5%–2.0% v/v	4	0	Apply morning or evening to reduce potential for leaf burn. OMRI-listed. ²
Beetles (including cucumber beetle, Japanese beetle, tortoise beetle, flea beetle, whitefringed beetle)	1A	Sevin 80S; XLR; 4F (carbaryl)	80S: 1.25–2.5 lb XLR, 4F: 1–2 qt	12	7	Do not apply more than 10 lb/A (80S) per crop or 8 qt (4F, XLR). See label for preplant dip treatment.
	1B	Imidan 70 W (phosmet)	1.3 lb	Seedbed treatment: 4 days Foliar: 5 days	7	No more than 5 applications per season. Do not apply through irrigation system. Crop must be mechanically harvested.
	1B	*Mocap 15 G, *EC (ethoprop)	See labels	48	Preplant	2–3 weeks before planting.
	3A	*Baythroid XL (beta-cyfluthrin)	0.8–2.8 fl oz	12	0	No more than 16.8 fl oz/A per season.

Insects	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes ²
	3A	*Brigade 2 EC (bifenthrin)	Soil: At plant: 9.6–19.2 oz At lay-by: 3.2–9.6 oz Foliar: 2.1–6.4 oz	12	21	No more than 2 foliar applications, at least 21 days apart. Do not apply more than 0.5 lb a.i./A per season, including soil applications.
	3A	*Fastac CS (alpha-cypermethrin)	1.8–3.8 fl oz	12	1	Maximum of 11.4 fl oz/A per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	1.76–4.0 fl oz	12	1	Maximum of 24 fl oz/A per season. Leaves cannot be used for food or feed.
	3A	*Warrior II (lambda-cyhalothrin)	0.96–1.92 fl oz	24	7	Maximum of 7.68 fl oz/A per crop. Many other brands with same active ingredient are available.
	3A + 4A	*Endigo ZC (lambda-cyhalothrin + thiamethoxam)	3.5–4.5 fl oz	24	14	Do not exceed a total of 10 fl oz/A per growing season. Do not use with other Group 4A insecticides.
	3A + 28	*Besiege (lambda-cyhalothrin + chlorantraniliprole)	5–9 oz	24	14	Do not apply more than 27.0 fl oz/A per season. Supplemental label.
	4A	Actara (thiamethoxam)	1.5–3.0 oz	12	14	Do not use after Platinum.
	4A	Admire Pro (imidacloprid)	Soil: 4.4–10.5 fl oz Foliar: 1.2 fl oz	12	Soil: 125 Foliar: 7	1 application to soil per season. If using as a foliar spray, no more than 3.7 fl oz/A per season. Flea beetles only.
	4A	Assail 30SG (acetamiprid)	1.5–4.0 oz	12	7	Whiteflies not on label for sweetpotatoes but are for other crops on label. No more than 4 applications per season.
	4A	Belay Insecticide (clothianidin)	In-furrow or side-dress: 9–12 fl oz Foliar: 2–3 fl oz	12	Foliar: 14	In-furrow or side-dress application, including chemigation up to 50% ground cover. Do not apply more than 12 fl oz/A per year. Flea beetles only.
	4A	Platinum 75SG (thiamethoxam)	1.66–2.67 oz	12	Applied at planting	To manage resistance, avoid using other Group 4A insecticides in conjunction with Platinum. Flea beetles only.
	4A	Scorpion 35 SL (dinotefuran)	Foliar: 2.0–2.75 fl oz Soil: 11.5–13.25 fl oz	12	Foliar: 7 Soil: apply preplant, preemergence or at ground crack	Do not apply more than 8 fl oz/A per season as foliar sprays or more than 13.25 fl oz as a soil application. Flea beetles only.
	4A + 28	Voliam Flexi (thiamethoxam + chlorantraniliprole)	4 oz	12	14	Do not exceed a total of 8 oz/A per season.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt if needed	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	OMRI-listed. ²

Insects	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes ²
Caterpillars (including armyworms, loopers, corn earworms, hornworms, webworms, saltmarsh caterpillars)	1A	Sevin 80S; XLR; 4F (carbaryl)	80S: 1.25–2.5 lb XLR, 4F: 1–2 qt	12	7	Do not apply more than 10 lb/A (80S) per crop or 8 qt (4F, XLR). See label for preplant dip treatment.
	3A	*Baythroid XL (beta-cyfluthrin)	0.8–2.8 fl oz	12	0	No more than 16.8 fl oz/A per season.
	3A	*Brigade 2 EC (bifenthrin)	Soil: At plant: 9.6–19.2 oz At lay-by: 3.2–9.6 oz Foliar: 2.1–6.4 oz	12	21	No more than 2 foliar applications, at least 21 days apart. Do not apply more than 0.5 lb a.i./A per season, including soil applications.
	3A	*Fastac CS (alpha-cypermethrin)	1.8–3.8 fl oz	12	1	Maximum of 11.4 fl oz/A per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	1.76–4.0 fl oz	12	1	Maximum of 24 fl oz/A per season. Leaves cannot be used for food or feed.
	3A	*Warrior II (lambda-cyhalothrin)	0.96–1.92 fl oz	24	7	Maximum of 7.68 fl oz/A per crop. Many other brands with same active ingredient are available.
	3A + 28	*Besiege (lambda-cyhalothrin + chlorantraniliprole)	5–9 oz	24	14	Do not apply more than 27.0 fl oz/A per season. Supplemental label.
	5	Entrust SC (spinosad)	4.5–10 fl oz	4	7	Do not make applications less than 7 days apart or apply more than 4 times per crop. Do not apply more than 21 fl oz/A per crop. OMRI-listed. ²
	5	Radiant SC (spinetoram)	6–8 fl oz	4	7	Do not make more than 4 applications per year.
	11A	DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb	4	0	Treat when larvae are young. Good coverage is essential. Can be used in organic production.
	11A	Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5–2.0 lb	4	0	Caterpillars only. Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic production.
	15	Rimon 0.83 EC (novaluron)	6–12 fl oz	12	14	Do not apply more than 24 oz/A per season. Limited to 2 applications for whiteflies (12 oz rate).
	18	Intrepid 2F (methoxyfenozide)	6–10 fl oz	4	7	Do not apply more than 64 fl oz/A per year or apply more often than every 14 days.
	22	Avaunt eVo (indoxacarb)	2.5–6.0 oz	12	7	Do not apply more than 24 oz/A per crop.
	28	Coragen (chlorantraniliprole)	3.5–7.5 fl oz	4	1	Maximum of 15.4 fl oz/A, or 4 applications, or 0.2 lb a.i./A chlorantraniliprole per crop.
	28	Exirel (cyantraniliprole)	10–20.5 fl oz	12	1	Maximum of 0.4 lb a.i./A per year of cyantraniliprole, including all application types.

Insects	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes ²
	28	Vantacor (chlorantraniliprole)	1.2–2.5 fl oz	4	1	Maximum of 5.1 fl oz/A, or 4 applications, or 0.2 lb a.i./A chlorantraniliprole per crop.
	28	Verimark (cyantraniliprole)	6.75–13.5 fl oz	4	At planting	Maximum of 0.4 lb a.i./A per year of cyantraniliprole, including all application types.
	32	Spear-Lep (GS-omega/kappa-Hxtx-Hv1a)	1–2 pt	4	0	Must be tank-mixed with a <i>Bacillus thuringiensis</i> (Bt) product. Maximum of 10 gal/A per year.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt if needed	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
	-	Grandevo (<i>Chromobacterium subtsugae</i> strain PRAA4-1)	1–3 lb	4	0	OMRI-listed. ²
	-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed. ² Antifeedant, repellent, IGR.
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	Does not kill adult insects. IGR and feeding repellent. OMRI-listed. ²
Fire ants	7A	Extinguish (S-methoprene)	1.0–1.5 lb	4	0	Slow-acting IGR. Best applied early spring and fall where crop will be grown. Colonies will be reduced after three weeks and eliminated after 8–10 weeks.
	7D	Esteem Ant Bait (pyriproxyfen)	1.5–2.0 lb	12	1	Do not exceed a total of 0.109 lb/A of pyriproxyfen (all formulations, e.g., Knack IGR). Ant Bait contains 0.5% a.i., or 0.10 lb at 2-lb rate.
Leafhoppers	1B	Malathion 5 EC (malathion)	5EC: 1.5–2.5 pt 8F: 1–1.5 pt	12	5EC: 0 8F: 3	Maximum of 2 applications per year.
	3A	*Baythroid XL (beta-cyfluthrin)	0.8–2.8 fl oz	12	0	No more than 16.8 fl oz/A per season.
	3A	*Fastac CS (alpha-cypermethrin)	1.8–3.8 fl oz	12	1	Maximum of 11.4 fl oz/A per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	1.76–4.0 fl oz	12	1	Maximum of 24 fl oz/A per season. Leaves cannot be used for food or feed.
	3A	*Warrior II (lambda-cyhalothrin)	0.96–1.92 fl oz	24	7	Do not apply more than 7.68 fl oz/A per season.
	3A + 4A	*Endigo ZC (lambda-cyhalothrin + thiamethoxam)	3.5–4.5 fl oz	24	14	Do not exceed a total of 10 fl oz/A of product per growing season. Do not use with other Group 4A insecticides.
	3A + 28	*Besiege (lambda-cyhalothrin + chlorantraniliprole)	5–9 oz	24	14	Do not apply more than 27.0 fl oz/A of product per season. Supplemental label.
	4A	Admire Pro (imidacloprid)	Soil: 4.4–10.5 fl oz Foliar: 1.2 fl oz	12	Soil: 125 Foliar: 7	1 application to soil per season. If using as a foliar spray, no more than 3.7 fl oz/A per season.

Insects	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes ²
	4A	Assail 30SG (acetamiprid)	1.5–4.0 oz	12	7	Whiteflies not on label for sweetpotatoes but are for other crops on label. No more than 4 applications per season.
	4A	Platinum 75SG (thiamethoxam)	1.66–2.67 oz	12	Applied at planting	To manage resistance, avoid using other Group 4A insecticides in conjunction with Platinum.
	4A	Scorpion 35 SL (dinotefuran)	Foliar: 2.0–2.75 fl oz Soil: 11.5–13.25 fl oz	12	Foliar: 7 Soil: apply preplant, preemergence, or at ground crack	Do not apply more than 8 fl oz/A per season as foliar sprays, or more than 13.25 fl oz as a soil application.
	4A + 28	Voliam Flexi (thiamethoxam + chlorantraniliprole)	4 oz	12	14	Do not exceed a total of 8 oz/A of product per season.
	4C	Transform WG (sulfoxaflor)	1.5–2.75 oz	24	7	Maximum of 8.5 oz/A per year.
	4D	Sivanto Prime (flupyradifurone)	7–14 fl oz	4	7	Minimum interval between applications = 7 days. Maximum allowed per year = 28 fl oz per acre.
	23	Movento (spirotetramat)	4.0–5.0 fl oz	24	7	Maximum of 10 fl oz/A per season.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt if needed	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
	-	Grandevo (<i>Chromobacterium subtsugae</i> strain PRAA4-1)	1–3 lb	4	0	OMRI-listed. ²
	-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed. ² Antifeedant, repellent, IGR.
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	Does not kill adult insects. IGR and feeding repellent. OMRI-listed. ²
	-	SuffOil-X (oil, insecticidal)	1%–2% v/v	4	0	OMRI-listed. ²
Leafminers	1B	Malathion 5 EC (malathion)	5EC: 1.5–2.5pt 8F: 1–1.5 pt	12	5EC: 0 8F: 3	Maximum of 2 applications per year.
	4A	Actara (thiamethoxam)	1.5–3.0 oz	12	14	Do not use after Platinum.
	5	Entrust SC (spinosad)	4.5–10 fl oz	4	7	Do not make applications less than 7 days apart or apply more than 4 times per crop. Do not apply more than 21 fl oz/A per crop. OMRI-listed. ²
	5	Radiant SC (spinetoram)	6–8 fl oz	4	7	Do not make more than 4 applications per year.
	6	*Agri-Mek SC (abamectin)	1.75–3.5 fl oz	12	14	Must be used with a nonionic activator-type wetting, spreading, and/or penetrating adjuvant, not a binder-sticker-type adjuvant.

Insects	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes ²
	15	Rimon 0.83 EC (novaluron)	6–12 fl oz	12	14	Do not apply more than 24 oz/A per season. Limited to 2 applications for whiteflies (12 oz rate).
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt if needed	4	0	Antifeedant, repellent, IGR. OMRI-listed ² .
	-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed ² . Antifeedant, repellent, IGR.
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	Does not kill adult insects. IGR and feeding repellent. OMRI-listed ² .
	-	Oil, insecticidal	1–2 gal/100 gal	12	0	No residual. Good coverage needed.
Mites	6	*Agri-Mek SC (abamectin)	1.75–3.5 fl oz	12	14	Must be used with a nonionic activator-type wetting, spreading, and/or penetrating adjuvant, not a binder-sticker-type adjuvant.
	23	Oberon 2SC (spiromesifen)	8–16 fl oz	12	7	Maximum amount per crop: 32 oz/A. No more than 2 applications.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt if needed	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
	-	Oil, insecticidal	1–2 gal/100 gal	12	0	No residual. Good coverage needed.
	-	SuffOil-X (oil, insecticidal)	1%–2% v/v	4	0	OMRI-listed. ²
	-	Trilogy (extract of neem oil)	0.5%–2.0% v/v	4	0	Apply morning or evening to reduce potential for leaf burn. OMRI-listed. ²
Stink bugs, plant bugs	3A	*Fastac CS (alpha-cypermethrin)	3.2–3.8 fl oz	12	1	Maximum of 11.4 fl oz/A per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	3.2–4.0 fl oz	12	1	Maximum of 24 fl oz/A per season. Leaves cannot be used for food or feed.
	3A	*Warrior II (lambda-cyhalothrin)	0.96–1.92 fl oz	24	7	Maximum of 7.68 fl oz/A per crop. Many other brands with same active ingredient are available.
	3A + 4A	*Endigo ZC (lambda-cyhalothrin + thiamethoxam)	3.5–4.5 fl oz	24	14	Do not exceed a total of 10 fl oz/A of product per growing season. Do not use with other Group 4A insecticides.
	3A + 28	*Besiege (lambda-cyhalothrin + chlorantraniliprole)	5–9 oz	24	14	Do not apply more than 27.0 fl oz/A of product per season. Supplemental label.
	29	Beleaf 50 SG (flonicamid)	2.0–2.8 oz	12	7	Do not apply more than 8.4 oz/A per season.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt if needed	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²

Insects	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes ²
Sweetpotato weevil	1B	Imidan 70 W (phosmet)	1.3 lb	Seedbed treatment: 4 days Foliar: 5 days	7	No more than 5 applications per season. Do not apply through irrigation system. Crop must be mechanically harvested.
	3A	*Baythroid XL (beta-cyfluthrin)	0.8–2.8 fl oz	12	0	No more than 16.8 fl oz/A per season. Adults only.
	4A	Belay Insecticide (clothianidin)	9–12 fl oz			In-furrow or side dressing.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt if needed	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	Does not kill adult insects. IGR and feeding repellent. OMRI-listed. ²
Thrips (check label for species controlled)	5	Entrust SC (spinosad)	4.5–10 fl oz	4	7	Do not make applications less than 7 days apart or apply more than 4 times per crop. Do not apply more than 21 fl oz/A per crop. OMRI-listed. ²
	5	Radiant SC (spinetoram)	6–8 fl oz	4	7	Do not make more than 4 applications per year.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt if needed	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
	-	BotaniGard ES BoteGHA ES Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 qt	4	0	Apply in sufficient water to cover foliage, typically 5–100 gal/A. Compatible in tank mix with some fungicides. Mycotrol ESO OMRI-listed. ²
	-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed. ² Antifeedant, repellent, IGR.
	-	SuffOil-X (oil, insecticidal)	1%–2% v/v	4	0	OMRI-listed. ²
	-	Trilogy (extract of neem oil)	0.5%–2.0% v/v	4	0	Apply morning or evening to reduce potential for leaf burn. OMRI-listed. ²
Whitefly	1B	Malathion 5 EC (malathion)	5EC: 1.5–2.5 pt 8F: 1–1.5 pt	12	5EC: 0 8F: 3	Maximum of 2 applications per year. Tank-mix with pyrethroid for best control.
	3A	*Brigade 2 EC (bifenthrin)	2.1–6.4 oz	12	21	Foliar only. No more than 2 foliar applications, at least 21 days apart. Do not apply more than 0.5 lb a.i./A per season, including soil applications. Tank-mix with Malathion for best control.
	3A	*Warrior II (lambda-cyhalothrin)	2.1–6.4 oz	24	7	Do not apply more than 7.68 fl oz/A per season. Tank-mix with Malathion for best control.
	3A + 4A	*Endigo ZC (lambda-cyhalothrin + thiamethoxam)	3.5–4.5 fl oz	24	14	Do not exceed a total of 10 fl oz/A per growing season. Do not use with other Group 4A insecticides.
	4A	Admire Pro (imidacloprid)	Soil: 4.4–10.5 fl oz Foliar: 1.2 fl oz	12	Soil: 125 Foliar: 7	1 application to soil per season. If using as a foliar spray, no more than 3.7 fl oz/A per season.

Insects	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes ²
	4A	Assail 30SG (acetamiprid)	1.5–4.0 oz	12	7	Whiteflies not on label for sweetpotatoes but are for other crops on label. No more than 4 applications per season.
	4C	Transform WG (sulfoxaflor)	2–2.75 oz	24	7	Maximum of 8.5 oz/A per year.
	4D	Sivanto Prime (flupyradifurone)	7–14 fl oz	4	7	Minimum interval between applications = 7 days. Maximum allowed per acre per year = 28 fl oz.
	15	Rimon 0.83 EC (novaluron)	6–12 fl oz	12	14	Do not apply more than 24 oz/A per season. Limited to two applications for whiteflies (12 oz rate).
	23	Movento (spirotetramat)	4.0–5.0 fl oz	24	7	Maximum of 10 fl oz/A per season.
	23	Oberon 2SC (spiromesifen)	8–16 fl oz	12	7	Maximum amount per crop: 32 oz/A. No more than 2 applications.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt if needed	4	0	Antifeedant, repellent, IGR. OMRI-listed. ²
	-	BotaniGard ES BoteGHA ES Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 qt	4	0	Apply in sufficient water to cover foliage, typically 5–100 gal/A. Compatible in tank mix with some fungicides. Mycotrol ESO OMRI-listed. ²
	-	Grandevo (<i>Chromobacterium subtsugae</i> strain PRAA4-1)	1–3 lb	4	0	OMRI-listed. ²
	-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed. ² Antifeedant, repellent, IGR.
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	Does not kill adult insects. IGR and feeding repellent. OMRI-listed. ²
	-	Oil, insecticidal	1–2 gal/100 gal	12	0	No residual. Good coverage needed.
	-	SuffOil-X (oil, insecticidal)	1%–2% v/v	4	0	OMRI-listed. ²
	-	Trilogy (extract of neem oil)	0.5%–2.0% v/v	4	0	Apply morning or evening to reduce potential for leaf burn. OMRI-listed. ²
Wireworms	1B	*Mocap 15 G, *EC (ethoprop)	See labels	48	Preplant	2–3 weeks before planting.
	3A	*Brigade 2 EC (bifenthrin)	Soil: At plant: 9.6–19.2 oz At lay-by: 3.2–9.6 oz	12	21	Do not apply more than 0.5 lb a.i./A per season, including soil applications.

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 a similar mode of action. This information must be considered for the insecticide resistance management decisions. - = unknown, or a mode of action that has not been classified yet.

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

***Restricted use insecticide.**

Table 11. Beet fungicides ordered by disease and then FRAC group according to their mode of action. Contact: Mathews Paret, UF/IFAS North Florida Research and Education Center.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Please refer to chapter 19 for information on biopesticides, including materials labeled for certified organic production.							
Alternaria Powdery mildew	7	Fontelis SC (penthiopyrad)	30 fl oz	61 fl oz	0	0.5	Apply no more than 2 sequential applications without alternating to dissimilar chemistry.
	7 + 11	Merivon (fluxapyroxad + pyraclostrobin)	5.5 fl oz	16.5 fl oz	7	0.5	Apply no more than 2 sequential applications without alternating to dissimilar chemistry.
	9 + 12	Switch 62.5WG (cyprodinil + fludioxonil)	14 oz	56 oz	7	0.5	See label for specifics regarding preplant incorporated applications and surface applications at the time of planting.
	19	OSO 5% SC (polyoxin D zinc salts)	13 fl oz	84 fl oz	0	4 hr	See label for details.
Cercospora	M1	(copper compounds) Many brands available: Americop 40 DF, Badge SC, Badge X2, Basic Copper 53, Champ DP, Champ Formula 2, Champ WG, Champ WP, COC DF, C-O-C-S WDG, COC WP, Copper Count N, Cueva, Cuprofix Ultra, Kentan DF, Kocide DF, Kocide 2000, Kocide 3000, Kocide 4.5 LF, Kop-hydroxide, Mastercop, Nordox 75 WG, Nu-Cop 3L, Nu-Cop 50WP, Nu-Cop DF, Nu-Cop HB, Top Cop w/Sulfur	SEE INDIVIDUAL LABELS		1	Varies by product from 4 hr to 2 days	
	M2	(sulfur) Many brands available: Kumulus DF, Micro Sulf, Microthiol Disperss, Sulfur 90W, Top Cop w/ Sulfur, Wettable Sulfur	SEE INDIVIDUAL LABELS		1	1	Do not apply during periods of warm weather. Do not apply within 2 weeks of an oil spray.
	3	(propiconazole) Many brands available: Bumper 41.8EC, Propiconazole 3.6 EC, Propicure 3.6 F, Propi-Star EC, Tilt	SEE INDIVIDUAL LABELS		7	0.5	Do not apply more than 4 applications per season.
	3	(tebuconazole) Many brands available: Folicur 3.6F, Monsoon, Onset 3.6L, Orius 3.6F, Tebusha 3.6L, Tebustar 3.6L, Tebuzol 3.6F, Toledo	7.2 fl oz	28.8 fl oz	7	0.5	Do not apply more than 4 applications per season.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	7	Fontelis (penthioopyrad)	30 fl oz	61 fl oz	0	0.5	Apply no more than 2 sequential applications without alternating to dissimilar chemistry.
	7 + 11	Merivon (fluxapyroxad + pyraclostrobin)	5.5 fl oz	16.5 fl oz	7	0.5	Apply no more than 2 sequential applications without alternating to dissimilar chemistry.
	11	Cabrio EG (pyraclostrobin)	16 oz	48 oz	0	0.5	Limit is 3 applications per crop and alternate chemistry.
	11	Flint Extra (trifloxystrobin)	3 oz	12 oz	7	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
	11	Gem 500SC (trifloxystrobin)	2.9 fl oz	11.6 fl oz	7	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
	11	Quadris (azoxystrobin)	15.4 fl oz	3.75 qt	0	4 hr	Alternate every other application with a fungicide of dissimilar mode of action.
	11	Reason (fenamidone)	8.2 fl oz	24.6 fl oz	2	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
Damping-off	M3	Defiant 75WP (thiram)	5.3 oz/100 lb of seed			1	Seed treatment only.
	M3	Signet (thiram)	5.0 oz/100 lb of seed			1	Seed treatment only.
Downy mildew	33	(mono- and dipotassium salts of phosphorous acids) Many brands available: Confine Xtra, Fosphite, Fungi-white, K-Phite 7LP, Oxiphos, Rampart	3 qt		0	4 hr	See label for details.
	43	Presidio (fluopicolide)	4 fl oz	12 fl oz	7	0.5	Do not exceed more than 2 sequential applications.
Pythium seedling blight	4	Apron XLS (mefenoxam)	0.64 fl oz/100 lb seed			2	Seed treatment only.
	4	(metalaxyl) Various brands available: Acquire, Allegiance FL, Dynashield, Metalaxyl 318 FS	0.75 fl oz/100 lb seed			0.5	Seed treatment only.
	4	Metastar 2E (metalaxyl)	8 pt			1	Apply as a broadcast soil application and incorporate into top 2 inches. See label for directions.
	4	Sebring (metalaxyl)	0.7 fl oz/100 lb seed			1	Seed treatment only.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
Pythium seedling diseases	4	Ridomil Gold EC (mefenoxam)	2 pt			2	Apply at seeding in a 7- to 12-inch band on soil over seed furrow.
	4	Ridomil Gold GR (mefenoxam)	40 lb			2	See label for specifics regarding preplant incorporated applications and surface applications at the time of planting.
	4	Ultra Flourish (mefenoxam)	4 pt			2	See label for specifics regarding preplant incorporated applications and surface applications at the time of planting.
Various seedling diseases	4 + 11	Uniform SC (mefenoxam + azoxystrobin)	0.34 fl oz/1000 ft of row	1 application		0	Soil incorporated.
	12	Maxim 4FS (fludioxonil)	0.16 fl oz/100 lb of seed			0.5	Seed treatment only.
	12	Spirato 480 FS (fludioxonil)	0.16 fl oz/100 lb of seed			0.5	Seed treatment only.
Various diseases	7 + 9	Luna Tranquility (fluopyram + pyrimethanil)	11.2 fl oz	54.7 fl oz	7	0.5	Do not make more than 2 sequential applications without rotating to a fungicide of dissimilar 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 a similar mode of action. This information must be considered for the fungicide resistance management decisions. U = unknown, or a mode of action that has not been classified yet and is typically associated with another number; P = host plant defense inducers. Source: FRAC Code List 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 12. Carrot fungicides ordered by disease and then FRAC group according to their mode of action. Contact: Mathews Paret, UF/IFAS North Florida Research and Education Center.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
Alternaria blight	M1	(copper compounds) Many labels available: Badge SC, Badge X2, Basic Copper 53, Champ, Champ DP, Champ Formula 2, Champ WG, COC DF, COCS WDG, COC WP, Copper Count N, Cueva, Cuprofix Ultra, Cuproxat, Kentan DF, Kocide, Kocide 2000, Kocide 3000, Kop-hydroxide, Mastercop, Nordox 75 WG, Nu-Cop, Nu-Cop 3L, Nu-Cop 50WP, Nu-Cop HB, Previsto, Stretch, Tenn-Cop 5E, Top Cop w/Sulfur	SEE INDIVIDUAL LABELS		1	Varies by product from 4 hr to 2 days	
			SEE INDIVIDUAL LABELS		7		0.5
	M5	(chlorothalonil) Many labels available: Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Chloronil 720, Chlorothalonil 720SC, Echo 720, Echo 90DF, Echo ZN, Equus 720SST, Equus DF, Initiate 720, Initiate ZN, Praiz	SEE INDIVIDUAL LABELS				
	M5 + 33	Catamaran (chlorothalonil + phosphite)	4 pt	50 pt	0	0.5	
	2	(iprodione) Many labels available: Enclosure 4F, Iprodione 4L AG, Meteor, Nevada 4F, Rovral 4F	2 pt	8 pt	0	1	
	3	(propiconazole) Many labels available: Amcide Propiconazole, Bumper 41.8EC, Fitness, Propicure, Propimax, Propi-Star EC, Shar-Shield PPZ, Tide Propiconazole, Tilt, Topaz, Willowood Azoxy	4 fl oz	16 fl oz	14	0.5	Do not exceed 4 total applications.
	3 + 9	Inspire Super (difenoconazole + cyprodinil)	20 fl oz	80 fl oz	7	0.5	Alternate with fungicides of dissimilar modes of action.
	4 + M5	Ridomil Gold Bravo (mefenoxam + chlorothalonil)	2 lb		7	2	
	4 + M5	Ridomil Gold Bravo SC (mefenoxam + chlorothalonil)	2.5 pt		7	2	
	7	Endura (boscalid)	7.8 oz	22.5 oz	0	0.5	Alternate with non-FRAC code 7 fungicide. See label for directions.
	7	Fontelis (penthiopyrad)	30 fl oz	61 fl oz	0	0.5	Alternate with non-FRAC code 7 fungicide. See label for directions.
7 + 11	Merivon (fluxapyroxad + pyraclostrobin)	5.5 fl oz	16.5 fl oz	7	0.5	Alternate with fungicides of dissimilar modes of action.	

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	9 + 12	Switch 62.5WDG (cyprodinil + fludioxonil)	14 oz	56 oz	7	0.5	
	11	Cabrio EG (pyraclostrobin)	12 oz	48 oz	0	0.5	Do not exceed 1 sequential and 4 total applications of Amistar or other Qol fungicides. See label for soil application.
	11 + M5	Quadris Opti (azoxystrobin + chlorothalonil)	2.4 pt	14.4 pt	0	0.5	Do not exceed 2 sequential and 6 total applications of Quadris Opti, and rotate with non-Qol fungicides.
	11 + 3	Quilt (azoxystrobin + propiconazole)	14 fl oz	55 fl oz	14	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
	11 + 3	Quilt XCEL (azoxystrobin + propiconazole)	14 fl oz	56 fl oz	14	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
Botrytis rot Sclerotinia white mold	7	Endura (boscalid)	7.8 oz	22.4 oz	0	0.5	See label for additional instructions.
	7 + 9	Luna Tranquility (fluopyram + pyrimethanil)	11.2 fl oz		7	0.5	See label for additional instructions.
	29	Omega (fluzinam)	1 pt		7	0.5	White mold only.
Cavity spot	M5	(chlorothalonil) Many labels available: Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Chloronil 720, Chlorothalonil 720SC, Echo 720, Echo 90DF, Echo ZN, Equus 720SST, Equus DF, Initiate 720, Initiate ZN	SEE INDIVIDUAL LABELS		7	0.5	
	4	Metastar 2E (metalaxy)	8 pt			2	Apply as a broadcast soil application and incorporate into top 2 inches. See label for directions.
	4	Ridomil Gold Ultra Flourish (mefenoxam)	2 pt		7	2	Apply at seeding in a 7- to 12-inch band on soil over seed furrow.
	4	Ridomil Gold SL (mefenoxam)	2 pt			2	See label for specifics regarding preplant incorporated applications and surface applications at the time of planting.
	4 + M1	Ridomil Gold Copper (mefenoxam + copper hydroxide)	2 lb	8 lb	7	2	
	4 + M5	Ridomil Gold Bravo (mefenoxam + chlorothalonil)	2 lb		7	2	
	4 + M5	Ridomil Gold Bravo SC (mefenoxam + chlorothalonil)	2.5 pt		7	2	
	11	Reason (fenamidone)	8.2 fl oz	24.6 fl oz	14	0.5	Alternate every other application with a fungicide of dissimilar mode of action.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	21	Ranman (cyazofamid)	6 fl oz	30 fl oz	14	0.5	Alternate with fungicides of dissimilar chemistry.
	43	Presidio (fluopicolide)	4 fl oz	12 fl oz	7	0.5	Must be applied with a fungicide of different mode of action.
Cercospora leaf spot	M1	(copper compounds) Many labels available: Badge SC, Badge X2, Basic Copper 53, Champ DP, Champ Formula 2, Champ WG, COC DF, COCS WDG, COC WP, Copper Count N, Cueva, Cuprofix Ultra, Cuproxat, Kentan DF, Kocide 2000, Kocide 3000, Kocide 4.5 LF, Kocide DF, Kop-hydroxide, Mastercop, Nordox 75 WG, Nu-Cop 3L, Nu-Cop 50WP, Nu-Cop DF, Nu-Cop HB, Nu-Cop XLR, Stretch, Tenn-Cop 5E, Top Cop w/Sulfur	SEE INDIVIDUAL LABELS		1	Varies by product from 4 hr to 2 days	
	3	(propiconazole) Many labels available: Amtide Propiconazole, Bumper 41.8EC, Fitness, Propimax, Propi-Star EC, Shar-Shield PPZ, Tide Propiconazole, Tilt, Topaz	4 fl oz	16 fl oz	14	0.5	Do not exceed 4 total applications.
	3 + 9	Inspire Super (difenoconazole + cyprodinil)	20 fl oz	80 fl oz	7	0.5	Alternate with fungicides of dissimilar modes of action.
	4 + M5	Ridomil Gold Bravo (mefenoxam + chlorothalonil)	2 lb		7	2	
	4 + M5	Ridomil Gold Bravo SC (mefenoxam + chlorothalonil)	2.5 pt		7	2	
	7	Fontelis (penthiopyrad)	30 fl oz	61 fl oz	0	0.5	Alternate with non-FRAC code 7 fungicide. See label for directions.
	7 + 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	230 fl oz	7	0.5	Do not make more than 2 sequential applications without rotating to a fungicide of dissimilar mode of action.
	7 + 11	Merivon (pyraclostrobin + fluxapyroxad)	5.5 fl oz	16.5 fl oz	7	0.5	Alternate with fungicides of dissimilar modes of action.
	11	Cabrio EG (pyraclostrobin)	12 oz	48 oz	0	0.5	Do not exceed 1 sequential and 4 total applications of Amistar or other QoI fungicides. See label for soil application.
Damping-off	M3	Defiant 75WP (thiram)	5.3 oz/100 lb of seed			1	Seed treatment only.
Powdery mildew	M2	(sulfur compounds) Many brands available: Dusting Sulfur – Crusade, IAP, Kumulus DF, Microfine Sulfur, Micro Sulf, Microthiol Disperss, Sulfur 90W, Super-Six, Top Cop w/Sulfur, Yellow Jacket Wettable Sulfur	SEE INDIVIDUAL LABELS		1	1	Do not apply during periods of warm weather. Do not apply within 2 weeks of an oil spray.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	3	(propiconazole) Many labels available: Amcide Propiconazole, Bumper 41.8EC, Fitness, Propimax, Propi-Star EC, Shar-Shield PPZ, Tilt	4 fl oz	16 fl oz	14	0.5	Do not exceed 4 total applications.
	3 + 9	Inspire Super (difenoconazole + cyprodinil)	20 fl oz	80 fl oz	7	0.5	Alternate with fungicides of dissimilar modes of action.
	7	Fontelis (penthiopyrad)	30 fl oz	61 fl oz	0	0.5	Alternate with non-FRAC code 7 fungicide. See label for directions.
	7 + 11	Merivon SC (pyraclostrobin + fluxapyroxad)	5.5 fl oz	16.5 fl oz	7	0.5	Alternate with fungicides of dissimilar modes of action.
	9 + 12	Switch 62.5WDG (cyprodinil + fludioxonil)	14 oz	56 oz	7	0.5	
	11 + M5	Quadris Opti (azoxystrobin + chlorothalonil)	2.4 pt	14.4 pt	0	0.5	Do not exceed 2 sequential and 6 total applications of Quadris Opti, and rotate with non-QoI fungicides.
	11 + 3	Avaris Quilt Willowood Azoxy (azoxystrobin + propiconazole)	14 fl oz	55 fl oz	14	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
	11 + 3	Quilt XCEL (azoxystrobin + propiconazole)	14 fl oz	56 fl oz	14	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
	33 + M2	Sanction (potassium phosphate + sulfur)	6 pt			2	
Pythium	21	Ranman (cyazofamid)	6 fl oz	30 fl oz	14	0.5	Alternate with fungicides of dissimilar chemistry.
	43	Presidio (fluopicolide)	4 fl oz	12 fl oz	7	0.5	Must be applied with a fungicide of different mode of action.
Pythium damping-off	4	Acquire, Sebring 318FS, Sebring 480FS, Metalaxy 4.0 ST (metalaxy)	0.7 fl oz/100 lb of seed			1	Seed treatment only.
Pythium seedling blight	4	Apron XL (mefenoxam)	0.64 fl oz/100 lb of seed			2	Seed treatment only.
	4	Metastar 2E (metalaxy)	8 pt			2	Apply as a broadcast soil application and incorporate into top 2 inches. See label for directions.
	4	Ridomil Gold (mefenoxam)	2 pt			2	Apply at seeding in a 7- to 12-inch band on soil over seed furrow.
	4	Ridomil Gold SL Ultra Flourish (mefenoxam)	2 pt			2	See label for specifics regarding preplant incorporated applications and surface applications at the time of planting.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
Various (see label)	7 + 9	Luna Tranquility (fluopyram + pyrimethanil)	11.2 fl oz	54.7 fl oz	7	0.5	Do not make more than 2 sequential applications without rotating to a fungicide of dissimilar mode of action.
	7 + 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	23 fl oz	7	0.5	Do not make more than 2 sequential applications without rotating to a fungicide of dissimilar mode of action.
	7 + 11	Merivon (fluxapyroxad + pyraclostrobin)	5.5 fl oz	16.5 fl oz	7	0.5	Alternate with fungicides of dissimilar modes of action.
	7 + 11	Pristine (boscalid + pyraclostrobin)	10.5 oz	63 oz	0	0.5	Limit is 6 applications crop and alternate chemistry.
	11	(azoxystrobin) Many labels available: Azoxystar, Azoxyzone, Equation SC, Quadris, Satori, Trevo, Willowood Azoxy	15.4 fl oz or 0.8 fl oz/1000 ft	3.75 qt	0	4 hr	Do not exceed 1 sequential and 4 total applications of QoI fungicides. See label for soil application.
	11	Flint (trifloxystrobin)	3 oz	12 oz	7	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
	11	Gem 500SC (trifloxystrobin)	2.9 fl oz	11.6 fl oz	7	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
	11	Heritage (azoxystrobin)	10.5 oz	4 lb	0	4 hr	Do not apply more than 3 sequential applications without alternating to a fungicide of dissimilar mode of action.
	11 + M5	Quadris Opti (azoxystrobin + chlorothalonil)	2.4 pt	14.4 pt	0	0.5	Do not exceed 2 sequential and 6 total applications of Quadris Opti, and rotate with non-QoI fungicides.
	11 + 3	Quadris Top (azoxystrobin + difenoconazole)	14 fl oz	56 fl oz	7	0.5	Do not exceed 1 sequential and 4 total applications of Quadris Top.
	11 + 3	Quilt (azoxystrobin + propiconazole)	14 fl oz	55 fl oz	14	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
11 + 3	Quilt XCEL (azoxystrobin + propiconazole)	14 fl oz	56 fl oz	14	0.5	Alternate every other application with a fungicide of dissimilar mode of action.	
19	OSO 5%SC (polyoxin D zinc salt)	13 fl oz	84 fl oz	0	4 hr	See label for details.	
29	Omega (fluzinam)	1 pt	4 pt	7	0.5	For southern blight, apply 45 days prior to harvest.	
33	(mono- and dipotassium salts of phosphorous acid) Many brands available: Alude, Confine Extra, Fosphite, Fungi-phite, K-Phite 7LP, Oxiphos, Phiticide, Prophyt, Phostrap, Rampart	3 qt		0	4 hr	See label for details.	

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
Various seedling diseases	12	Maxim 4FS Spirato 480 FS (fludioxonil)	0.16 fl oz/100 lb of seed			0.5	Seed treatment only.

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 a similar mode of action. This information must be considered for the fungicide resistance management decisions. U = unknown, or a mode of action that has not been classified yet and is typically associated with another number; P = host plant defense inducers. Source: FRAC Code List 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 13. Radish fungicides ordered by disease and then FRAC group according to their mode of action. Contact: Mathews Paret, UF/IFAS North Florida Research and Education Center.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Please refer to chapter 19 for information on biopesticides, including materials labeled for certified organic production.							
Alternaria leaf spot	7	Fontelis (pentiopyrad)	30 fl oz	61 fl oz	0	0.5	Alternate with non-FRAC code 7 fungicide. See label for directions.
	7 + 11	Merivon (fluxapyroxad + pyraclostrobin)	5.5 fl oz	16.5 fl oz	7	0.5	Alternate with fungicides of dissimilar modes of action.
	9 + 12	Switch 62.5WDG (cyprodinil + fludioxonil)	14 oz	56 oz	7	0.5	
	11	(azoxystrobin) Various brands available: Quadris, Satori, Willowood Azoxy	15.4 fl oz	62 fl oz	0	0.5	Do not exceed 1 sequential and 4 total applications of Qol fungicides.
	11	Cabrio EG (pyraclostrobin)	12 oz	48 oz	0	0.5	Do not exceed 1 sequential and 4 total applications of Qol fungicides.
Cercospora leaf spot	3	Tilt (propiconazole)	4 fl oz	16 fl oz	14	0.5	
	3 + 11	Quilt (propiconazole + azoxystrobin)	14 fl oz	56 fl oz	14	0.5	Alternate with fungicides of dissimilar modes of action.
	7	Fontelis (pentiopyrad)	30 fl oz	61 fl oz	0	0.5	Alternate with non-FRAC code 7 fungicide. See label for directions.
	7 + 11	Luna Sensation (fluopyram + trifloxystrobin)	5.8 fl oz	23 fl oz	7	0.5	Alternate with fungicides of dissimilar modes of action.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	7 + 11	Merivon (fluxapyroxad + pyraclostrobin)	5.5 fl oz	16.5 fl oz	7	0.5	Alternate with fungicides of dissimilar modes of action.
	9 + 12	Switch 62.5WDG (cyprodinil + fludioxonil)	14 oz	56 oz	7	0.5	
	11	(azoxystrobin) Various brands available: Quadris, Satori, Willowood Azoxy	15.4 fl oz	62 fl oz	0	0.5	Do not exceed 1 sequential and 4 total applications of Qol fungicides.
	11	Cabrio EG (pyraclostrobin)	12 oz	48 oz	0	0.5	Do not exceed 1 sequential and 4 total applications of Qol fungicides.
	11	Flint Extra (trifloxystrobin)	3 oz	12 oz	0	0.5	Alternate with fungicides of dissimilar modes of action.
Damping-off	M3	Defiant 75WP (thiram)	5.3 oz/100 lb of seed			1	Seed treatment only.
Downy mildew	4 + M1	Ridomil Gold Copper (mefenoxam + copper hydroxide)	2 lb	8 lb	7	2	
	33	(mono- and dipotassium salts of phosphorous acid) Many brands available: Confine Extra, Fosphite, Fungi-phite, K-Phite, Oxiphos, Phiticide, Rampart	3 qt		0	4 hr	See label for details.
	43	Presidio (fluopicolide)	4 fl oz	16 fl oz	7	0.5	Alternate with fungicides of dissimilar chemistry.
Powdery mildew	M2	(sulfur compounds) Many brands available: Micro Sulf, Microthiol Disperss, Sulfur 90W, Top Cop w/Sulfur	SEE INDIVIDUAL LABELS		1	1	Do not apply during periods of warm weather. Do not apply within 2 weeks of an oil spray.
	7	Fontelis (penthiopyrad)	30 fl oz	61 fl oz	0	0.5	Alternate with non-FRAC code 7 fungicide. See label for directions.
	7 + 11	Merivon (fluxapyroxad + pyraclostrobin)	5.5 fl oz	16.5 fl oz	7	0.5	Alternate with fungicides of dissimilar modes of action.
	9 + 12	Switch 62.5WDG (cyprodinil + fludioxonil)	14 oz	56 oz	7	0.5	

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	11	(azoxystrobin) Various brands available: Quadris, Satori, Willowood Azoxy	15.4 fl oz	62 fl oz	0	0.5	Do not exceed 1 sequential and 4 total applications of Qol fungicides. See label for soil application.
	11	Cabrio EG (pyraclostrobin)	12 oz	48 oz	0	0.5	Do not exceed 1 sequential and 4 total applications of Qol fungicides. See label for soil application.
Pythium	21	Presidio (fluopicolide)	4 fl oz	16 fl oz	7	0.5	Alternate with fungicides of dissimilar chemistry.
Pythium damping-off	4	Acquire Sebring 318FS Sebring 480FS (metalaxyl)	0.7 fl oz/100 lb of seed			1	Seed treatment only.
Pythium seedling blight	4	Apron XL (mefenoxam)	0.64 fl oz/100 lb of seed			2	Seed treatment only.
	4	Metastar 2E (metalaxyl)	8 pt			2	Apply as a broadcast soil application and incorporate into top 2 inches. See label for directions.
	4	Ridomil Gold (mefenoxam)	2 pt			2	Apply at seeding in a 7- to 12-inch band on soil over seed furrow.
	4	Ridomil Gold SL (mefenoxam)	2 pt			2	See label for specifics regarding preplant incorporated applications and surface applications at the time of planting.
White rust	11	(azoxystrobin) Various brands available: Quadris, Satori, Willowood Azoxy	15.4 fl oz	62 fl oz	0	0.5	Do not exceed 1 sequential and 4 total applications of Qol fungicides. See label for soil application.
	11	Cabrio EG (pyraclostrobin)	12 oz	48 oz	0	0.5	Do not exceed 1 sequential and 4 total applications of Qol fungicides. See label for soil application.
Various (see label)	7 + 9	Luna Tranquility (fluopyram + pyrimethanil)	11.2 fl oz	54.7 fl oz	7	0.5	Do not make more than 2 sequential applications without rotating to a fungicide of dissimilar mode of action.
	7 + 11	Merivon (fluxapyroxad + pyraclostrobin)	5.5 fl oz	16.5 fl oz	7	0.5	Alternate with fungicides of dissimilar modes of action.
	11	(azoxystrobin) Various brands available: Quadris, Satori, Willowood Azoxy	15.4 fl oz or 0.8 fl oz/1000 row ft	62 fl oz	0	0.5	Do not exceed 1 sequential and 4 total applications of Qol fungicides. See label for soil application.
	33	(mono- and dipotassium salts of phosphorous acid) Many brands available: Confine Extra, Fosiphite, Fungi-phite, K-Phite 7LP, Oxiphos, Rampart	3 qt		0	4 hr	See label for details.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
Various seedling diseases	12	(fludioxonil) Various brands available: Dynashield, Maxim 4FS, Spirato 480 FS	0.16 fl oz/100 lb of seed		0.5	0.5	Seed treatment only.

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 a similar mode of action. This information must be considered for the fungicide resistance management decisions. U = unknown, or a mode of action that has not been classified yet and is typically associated with another number; P = host plant defense inducers. Source: FRAC Code List 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. OMRI-listed: Listed by the Organic Materials Review Institute for use in organic production.

Table 14. Sweetpotato fungicides ordered by disease and then FRAC group according to their mode of action. Contact: Shouan Zhang, UF/IFAS Tropical Research and Education Center.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Please refer to chapter 19 for information on biopesticides, including materials labeled for certified organic production.							
Alternaria leaf blight	BM01 + 3	Regev (tea tree oil, difenoconazole)	8.5 fl oz	34 fl oz	14	0.5	
	3	Proyvol (mefentrifluconazole)	5 fl oz	15 fl oz	7	0.5	
	3	Quash (metconazole)	4 oz	16 oz	1	0.5	
	3 + 11	Veltyma (mefentrifluconazole + pyraclostrobin)	10 fl oz	30 fl oz	7	0.5	
	3 + 29	Orbus ESQ (difenoconazole + fluazinam)	14.5 fl oz	64 fl oz	14	2	
	7	Bonafide (boscalid)	10 oz	20 oz	10	0.5	
	7	Vertisan (penthiopyrad)	24 fl oz	72 fl oz	7	0.5	
	7 + 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	27 fl oz	14	0.5	
	7 + 12	Miravis Prime (pydiflumetofen + fludioxonil)	11.4 fl oz	32.4 fl oz	14	0.5	
	9	Vango WG (cyprodinil)	7 oz	28 oz	14	0.5	
	9 + 12	Alterity 62.5WG (cyprodinil + fludioxonil)	14 oz	56 oz	14	0.5	Alternate with another labeled non-Group 9 or 12 fungicide for 2 applications after 2 applications of Switch WG.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	11	Aframe (azoxystrobin)	15.5 fl oz	123 fl oz	0	4 hr	Do not make more than 1 sequential application, including other Group 11 fungicides.
	11	Atticus Acadia 2 SC, Arius 250, A-Zox 25SC Azoxystar, GCS Azoxy 25C, Tetraban, Trevo (azoxystrobin)	20 fl oz	123 fl oz	14	4 hr	Make no more than 2 sequential applications, including other Group 11 fungicides, before alternating with another group.
	11	AZteroid FC 3.3 (azoxystrobin)	12.8 fl oz	77.6 fl oz	14	4	
	11	Cabrio EG (pyraclostrobin)	12 oz	48 oz	0	0.5	Make no more than 1 consecutive application.
	11	Headline Headline SC (pyraclostrobin)	12 fl oz	72 fl oz	3	0.5	Do not make more than 2 sequential applications, including other Group 11 fungicides.
	11	Quadris (azoxystrobin)	15.5 fl oz	120 fl oz	14	4 hr	Make no more than 1 consecutive application.
	11	Satori (azoxystrobin)	20 fl oz	120 fl oz	14	4 hr	Do not make more than 1 sequential application, including other Group 11 fungicides.
Ascochyta leaf spot	3 + 7	Miravis Top (difenoconazole + pydiflumetofen)	13.7 fl oz	56 fl oz	14	0.5	An adjuvant may be added at recommended rates; minimum application interval is 7 days.
	7 + 9	Luna Tranquility (fluopyram + pyrimethanil)	11.2 fl oz	54.7 fl oz	7	0.5	Do not make more than 2 sequential applications of Luna Tranquility or any Group 7 or Group 9 containing fungicides.
	7 + 12	Miravis Prime (pydiflumetofen + fludioxonil)	11.4 fl	34.2 fl oz	14	0.5	An adjuvant may be added at recommended rates.
	11	Aframe Quadris (azoxystrobin)	15.5 fl oz	120 fl oz	14	4 hr	Do not make more than 1 sequential application, including other Group 11 fungicides.
	11	Atticus Acadia 2 SC, Arius 250, A-Zox 25SC, Azoxystar, GCS Azoxy 25C, Satori, Tetraban, Trevo (azoxystrobin)	20 fl oz	123 fl oz	14	4 hr	Do not make more than 1 sequential application, including other Group 11 fungicides.
	11	AZteroid FC 3.3 (azoxystrobin)	12.8 fl oz	77.6 fl oz	14	4 hr	Do not make more than 1 sequential application, including other Group 11 fungicides.
	11 + 3	Acadia ESQ Quadris Top (azoxystrobin + difenoconazole)	14 fl oz	55.3 fl oz	14	0.5	Make no more than 2 consecutive applications; addition of a spreading/penetrating adjuvant (nonionic surfactant or crop oil concentrate) is recommended.
Black dot	3	Proyvol (mefentrifluconazole)	5 fl oz	15 fl oz	7	0.5	

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	3	Quash (metconazole)	4 oz	16 oz	1	0.5	
	3 + 11	Veltyma (mefentrifluconazole + pyraclostrobin)	10 fl oz	30 fl oz	7	0.5	
	3 + 29	Orbus ESQ (difenoconazole + fluazinam)	14.5 fl oz	64 fl oz	14	2	
	7	Velum Prime (fluopyram)	6.84 fl oz	13.7 fl oz	7	0.5	
	7	Vertisan (penthioopyrad)	24 fl oz	72 fl oz	7	0.5	
	7 + 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	27 fl oz	14	0.5	
	7 + 9	Luna Tranquility (fluopyram + pyrimethanil)	11.2 fl oz	54.7 fl oz	7	0.5	Do not make more than 2 sequential applications of Luna Tranquility or any Group 7 or Group 9 containing fungicides.
	7 + 12	Miravis Prime (pydiflumetofen + fludioxonil)	11.4 fl oz	34.2 fl oz	14	0.5	An adjuvant may be added at recommended rates.
	11	Aftershock Evito 480 SC (fluoxastrobin)	0.24 fl oz/1000 row ft	22.8 fl oz	7	0.5	Make no more than 1 application of seed treatment or in-furrow or banded application in conjunction with foliar application.
	11	Reason 500 SC (fenamidone)	8.2 fl oz	16.4 fl oz	14	0.5	Make no more than 1 consecutive application.
	11	Tepera (fluoxastrobin)	9.2 fl oz	50.4 fl oz	7	0.5	Do not apply more than 6 applications per year.
	11 + 3	Acadia ESQ Quadris Top (azoxystrobin + difenoconazole)	14 fl oz	55.3 fl oz	14	0.5	Make no more than 2 consecutive applications; addition of a spreading/penetrating adjuvant (nonionic surfactant or crop oil concentrate) is recommended.
	11 + 3	Tepera Plus (fluoxastrobin + bifenthrin)	18.5 fl oz	37 fl oz	21	0.5	Do not make more than 1 in-furrow or banded application in conjunction with foliar application. Do not make more than 2 applications per year.
	11 + 12	Archive (azoxystrobin + fludioxonil)	1.0 fl oz/ 2000 lb of tubers				In-line spray.
	BM 01 + 3	Regev (tea tree oil + difenoconazole)	8.5 fl oz	34 fl oz	14	0.5	
Botrytis	BM 01 + 3	Regev (tea tree oil + difenoconazole)	8.5 fl	34 fl oz	14	0.5	
	3	Quash (metconazole)	4.0 oz	16 oz	1	0.5	

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	7	Vertisan (penthiopyrad)	24 fl oz	72 fl oz	7	0.5	
	7 + 9	Luna Tranquility (fluopyram + pyrimethanil)	11.2 fl oz	54.7 fl oz	7	0.5	Do not make more than 2 sequential applications of Luna Tranquility or any Group 7 or Group 9 fungicides.
	7 + 12	Miravis Prime (pydiflumetofen + fludioxonil)	11.4 fl oz	34.2 fl oz	14	0.5	
	9	Scala SC (pyrimethanil)	7 fl oz	35 fl oz	7	0.5	See label.
Cercospora leaf spot	BM 01 + 3	Regev (tea tree oil + difenoconazole)	8.5 fl oz	34 fl oz	14	0.5	
	7 + 12	Miravis Prime (pydiflumetofen + fludioxonil)	11.4 fl oz	34.2 fl oz	14	0.5	Do not make more than 2 consecutive applications of Miravis Prime or other Group 7 fungicide before alternation with a fungicide that is not in Group 7.
	11	Aframe, Arius 250, Atticus Acadia™ 2 SC, A-Zox 25SC, AzoxyStar, Azoxystrobin SC, GCS Azoxy 25C, Satori, Tetraban, Trevo (azoxystrobin)	15.5 fl oz	123 fl oz	14	4 hr	Do not make more than 1 sequential application, including other Group 11 fungicides.
	11	Azteroid FC 3.3 (azoxystrobin)	9.7 fl oz	77.6 fl oz	14	4 hr	Do not make more than 1 sequential application, including other Group 11 fungicides.
	11	Cabrio EG (pyraclostrobin)	12 oz	48 oz	0	0.5	
	11	Headline Headline SC (pyraclostrobin)	12 fl oz	72 fl oz	3	0.5	
	11	Quadris (azoxystrobin)	15.5 fl oz	120 fl oz	0	4 hr	
Early blight	BM 01 + 3	Regev (tea tree oil + difenoconazole)	8.5 fl oz	34 fl oz	14	0.5	Do not make more than 1 postharvest application to the tubers.
	3	Provyzol (mefentrifluconazole)	5 fl oz	15 fl oz	7	0.5	
	3	Quash (metconazole)	4 oz	16 oz	1	0.5	
	3 + 7	Miravis Top (difenoconazole + pydiflumetofen)	13.7 fl oz	56 fl oz	14	0.5	An adjuvant may be added at recommended rates. Minimum application interval is 7 days.
	3 + 11	Veltyma (mefentrifluconazole + pyraclostrobin)	10 fl oz	30 fl oz	7	0.5	
	3 + 29	Orbus ESQ (difenoconazole + fluazinam)	14.5 fl oz	64 fl oz	14	2	

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	7	Endura (boscalid)	10 oz	20 oz	10	0.5	
	7	Velum Prime (fluopyram)	6.84 fl oz	13.7 fl oz	7	0.5	Do not make more than 2 sequential applications or with Group 7 fungicides. Postplanting drench or hill drench.
	7	Vertisan (penthiopyrad)	24 fl oz	72 fl oz	7	0.5	
	7 + 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	27 fl oz	14	0.5	Apply on a 14-day interval. Do not apply more than 2 consecutive applications. Addition of a spreading/penetrating-type adjuvant is recommended.
	7 + 9	Luna Tranquility (fluopyram + pyrimethanil)	11.2 fl oz	54.7 fl oz	7	0.5	Do not make more than 2 sequential applications or with Group 7 or 9 fungicides.
	7 + 12	Miravis Prime (pydiflumetofen + fludioxonil)	6.8 fl oz	20.4 fl oz	7	0.5	An adjuvant may be added at recommended rates.
	9	Scala SC (pyrimethanil)	7 fl oz	35 fl oz	7	0.5	See label.
	9	Vango WG (cyprodinil)	7 oz	28 oz	14	0.5	
	9 + 12	Alterity 62.5WG (cyprodinil + fludioxonil)	14 oz	56 oz	14	0.5	
	11	Aftershock Evito 480 SC (fluoxastrobin)	3.8 fl oz	22.8 fl oz	7	0.5	See label.
	11	Aproach (picoxystrobin)	12 fl oz	36 fl oz	3	0.5	
	11	Flint Extra (trifloxystrobin)	3.8 fl oz	23 fl oz	7	0.5	
	11	Reason 500 SC (fenamidone)	8.2 fl oz	16.4 fl oz	14	0.5	
	11	Tepera (fluoxastrobin)	8.4 fl oz	50.4 fl oz	7	0.5	Do not apply more than 6 applications of product per acre per year, with a minimum retreatment interval of 7 days between applications.
	11 + 3	Acadia ESQ Quadris TOP (azoxystrobin + difenoconazole)	14 fl oz	55.3 fl oz	14	0.5	Addition of nonionic surfactant or crop oil concentrate or blend is recommended.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	11 + 3	Tepera Plus (fluoastrobilin + bifenthrin)	18.5 fl oz		21	0.5	Do not make more than 1 in-furrow or banded application in conjunction with foliar application; do not make more than 2 applications per year.
	28	Previcur Flex (propamocarb hydrochloride)	1.2 pt	6 pt	14	0.5	Tank-mix with chlorothalonil, maneb, or mancozeb for better control
Fusarium dry rot	BM 01 + 3	Regev (tea tree oil + difenoconazole)	8.5 fl oz	34 fl oz	14	0.5	
	11	Atticus Acadia 25C, A-Zox 255C, Azoxystar, Azoxystrobin SC, GCS Azoxy 25C, Satori, Tetraban (azoxystrobin)	0.6 fl oz/ton of tubers			4 hr	In-line aqueous spray. Do not make more than 1 postharvest application to tubers.
	11 + 12	Archive (azoxystrobin + fludioxonil)	1.0 fl oz/ 2000 lb of tubers				In-line spray
	11 + 12 + 3	Stadium (azoxystrobin + fludioxonil + difenoconazole)	0.5 fl oz/1000 lb tubers				
Phytophthora	4	Orondis Gold B (mefenoxam)	2 pt	1.5 lb a.i.		2	Do not apply more than 3 applications per crop.
	4	ReCon Bold SL (mefenoxam)	2 pt	1.5		2	
	4	Ridomil Gold SL (mefenoxam)	2 pt	1.5 lb a.i.		2	Preplant incorporated broadcast or band application, soil spray.
	4	Ultra Flourish (mefenoxam)	4 pt	1.5 lb a.i.		2	Preplant incorporated broadcast or band application, surface application.
	4	Xyler FC (metalaxy)	2.9 qt	2.9 qt			Preplant incorporated broadcast or band application, surface application.
	11	Aframe (azoxystrobin)	15.5 fl oz	123 fl oz	14	4 hr	Do not make more than 1 sequential application, including other Group 11 fungicides.
	43	Presidio (fluopicolide)	4 fl oz	12 fl oz	7	0.5	
Pink rot	11	Acadia 25C Azoxystar (azoxystrobin)	0.6 fl oz/ton tubers			4 hr	Do not make more than 1 postharvest application to the tubers.
	11	Satori Tetraban (azoxystrobin)	0.6 fl oz/ton tubers				
	21	Ranman 400SC (cyazofamid)	At planting: 0.42 fl oz/1000 linear ft Lay-by/Hilling: 2.75 fl oz		27.5 fl oz	0.5	

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	22	Elumin (ethaboxam)	8 fl oz	16 fl oz		0.5	
	46	Timorex ACT (tea tree oil)	35 fl oz	120 fl oz	2	4 hr	
	49	Orondis Gold 200 (oxathiapiprolin)	9.6 fl oz	9.6 fl oz	5	4 hr	Apply as an in-furrow application at planting.
	49 + 4	Orondis Gold (Premix) (oxathiapiprolin + mefenoxam)	Soil applied: 27.8 fl oz Foliar: 12 fl oz	27.8 fl oz	14	2	
Powdery mildew	46	Timorex ACT (tea tree oil)	35 fl oz	120 fl oz	2	4 hr	
	BM 01 + 3	Regev (tea tree oil + difenoconazole)	8.5 fl oz	34 fl oz	14	0.5	
	M2	Micro Sulf (sulfur)	5 lb			1	Do not apply within 14 days of an oil spray.
	M2	Microthiol Dispers (sulfur)	10 lb			1	
	M2	Suffa (sulfur)	0.6 gal	2.8 gal	0	1	Apply at 14-day intervals or as needed.
	M2	Sulfur 80 WDG (sulfur)	10 lb			1	OMRI-listed. ² Apply at early leaf stage; repeat every 14 days or as needed.
	M2	Sulfur 90W (sulfur)	20 lb			1	For greenhouse use.
	3	Quash (metconazole)	4 oz	16 oz	1	0.5	Do not make more than 2 sequential applications.
	3 + 7	Miravis Top (difenoconazole + pydiflumetofen)	13.7 fl oz	56 fl oz	14	0.5	An adjuvant may be added at recommended rates; minimum application interval is 7 days.
	3 + 11	Veltyma (mefentrifluconazole + pyraclostrobin)	10 fl oz	30 fl oz	7	0.5	
	7	Vertisan (penthioopyrad)	24 fl oz	72 fl oz	7	0.5	May be used with adjuvants; other crops cannot be planted until 120 days after the last application of Vertisan.
	7 + 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	27 fl oz	14	0.5	Apply on a 14-day interval. Do not apply more than 2 consecutive applications. Addition of a spreading/penetrating-type adjuvant is recommended.
	7 + 9	Luna Tranquility (fluopyram + pyrimethanil)	11.2 fl oz	54.7 fl oz	7	0.5	
	7 + 12	Miravis Prime (pydiflumetofen + fludioxonil)	11.4 fl oz	34.2 fl oz	14	0.5	An adjuvant may be added at recommended rates.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to Reentry		Remarks ²
			Appl.	Season	Harvest	Reentry	
	9	Vango WG (cyprodinil)	7 oz	28 oz	14	0.5	
	9 + 12	Alterity 62.5WG (cyprodinil + fludioxonil)	14 oz	56 oz	Leaves of root & tuber subgroup: 7 Tuberous and corm subgroup: 14	0.5	
	9 + 12	Switch 62.5WG (cyprodinil + fludioxonil)	14 oz	56 oz	7	0.5	Alternate with another labeled fungicide for 2 applications after 2 applications of Switch WG.
	11	Aframe, Arius 250, A-Zox 25SC, Azoxystar, GCS Azoxy 2SC, Quadris, Satori, Tetraban, Trevo (azoxystrobin)	15.5 fl oz	123 fl oz	0	4 hr	
	11	Acadia 2SC (azoxystrobin)	20 fl oz	123 fl oz	0	4 hr	Do not make more than 1 sequential application or with other Group 11 fungicides.
	11	Azteroid FC 3.3 (azoxystrobin)	9.7 fl oz	77.6 fl oz	Leaves of root & tuber subgroup: 0 Tuberous and corm subgroup: 14	4 hr	
	11	Cabrio EG (pyraclostrobin)	12 oz	48 oz	0	0.5	
	11	Headline Headline SC (pyraclostrobin)	12 fl oz	72 fl oz	3	0.5	Do not make more than 2 sequential applications or with other Group 11 fungicides.
	11 + 3	Quadris Top (azoxystrobin + difenoconazole)	14 fl oz	55.3 fl oz	14	0.5	Make no more than 2 sequential applications or with other Group 11 fungicides. Adding adjuvant may enhance the efficacy.
Pythium damping-off	4	MetaStar 2E (metalaxyl)	8 pt			2	Preplant incorporated application or surface application.
	4	Orodis Gold B (mefenoxam)	2 pt	1.5 lb a.i.		2	Preplant incorporated application or soil spray.
	4	ReCon 4 F (metalaxyl)	4 pt			2	

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	4	Ridomil Gold SL (mefenoxam)	2 pt			2	
	4	Thrive 4M (mefenoxam)	31.4 fl oz			2	
	4	Ultra Flourish (mefenoxam)	4 pt			2	Preplant incorporated broadcast or band application, surface application.
	4	Xylar FC (metalaxyl)	2.9 qt			2	
	11	Aframe Satori (azoxystrobin)	0.8 fl oz/1000 row ft	120 fl oz	14	4 hr	
	11	Atticus Acadia 2 SC, Arius 250, A-Zox 25SC, Azoxystar, GCS Azoxy 2SC (azoxystrobin)	0.8 fl oz/1000 row ft	123 fl oz	0	4 hr	In-furrow and banded applications over the row shortly after plant or during herbicide applications or cultivation.
	11	AZteroid FC 3.3 (azoxystrobin)	0.48 fl oz/1000 row ft	77.6 fl oz	14	4 hr	
	11	Quadris (azoxystrobin)	0.8 fl oz/1000 row ft	120 fl oz	14	4 hr	
	11	Tetran Trevo (azoxystrobin)	0.8 fl oz/1000 row ft	123 fl oz	14	4 hr	
	11 + 4	Uniform (azoxystrobin + mefenoxam)	0.34 fl oz/1000 ft row			0	Make only 1 application per crop season as an in-furrow spray.
	21	Ranman 400SC (cyazofamid)	0.42 fl oz/1000 linear ft	27.5 fl oz	7	0.5	To avoid development of resistant strains, do not apply at reduced rate; rotate with other fungicides of a different group.
	22	Elumin (ethaboxam)	8 fl oz	16 fl oz		0.5	Make applications at least 25 days apart.
	43	Presidio (fluopicolide)	4 fl oz	12 fl oz	7	0.5	Must be tank-mixed with another fungicide of different group; apply no more than 2 sequential applications.
	49 + 9	Orondis Gold (Premix) (oxathiapiprolin + mefenoxam)	In furrow: 27.8 fl oz Foliar: 12 fl oz	27.8 fl oz	14	2	
Rhizopus rot	12	Scholar SC, Pilato (fludioxonil)	Postharvest dip: 32 fl oz/100 gal of water Spray: 16 fl oz/200,000 lb sweet potatoes				Do not make more than 1 postharvest application.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	14	Botran 5F (DCNA dicloran)	0.6 qt in 100 gal water for postharvest or for root dip 5–10 seconds			0.5	See label.
	11 + 12	Archive (azoxystrobin + fludioxonil)	1.0 fl oz/ 2000 lb tubers				In-line spray
Rust/white rust	46 + 3	Regev (tea tree oil + difenoconazole)	8.5 fl oz	34 fl oz	14	0.5	
	7 + 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	27 fl oz	14	0.5	Apply on a 14-day interval. Do not apply more than 2 consecutive applications. Addition of a spreading/penetrating-type adjuvant is recommended.
	11	Aframe Satori (azoxystrobin)	15.5 fl oz	120 fl oz	14	4 hr	Do not make more than 1 sequential application, including other Group 11 fungicides.
	11	Arius 250, Atticus Acadia 2 SC, A-Zox 25SC, AzoxyStar, GCS Azoxy 2SC, Tetraban, Trevo (azoxystrobin)	20 fl oz	123 fl oz	14	4 hr	
	11	AZteroid FC 3.3 (azoxystrobin)	12.8 fl oz	77.6 fl oz	14	4 hr	
	11	Cabrio EG (pyraclostrobin)	16 oz	48 oz	0	0.5	Alternate with other labeled fungicides after each application.
	11	Headline Headline SC (pyraclostrobin)	12 fl oz	48 fl oz	3	0.5	Alternate with other labeled fungicides after each application.
	11	Quadris Flowable (azoxystrobin)	15.5 fl oz	120 fl oz	14	4 hr	Do not make more than 1 application before alternating with a different mode of action.
	11	Reason 500SC (fenamidone)	8.2 fl oz	16.4 fl oz	14	0.5	
	11 + 3	Acadia ESQ Quadris Top (azoxystrobin + difenoconazole)	14 fl oz	55.3 fl oz	14	0.5	Make no more than 2 consecutive applications; adding adjuvant may enhance the efficacy.
Sclerotinia white mold	46 + 3	Regev (tea tree oil + difenoconazole)	8.5 fl oz	34 fl oz	14	0.5	
	3	Quash (metconazole)	4 oz	16 oz	1	0.5	Do not make more than 2 sequential applications.
	3 + 7	Miravis Top (difenoconazole + pydiflumetofen)	13.7 fl oz	56 fl oz	14	0.5	Apply at early flowering, followed by a second application 14 days later; minimum application interval is 7 days.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	3 + 29	Orbus ESQ (difenoconazole + fluazinam)	12.5 fl oz	64 fl oz	14	2	
	7	Endura (boscalid)	10 oz	20 oz	10	0.5	Do not make more than 2 sequential applications or with other Group 7 fungicides.
	7	Velum Prime (fluopyram)	6.84 fl oz	13.7 fl oz	7	0.5	
	7	Vertisan (penthioopyrad)	24 fl oz	72 fl oz	7	0.5	
	7 + 9	Luna Tranquility (fluopyram + pyrimethanil)	11.2 fl oz	54.7 fl oz	7	0.5	Do not make more than 2 sequential applications of Luna Tranquility or any Group 7 or Group 9 fungicides.
	7 + 12	Miravis Prime (pydiflumetofen + fludioxonil)	11.4 fl oz	32.4 fl oz	14	0.5	Apply at or before row closure, followed by a second application 14 days later; an adjuvant may be added at recommended rates.
	11	Approach (picoxystrobin)	12 fl oz	36 fl oz	3	0.5	
	29	Omavo, Omega 500F, Orbus 4F, Vantana (fluazinam)	8 fl oz	56 fl oz	14	0.5	
Scurf	46 + 3	Regev (tea tree oil + difenoconazole)	8.5 fl oz	34 fl oz	14	0.5	
	7	Vertisan (penthioopyrad)	1.6 fl oz/1000 row ft	24 fl oz	7	0.5	Make no more than 2 sequential applications.
	11	Acadia 2SC Azoxystar A-Zox 25SC Azoxystrobin SC GCS Azoxystrobin 25C Satori (azoxystrobin)	0.6 fl oz/ton tubers			4 hr	Do not make more than 1 postharvest application to tubers.
	11	Aftershock Evito 480 SC	0.24 fl oz/1000 row ft 9.2 fl oz	22.8 fl oz	7	0.5	Make no more than 1 application of seed treatment or in-furrow or banded application in conjunction with foliar application.
		Tepera (fluoxastrobin)	9.2 fl oz	0.72 lb a.i.	7	0.5	
	11 + 3	Tepera Plus (fluoxastrobin + bifenthrin)	18.5 fl oz		21	0.5	Do not make more than 1 in-furrow or banded application in conjunction with foliar application; do not make more than 2 applications per year.
	11 + 12	Archive (azoxystrobin + fludioxonil)	1.0 fl oz/ 2000 lb tubers				In-line spray

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	11 + 12 + 3	Stadium (azoxystrobin + fludioxonil + difenoconazole)	0.5 fl oz/1000 lb tubers				
	12	Pilato SC (fludioxonil)	0.6 fl oz/ton tubers				
	14	Botran 5F (DCNA dicloran)	Seed dip: 0.6 qt/7.5 gal water; Plant bed spray: 5.73 oz/1000 linear ft bed (42 in)	3.2 qt		0.5	Do not plant tomatoes as a follow-up crop.
Septoria leaf spot	M2	Sulfur 80 WDG (sulfur)	5 lb/treated acre 10 lb		0	1	Do not use within 2 weeks of an oil spray treatment. OMRI-listed. ² Apply at early leaf stage; repeat every 14 days or as needed.
	3 + 7	Miravis Top (difenoconazole + pydiflumetofen)	13.7 fl oz	56 fl oz	14	0.5	An adjuvant may be added at recommended rates; minimum application interval is 7 days.
	3 + 29	Orbus ESQ (difenoconazole + fluazinam)	14.5 fl oz	64 fl oz	14	2	
	7 + 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	27 fl oz	14	0.5	Apply on a 14-day interval. Do not apply more than 2 consecutive applications. Addition of a spreading/penetrating-type adjuvant is recommended.
	7 + 12	Miravis Prime (pydiflumetofen + fludioxonil)	11.4 fl oz	34.2 fl oz	14	0.5	An adjuvant may be added at recommended rates.
	9	Vango WG (cyprodinil)	7 oz	28 oz	14	0.5	
	9 + 12	Alterity 62.5WG (cyprodinil + fludioxonil)	14 oz	56 oz	7	0.5	
	11 + 3	Acadia ESQ Quadris Top (azoxystrobin + difenoconazole)	14 fl oz	55.3 fl oz	14	0.5	Make no more than 2 consecutive applications; adding adjuvant may enhance the efficacy.
Southern blight (<i>Sclerotium rolfsii</i>)	11	Aframe Satori (azoxystrobin)	0.80 fl oz/1000 row ft	120 fl oz	14	4 hr	
	11	Atticus Acadia 2 SC, Arius 250, A-Zox 25SC, AzoxyStar, GCS Azoxy 25C, Tetraban, Trevo (azoxystrobin)	0.80 fl oz/1000 row ft	123 fl oz	Tuberous and corm subgroup: 14	4 hr	
	11	AZteroid FC3.3 (azoxystrobin)	0.48 fl oz/1000 row ft	77.6 fl oz		4 hr	

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Minches Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	11	Quadris Flowable (azoxystrobin)	0.80 fl oz/1000 row ft	120 fl oz		4 hr	
Various soilborne diseases	11	Many brands (azoxystrobin)	Various; see label	See label	4 hr	See label.	

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 a similar mode of action. This information must be considered for the fungicide resistance management decisions. U = unknown, or a mode of action that has not been classified yet and is typically associated with another number; P = host plant defense inducers. Source: FRAC Code List 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. OMRI-listed: Listed by the Organic Materials Review Institute for use in organic production.

Table 15. Nonfumigant nematicides for carrot, beet, and radish in Florida. Contact: Johan Desaegeer, UF/IFAS Gulf Coast Research and Education Center.

Product	Application Directions
Vydate L (a.i. oxamyl) (carrot only)	Apply within 1 week before planting or before emergence if postplant, either broadcast (2 gal/A, incorporate 2 inches at least), in the seed furrow (1–2 gal/A), or via chemigation (1 gal/A). Do not apply more than 4 gal/A per season. Minimum retreatment interval is 14 days. No more than 8 applications per season. Last application at least 14 days to harvest.
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.

Vydate is an insecticide/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 best to 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 16. Nonfumigant nematicides for sweetpotato in Florida. Contact: Johan Desaegeer, UF/IFAS Gulf Coast Research and Education Center.

Product	When to Apply	Application Pattern	Incorporation Depth	Rate
Mocap 15G (a.i. ethoprop)	2–3 weeks preplant	Row, 12"–15" band	2"–4" with rotary hoe, tiller, etc. or by bedding over the band	20–26 lb/A or 1.6–2.1/1000 ft of row (min. row spacing of 42")
Mocap EC (a.i. ethoprop)	2–3 weeks preplant	Row, 12"–15" band	2"–4" deep	5.1–6.9 fl oz/1000 ft row
Vydate L* (a.i. oxamyl)	Within 1 week before planting	Broadcast, band, or in-furrow transplant drench	4"–6" deep	2 gal/A broadcast or 1–2 gal/A in-furrow (Consult table for specific instructions and other uses.)
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 as an in-furrow spray during planting directed on or below seed, by using overhead chemigation equipment, or for transplanted crops, as a postplanting drench or hill drench. 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). Do not apply Velum within 7 days of harvest. 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. The grazing of livestock in treated areas within 7 days of application is prohibited.			
Biological nematicides	See chapter 19			

Mocap and Vydate are insecticide/nematicides; 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 best to apply them (see specific label recommendations). When nematode pressure is high, they may not be as consistently effective against root nematodes as the fumigants. *Vydate L has registration for nematode control on sweet potatoes only as a broadcast or in-furrow treatment. Foliar applications are registered for insect control only. For broadcast or in-furrow treatments, Vydate L should be applied in a minimum of 20 gal of water. As a broadcast treatment thoroughly incorporate to a soil depth of 4 inch–6 inch.

Table 17. Fumigant nematicides for carrot and sweetpotato 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}	9–12	26–35	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}	10.8–17.1	31.8–50.2	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}	13–20.5	38–60	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.
Pic-Clor 60	19–31.5	57–90	For any row spacing, application rates should never exceed the labeled maximum for broadcast applications. Consult the product label for additional detail.
Vapam HL	75	-	For drip or in-row chisel fumigation, consult product label for proportionately reduced overall rates, drip concentration, and flow-modifying directions and procedures.
KPam HL	60	-	For drip or in-row chisel fumigation, 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 new label details for additional use restrictions based on soil characteristics, buffer zones, requirements for Fumigant Management Plans (FMP) and Personal Protective Equipment (PPE), mandatory good agricultural practices (GAPs), product and applicator training certification, and other use and rate-modifying recommendations.

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.