



Berry/Vegetable Times

February 2012



2012 Calendar of Events

Feb. 21, March 20 Pesticide Testing at the Hillsborough county Extension Office, Seffner. 9:00. For more information call Susan Haddock at 813-744-5519 ext. 54103.

June 3-5 Florida State Horticulture Society Annual Meeting. Delray Beach Marriott-Beach Resort. For more information go to www.fshs.org.



The 2012 Florida Ag Expo is already on our calendar.

How about yours?
SAVE THE DATE

**Wednesday
November 7, 2012**

A University of Florida/IFAS and Florida Cooperative Extension Service Newsletter
Hillsborough County, 5339 CR 579
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James F. Price, Co-Editor
<http://gcrc.ifas.ufl.edu>



**Tuesday, February 14, 2012
11:30 a.m. to 4:00 p.m.**

11:30 A.M.	Registration
12:00 NOON	Lunch
	New Strawberry Selection Tasting
12:20 P.M.	Opening Remarks and Welcome
	Moderated by Jack Rechcigl, GCREC Center Director,
	Steve Sargent, Chair, UF Horticultural Science Department
	Jack Hayes, Dean for Research, UF/IFAS
12:30 P.M.	Strawberry Marketing Roundtable
	Moderated by Ted Campbell, FSGA
	Participants:
	Gary Wishnatzki, Wish Farms
	Mark Greeff, Driscoll
	David Spivey, Spivey Farms
	Shawn Pollard, Astin Strawberry Exchange
1:45 P.M.	Field Tours
	Latest Advances in Breeding - Vance Whitaker
	Recent Findings on Disease Control - Natalia Peres
	Fertilization and Irrigation Practices for Open Fields and Protected Culture - Bielinski Santos
	Formulas for Managing Insect Pests - James Price
	Stinger Herbicide for Strawberry Plasticulture - Andrew MacRae
	Nematode Management Strategies - Joe Noling

Free registration at <http://2012berryexpo.eventbrite.com> or by email to ccooley@ufl.edu or call 813-634-0000 X3101. Register by 2/10.

From Your Agent...Early Season Fertilization of Blueberries

We are at the beginning of February so it will soon be time to give your blueberry plants their first fertilizer for the season. Depending on how cold February is, the general rule of thumb is that around the middle of February you would make your first application of fertilizer.

When the plants start to bloom and set fruit it is very important to get leaves to push out to support the fruit load. Providing fertilizer is important for encouraging the plant to leaf out well. I would use a fertilizer that is made for blueberries and contains all the major and micro nutrients to provide everything needed by the plant for good growth.

I stress that you use a dry fertilizer formulated for blueberries that contains the correct form of nitrogen for blueberries and a low chloride content. I do not recommend a slow release fertilizer this early in the season. Slow release fertilizers need to dissolve to release the nutrients and warm weather and moisture are the key for this release. We can still be very chilly this early in the year and that could delay the release of the nutrients to the plants so the plants do not get the boost they need quickly.

Instead of slow release I would use regular dry fertilizer so that the nutrients are readily available and you also can get a good shot of phosphorus to the plant from the dry fertilizer. If your plants were short of any micronutrients at the end of last fall, the micronutrients in the dry fertilizer will provide to the plant what it was lacking and this should help the plants come out with better new growth.

Applying fertilizer is a great way to help get your blueberry plants off to a good start this season but remember plants need adequate water to dissolve the fertilizer and make the nutrients available to the plants in

other words, to make the fertilizer work. Be sure to water the plants before you apply the fertilizer and then again afterward. Also be sure you do not let the plants dry out after fertilization because you could get salt burn. You want a consistent moisture level in the root zone. If you are unsure, dig down into your beds or containers and feel the moisture level in the mix several inches down.

Remember soggy is like too dry-bad!!! If you grow in containers and your bark mix is old, especially if you mixed the bark with another ingredient, then at the bottom of your pot it can get mucky and drainage holes can get plugged up. Be sure water drains freely out of the containers and after watering stick your hand way down in the potting mix and check the consistency. You can greatly limit the growth and fruiting of your blueberry plant with this problem.

Happy Valentines Day!

Alicia Whidden



Spotted Wing Drosophila in Florida Berry Culture

James F. Price, GCREC Entomologist; Oscar E. Liburd, GNV Entomologist; Craig R. Roubos, GNV Entomologist; and Curtis A Nagle, GCREC Bio Scientist/Entomology

Spotted wing drosophila (SWD) has been in the GCREC Wimauma, Florida region since summer 2009, but the problematic fly never had been found at the center during winter strawberry production.

Things have changed. We have been trapping SWD along the margins of our 15-acre strawberry planting since ripe fruit began to appear in December 2011. We have found the flies present ever since. We are no longer free of SWD during strawberry production at GCREC.

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We do not know if the mild winter to this point has resulted in this change and we do not know how widespread the problem is. But it is important that growers be alert to SWD presence on their farms and be prepared to react with the best information at hand.

The following updated article will appear on the University of Florida IFAS EDIS Website in the near future. The authors are providing it now in order to prepare growers to avoid losses.

Spotted wing drosophila (*Drosophila suzukii* (Matsumura), Diptera: Drosophilidae) is an invasive pest recently introduced into Florida that could affect berry production including strawberry, blueberry, blackberry, raspberry and other

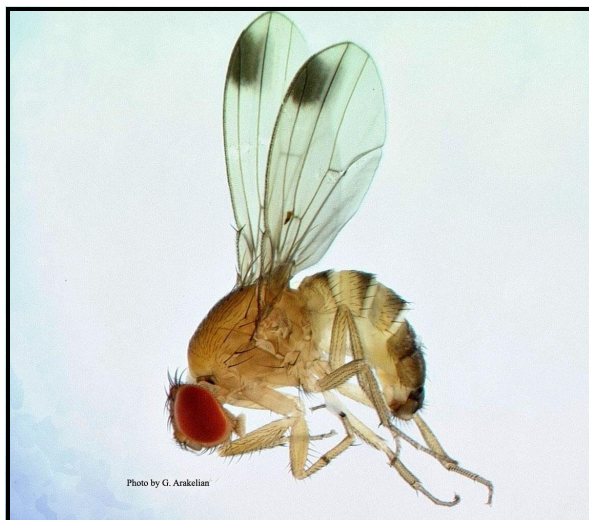


Figure 1. Male spotted wing drosophila. Only males possess a spot on each wing. Photo by permission of G. Arakelian, Los Angeles County Agricultural Commissioner/Weights & Measures Department.

thin-skinned fruit. In August 2009, spotted wing drosophila was discovered in the northeast corner of Hillsborough County, after having been known in California since 2008 and in Washington since earlier in 2009. As of June 2011 it has spread to several other states and 26 Florida counties. The highest numbers in Florida have been found in Hillsborough, Dade, Palm Beach, and Broward counties.

This fly, originating in the Orient, resembles the common *Drosophila* spp. flies that accumulate on over-ripe bananas, strawberries left without refrigeration, old fallen citrus, discarded watermelon rinds, and other fruit beginning to decompose. Both flies are small (1/8 inch or 2 – 3 mm), have prominent red eyes and, indeed, are closely related. Wing tips of male spotted wing drosophila incorporate a dark spot that is lacking in our common drosophilids (Figure 1). Spotted wing drosophila males and females also have dark bands on their abdomens.

Female spotted wing drosophila possess serrations on their egg laying organ that can cut soft surfaces of sound fruit to lay eggs inside. Common drosophilid flies lack this modification and are limited to laying eggs in soft over-ripe or rotting fruit. Spotted wing drosophila eggs that hatch



Figure 2. Plastic cup baited with apple cider vinegar for monitoring *Drosophila suzukii*. For best results traps should be deployed in shaded areas.

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inside fruit become white maggots that can soften and ruin fruit in the field or can accompany harvested fruit undiscovered until the fruit are in consumers' hands. Currently, there are no restrictions on fruit from infested farms.

Drosophilids are often called the pomace, vinegar, or fruit flies, but “fruit flies” in this case is confusing since that common name applies to larger flies, the Tephritidae, often problematic and reported in the news media. Tephritids include banded winged flies such as Mediterranean fruit fly, blueberry maggot fly, Caribbean fruit fly, Oriental fruit fly, Mexican fruit fly, and others. Drosophilid flies are not closely related to tephritid flies and management of the two groups can be different. For instance, rare outbreaks of Mediterranean fruit flies in Florida are managed in part with mass releases of sterilized male Mediterranean fruit flies. This technique has not been developed for drosophilids and is impractical to consider in most cases.

Spotted wing drosophila can survive in Florida's climate and, given the swift colonization of California and spread through Florida, berry growers should be prepared to encounter this fly. The degree of interference to production is clearly unknown. However, management plans are surfacing. Below are tactics that can be applied as conditions warrant. Presently, there are no action thresholds established. Presence of spotted wing drosophila on a farm can be ascertained by sweep-netting and by observing adult flies attracted to strategically-placed clear plastic cups baited with apple cider vinegar (Figure 2). These cups/traps can be hung in strawberry field margins about chest height, protected from the direct rays of the sun, the disturbance by tractor operations, and the disturbance by overhead sprinkler operations. Similarly, in blueberries and cane berries plastic cups can be hung on the south side of the

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Table 1. Insecticides available in Florida that may be useful as sprays for management of *Drosophila* spp. flies on berry crops.

Active Ingredient	Trade Name	REI ¹	PHI ²	Mode of Action Code ³	Blueberry	Black-berry	Strawberry	Raspberry
Bifenthrin	Brigade	12 hours	0 days	3A	X	X	X	X
Fenpropathrin	Danitol	24 hours	2 days	3A	X	X	X	X
Malathion	Malathion	12 hours	1-3 days	1B	X	X	X	X
Naled	Dibrom	48 hours	1 day	1B			X	
Spinetoram	Radiant	4 hours	1 day	5			X	
	Delegate	4 hours	3 days	5	X	X		X
Spinosad	SpinTor	4 hours	1-3 days	5	X	X	X	X
	Entrust	4 hours	1-3 days	5	X	X	X	X
Zeta-Cypermethrin	Mustang Max	12 hours	1 day	3A	X	X		X

¹ Re-entry interval that must elapse between application of the indicated insecticide and entry of any persons into the treated area

² Pre-harvest interval that must elapse between the application of the indicated insecticide and harvest of the crop. PHI varies depending on the berry crop where the product is used. ALWAYS follow label instructions.

³ For management of spotted wing drosophila (SWD) resistance to insecticides, growers should use products from one mode of action group during the period of one SWD lifecycle then rotate to another mode of action for a similar period.

plants away from the morning sun and ~ 1 foot (30 cm) below the top of the bush.

Management practices immediately available in Florida for spotted wing drosophila are those used to manage our common drosophilids. The most important progress in managing the new pest will be achieved by implementing cultural practices that deny spotted wing drosophila its breeding sites and kill immature stages inside cull fruit. This can be accomplished in the field by removing marketable berries quickly, before they are infested and properly disposing of unmarketable fruit and the immature insects they harbor. Any fruit not to be sold should be collected and buried or sent to municipal disposal sites. It is important to bury fruit at least 1 foot (30 cm) deep, in the case of Florida's sandy soils, to ensure that the insects do not emerge from the soil. If buried too shallow, the fly larvae will crawl to the soil surface, develop to adults, and damage fruit.

Additionally, applications of appropriate insecticides should be made as spotted wing drosophila appears. Insecticides that are useful in controlling adults and approved for various berry crops are listed in Table 1. There are no insecticides available for egg or maggot control inside fruit. It is unknown how long pesticide residues could be effective to kill spotted wing drosophila flies under our various cultural conditions, so recurring applications of pesticides at close intervals may be required under heavy pressure, for populations of mixed life stages, or when flies regularly move from outside sources into fruiting fields. When these conditions are absent, applications could be held to one lifecycle or longer, probably 10 days to 2 weeks or longer during much of Florida's fruit production period.

Production by vigilant and responsive berry growers in Florida probably will not be reduced by this new pest, so long as the present management tools remain effective

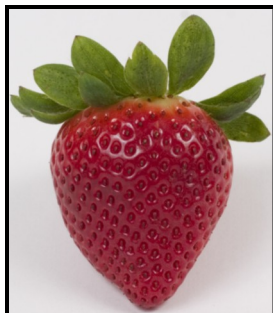
and available and growers cooperate to manage spotted wing drosophila throughout the area. New management measures must be developed, though, to assure long-term control and to reduce the negative impacts associated with the use of insecticides.

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Lessons Learned on the Management of 'Florida Radiance'

Vance M. Whitaker, GCREC Horticulturist; Bielinski M. Santos, GCREC Horticulturist; and Natalia A. Peres, GCREC Plant Pathologist



Each strawberry cultivar is unique, and it takes considerable time and effort to learn how to manage it optimally. This has certainly been true for 'Florida Radiance'. We have learned a great deal about this cultivar since its commercial introduction in 2009. In this article we relate our recommendations for the management of 'Florida Radiance' in Florida based on our research results and many field observations and consultations with growers over the past 3 years. Three main areas of emphasis are management of *Phytophthora* crown rot, fertilization, and optimal planting dates.

Phytophthora crown rot

It is no secret that 'Florida Radiance' is highly susceptible to root and crown rots caused by *Phytophthora cactorum*. Field research at the GCREC has continually demonstrated that metalaxyl, the active ingredient in Ridomil Gold®, is highly effective against *Phytophthora*. Since infected transplants are the main source of inoculum, the key is to inject this product through the drip tape as soon as possible during plant establishment. Two applications may be needed to treat an infected crop, with the second application within 2 to 3 weeks after the first one. Products containing potassium phosphite or potassium salts of phosphorus acid are alternatives that could be applied either as foliar sprays or injections through the drip as often as every 2 to 3 weeks (depending on the product label). Since infected transplants are the main

source of inoculum, applying Ridomil to the soil prior to planting is expected to give little if any benefit.

Fertilization and Irrigation

This cultivar has shown excellent response to nitrogen (N) rates up to 1.0 lb/acre per day, especially after mid-November. Higher N rates likely will not result in higher yields and may cause excessive foliar growth and other problems such as soft fruit. While excess N during the main growing season should be avoided, adequate N early in the season is very important for this cultivar. Shortly after transplanting, 'Florida Radiance' is very sensitive to the lack of N in the soil unlike 'Strawberry Festival'. Thus, growers should provide adequate rates of N (e.g. 0.5 to 0.75 lb/acre per day) through the drip tape immediately after the overhead irrigation is turned off in order to promote transplant root development. Therefore, reliance on pre-plant fertilizer, which may not be distributed evenly throughout the soil profile and thus may not be available to the developing roots, is not recommended. Previous research has indicated that pre-plant N fertilization is not required for Florida cultivars because young transplants do not respond to available N levels in the soil (see related publication at <http://edis.ifas.ufl.edu/pdf/HS/HS37000.pdf>).

More research is in progress to determine the appropriate potassium (K) scheduling and its effect on fruit weight and quality. However, field observations have indicated that during heavy fruiting, plants seemed to benefit from K applications of 1.0 lb/acre per day or higher. Growers should exercise care when irrigating during this phase of the crop, especially if warm periods are present because excessive irrigation will leach K rapidly through sandy soil profiles. There is a variety of irrigation programs used in the region, going from once or twice per day using short irrigation periods (30 to 45 minutes) to 3

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to 5 times per week. Regardless of the irrigation program, it is recommended not to water more than 1 hour at a time to avoid nutrient leaching below the root zone due to the rapid infiltration of sandy soils in the region. Always use the recommended evapotranspiration rates for the area and crop growing stage to estimate your irrigation needs.

Optimal Planting Dates

Transplanting ‘Florida Radiance’ during the early portion of the planting period (October 7th-15th) has yielded good results for growers. Late planting dates have typically not been as successful due to decreased early yields and poor plant development. Because this cultivar has a weak plant habit and may arrive from the nursery with some petiole breakage and other damage, early planting dates allow stronger vegetative development prior to fruiting.

However, earlier may not always be better. Planting dates that are very early (October 1st to October 7th) may not be advisable. Several growers have reported that ‘Florida Radiance’ bare-root transplants planted this early do not give greater earlier yields than those planted from the 7th to the 15th of October. One reason for this may be that additional chilling hours in the nursery are known to promote greater root development and greater vigor. Harvesting ‘Florida Radiance’ from nurseries 1 week later allows additional growth, particularly of the roots. We have also noted an increase in the number of elongated or “bullet” fruit in this cultivar with earlier planting dates. The exact cause of “bullet” fruit is unknown, but there is clearly an environmental effect as “bullet” fruit have not been observed in many international growing regions such as southwest Spain. It has been suggested that

exposing the strawberry crown to high temperatures after transplanting inhibits the proper development of the flower buds which emerge in the second flush. And as we all know, the earliest transplanting dates will almost always expose the transplants to higher temperatures.

When managed properly, it is clear that ‘Florida Radiance’ has shown excellent performance for Florida growers. While there are certainly other important cultural considerations, management of Phytophthora root rot, proper fertilization, and careful selection of planting dates have been some of the most critical over the past 3 years. Research will continue to be conducted to refine recommendations for these and other aspects of management.

Mild winter may cause potential late blight headache for tomato growers!

Gary Vallad, GCREC Plant Pathologist

I’m as relieved as anyone that our winter to this point has been mild relative to the previous winters of 2010 and 2011. Although, from my perspective, a timely freeze is the most efficient and economical means to destroy weeds and crop residues that serve as reservoirs for many plant pathogens and insect pests effectively limiting carryover of disease, and pest issues into the spring crop. While the freezing weather in early January was timely, it unfortunately was not sufficient to destroy remaining crop residues and weeds. In addition, there was considerable acreage of late planted vegetables along the Gulf Coast that was hardly impacted by the freeze. Take these factors and also consider the severities of several vegetable diseases (downy mildew, powdery mildew, TYLCV, early blight and target spot) last fall and you can begin to

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Figure 1. Tomato leaves exhibiting classic symptoms of Late Blight, caused by the fungal-like pathogen *Phytophthora infestans*. Note that the lesions are irregularly shaped, black to tan in color.

understand my concerns. As growers continue planting their spring crop in the area, they need to be vigilant to keep ahead of potential crop threats, especially as cold fronts approach the area.

One disease tomato and potato growers should be especially concerned about this spring, is late blight caused by the fungal-like pathogen, *Phytophthora infestans*. Late blight was initially found on tomatoes in Manatee and Hillsborough Counties in early January, which is quite unusual for this area. Unfortunately, because of the very issues I mentioned above, additional samples from the area have continued to show up in the diagnostic clinic. As of last Friday, the lab has received additional samples from throughout Manatee and Hillsborough Counties. In one case, the grower was unaware of the issue, having sent tomato plants into the lab for an unrelated issue.

Symptoms of late blight on tomato consist of light green, water-soaked lesions that can be circular or irregularly shaped (Figure 1). Often the tissue surrounding the lesion will have an off-colored appearance, giving the appearance of a halo around the lesion and will be noticeably darker when held up to the light (Figure 2). Symptoms can appear on leaves, petioles and stems and can enlarge



Figure 2. Close up of Late Blight lesions showing the green halo effect that can often be found around the lesion margin. Note that if held up to the light this tissue will appear darker than the surrounding uninfected, healthy tissue.

rapidly when weather conditions are favorable, such as during periods of high humidity or leaf wetness and cooler temperatures (night temperatures in the 50s and day temperatures in the 70s). The cool, damp evenings following a rain event and cool mornings that promote heavy dew and fog are ideal for disease development. Sporulation from new infections can occur in as little as 4 days. Under such conditions the disease can quickly reach epidemic levels within a field in a matter of days. However, even in the absence of rain, late blight can develop when the relative humidity nears 90% or higher.

The mornings are a great time to scout for this disease, since the cooler temperatures and higher humidity promote sporulation on affected plant tissues. The white cottony growth, consisting of sporangiophores and sporangia, can often be seen on the underside of symptomatic leaves and on infected stems (Figure 3). The sporulation will be on the leading edge of the lesion as it enlarges. Eventually the lesion will turn black/brown before the leaf dies. Lesions can also develop on stems and fruit (Figure 4). Stem lesions have a similar appearance as leaf lesions, but can girdle the plant as they enlarge. Fruit lesions appear as

large, light green to light brown colored, water-soaked blotches that are usually firm in texture and can show some zonation as the symptoms progress. Growers need to monitor carefully fruit from fields with late blight, as fruit symptoms from latent field infections can develop in storage or en route to market

A number of products are available for late blight control, but timing is critical. Multi-site fungicides like fixed copper (Kocide, Cuprofix), mancozeb (Dithane, Penncozeb) or chlorothalonil (Bravo, Equus, Echo) are fairly effective against *P. infestans* if applied preventatively prior to disease.



Figure 3. Closeup of late blight lesions on tomato leaves showing white sporulation of the fungal-like pathogen, *Phytophthora infestans*. Sporulation is easiest to see in the early morning when the relative humidity is highest.

Many other effective commercial fungicides are also available that are specific to *P. infestans* and related oomycete pathogens and have systemic activity within the plant, such products contain the active ingredients: cymoxanil (Curzate), cyazofamid (Ranman), dimethomorph (Acrobat/Forum), fluopicolide (Presidio), mandipropamid (Revus), mefenoxam (Ridomil), or propamocarb hydrochloride (Previcur Flex/Promess). Several of these products can be used in greenhouse (Curzate, Previcur Flex, Revus) and in transplant production (Curzate, Previcur Flex, Ranman, Revus), some can even be applied through overhead irrigation and a few through drip irrigation (Presidio, Previcur Flex, Ridomil Gold SL).

Please READ THE LABELS CAREFULLY, since most of these products have specific limitations with the method and number of applications and must either be combined or rotated with other effective fungicides with a different mode of action. These rotations are important to avoid the development of fungicide resistance in the pathogen population.

As growers continue setting plants in the field, they should carefully check their transplants for symptoms of late blight and consider adding protective fungicides to the transplant water (such as Previcur Flex) or making protective applications immediately following planting. While late blight has not been reported in transplant facilities, conditions in such facilities are ideal for infection. Similarly, tomatoes produced in high-tunnels, greenhouses, and other protected structures also need to be on guard, as these structures often offer ideal conditions for the late blight to develop and for the pathogen to persist, especially when the relative humidity within the structure nears 90% or higher. Efforts to minimize humidity within these protected structures will help hinder disease development.



Figure 4. Symptoms of Late Blight on tomato stems, petiole and fruit.

Labelled fungicides for Late Blight on Tomato.

Sorted in order by FRAC group corresponding to the mode of action (Updated June 2011).

Dr. Gary E. Vallad, UF/IFAS Gulf Coast REC. gvallad@ufl.edu

BE SURE TO READ A CURRENT PRODUCT LABEL BEFORE APPLYING ANY CHEMICAL.

Chemical (active ingredient)	Fungicide Group ¹	Maximum Rate/Acre/		Min. Days to Harvest	Remarks ²
		Applic.	Season		
(copper compounds) Many brands available.	M1	SEE INDIVIDUAL LABELS**		0	Mancozeb or maneb enhances bactericidal effect of fix copper compounds. See label for details. **Be aware that reentry intervals have changed for many copper compounds.
(maneb) Many brands available.	M3	SEE INDIVIDUAL LABELS		5	*Bacterial spot control only when tank mixed with a copper fungicide. See label for details.
(mancozeb) Many brands available.	M3	SEE INDIVIDUAL LABELS		5	
Cuprofix MZ Disperss (mancozeb + copper sulfate)	M3 / M1	7.25 lbs	55.2 lbs	5	See label
ManKocide (mancozeb + copper hydroxide)	M3 / M1	5 lbs.	112 lbs.	5	
(chlorothalonil) Many brands available.	M5	SEE INDIVIDUAL LABELS		0	Use higher rates at fruit set and lower rates before fruit set, see label
Ridomil MZ 68 WP (mefenoxam + mancozeb)	4 / M3	2.5 lbs.	7.5 lbs.	5	Limit is 3 appl./crop, see label
Ridomil Gold Copper 64.8 W (mefenoxam + copper hydroxide)	4 / M1	2 lbs.		14	Limit is 3 appl. /crop. Tank mix with maneb or mancozeb fungicide, see label
Ridomil Gold Bravo 76.4 W (chlorothalonil + mefenoxam)	4 / M5	3 lbs.	12 lbs	14	Limit is 4 appl./crop, see label
Amistar 80 DF (azoxystrobin)	11	2 oz	12 oz	0	Must alternate or tank mix with a fungicide from a different FRAC group; use of an adjuvant may cause phytotoxicity; avoid applications of Heritage/Amistar until 21 days after transplanting or 35 days after seeding, or within +/- 6 days of a postemergence broadcast application of Sencore; see label.
Heritage (azoxystrobin)	11	3.2 oz	1.6 lbs	0	
Quadris FL (azoxystrobin)	11	6.2 fl.oz.	37 fl.oz.	0	
Cabrio 2.09 F (pyraclostrobin)	11	16 fl oz	96 fl oz	0	Only 2 sequential appl. Allowed. Limit is 6 appl/crop. Must alternate or tank mix with a fungicide from a different FRAC group, see label.
Flint (trifloxystrobin)	11	4 oz	16 oz	3	Limit is 5 appl/crop. Must tank mix with another labeled fungicide from a different FRAC group at 75% of its labeled rate, see label.
Evito (fluoxystrobin)	11	5.7 fl oz	22.8 fl oz	3	Limit is 4 appl/crop. Must alternate or tank mix with a fungicide from a different FRAC group, see label.
Reason 500 SC (fenamidone)	11	8.2 oz	24.6 lb	14	Must alternate with a fungicide from a different FRAC group. See supplemental label for restrictions and details.
Quadris Opti (azoxystrobin + chlorothalonil)	11 / M5	1.6 pts	8 pts	0	Must alternate with a non-FRAC code 11 fungicide; use of an adjuvant may cause phytotoxicity; do not apply until 21 days after transplanting or 35 days after seeding; avoid applications within +/- 6 days of a postemergence broadcast application of Sencore; see label.
Tanos (famoxadone + cymoxanil)	11 / 27	8 oz	72 oz	3	Do not alternate or tank mix with other FRAC group 11 fungicides. See label for details

Table continues on page 11

Chemical (active ingredient)	Fungicide Group ¹	Maximum Rate/Acre/		Min. Days to Harvest	Remarks ²
		Applic.	Season		
Ranman (cyazofamid)	21	2.75 fl oz	16 fl oz	0	Limit is 6 appl./crop, see label
Gavel 75DF (zoaximide + mancozeb)	22 / M3	2.0 lbs	16 lbs	5	See label
Curzate 60DF (cymoxanil)	27	5 oz	30 oz per year	3	Do not use alone, see label for details
Previcur Flex or Promess (propamocarb hydrochloride)	28	1.5 pts	7.5 pts	5	Must tank mix with Chlorothalonil, maneb or mancozeb; see label.
Alude Fosphite Fungi-Phite Helena Prophyte K-phite 7LP Phostrol Topaz (mono- and di-potassium salts of phosphorous acid)	33	SEE INDIVIDUAL LABELS		0	Do not apply with copper-based fungicides. See label for restrictions and details
Acrobat 50 WP (dimethomorph)	40	6.4 oz	32 oz	4	See label for details
Forum (dimethomorph)	40	6 oz	30 oz	4	Only 2 sequential appl. See label for details
Revus (mandipropamid)	40	8 fl oz	32 fl oz	1	Supplemental label; No more than 2 sequential appl.; See label
Revus Top (mandipropamid + difenoconazole)	40 / 3	7 fl oz	28 fl oz	1	4 apps per season; no more than 2 sequential apps; do not use on varieties with mature fruit less than 2 inches in diameter. Not labeled for transplants. See label
Presidio (Fluopicolide)	43	4 fl oz	12 fl oz/per season	2	4 apps per season; no more than 2 sequential apps. 10 day spray interval; Tank mix with another labeled non-FRAC code 43 fungicide; 18 month rotation with off label crops; see label.

¹FRAC code (fungicide group): Numbers (1-44) and letters (M, NC, U, P) are used to distinguish the fungicide mode of action groups. All fungicides within the same group (with same number or letter) indicate same active ingredient or similar mode of action. This information must be considered for the fungicide resistance management decisions. M = Multi site inhibitors, fungicide resistance risk is low; NC = not classified, includes mineral oils, organic oils, potassium bicarbonate, and other materials of biological origin; U = Recent molecules with unknown mode of action; P = host plant defense inducers. Source: FRAC Code List 2011; <http://www.frac.info/> (FRAC = Fungicide Resistance Action Committee).

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

Please remember...

The use of trade names in this publication is solely for the purpose of providing specific information. It is not a guarantee or warranty of the products named and does not signify that they are approved to the exclusion of others of suitable composition. Use pesticides safely. Read and follow directions on the manufacturer's label.