



SOUTH FLORIDA VEGETABLE PEST AND DISEASE HOTLINE

January 22, 2020

Weather over the past few weeks has varied widely with mostly unseasonably warm conditions and a number of days hitting the mid 80’s. This has been punctuated by cold fronts which dropped temps into the 30’s in a number of places. The coldest weather of the season occurred this morning with many places dipping into the 30’s. A few normally colder interior locations reported a short period of time with temps going just below freezing at dawn. Lowest was Palmdale with 29.53 degrees. Cold windy conditions have resulted in some damage on sensitive crops like squash and beans, battering plants and scarring some fruit.

FAWN Weather Summary

Date	Air Temp °F		Rainfall (Inches)	Ave Relative Humidity (Percent)	ET (Inches/Day) (Average)
	Min	Max			
Balm					
12/27 – 1/21/20	31.51	86.40	0.68	81	0.07
Belle Glade					
12/27 – 1/21/20	40.35	86.63	1.49	83	0.07
Clewiston					
12/27 – 1/21/20	31.21	86.72	0.67	82	0.07
Ft Lauderdale					
	37.87	86.79	0.55	78	0.07
Homestead					
12/27 – 1/21/20	36.5	85.03	0.70	83	0.07
Immokalee					
12/27 – 1/21/20	32.7	87.19	0.70	82	0.07
Okeechobee					
12/27 – 1/21/20	33.15	85.86	1.04	84	0.06
Wellington					
12/27 – 1/21/20	42.31	85.26	1.6	81	0.07

“Remember, when in doubt - scout.”

Fog and heavy dews are keeping disease active.

Growers are harvesting a wide variety of vegetables and are busy planting spring crops including watermelons. Prices have been favorable for a number of items.

The National Weather Service forecast indicates the low which brought chilly weather to South Florida today will move eastward into the Atlantic waters through Thursday. This will allow for the winds to become more easterly over South Florida as the pressure gradient relaxes.

A warming trend will start tonight and continue into Thursday over South Florida with lows tonight in the upper 40's and 50's. Highs on Thursday will be in the 70s with Thursday night lows in the 50s.

Flows become more southerly on Friday, placing South Florida under a brief, warmer regime for the end of work week. The southerly flow will bring additional moisture into the atmospheric column, resulting in a slight chance of showers for the east coast and Atlantic.

A frontal boundary will approach the region late Saturday into early Sunday. Behind the front, winds veer out of the north and allow for another shot of cold air down the peninsula that will moderate temperatures a few degrees below average. Overnight, lows could dip into the mid to upper 40s across the northwestern interior and near 60 across the east coast each night through early next week. Afternoon temperatures should only climb into the upper 60s to low 70s across South Florida.

One feature to keep an eye on for the early portions of next week is a surface low developing over the central Gulf of Mexico which could result in a higher chance of showers and thunderstorms.

For additional information, visit the National Weather Service in Miami website at <https://www.weather.gov/mfl/>

Insects

Whiteflies

Respondents on the East Coast report that whiteflies are becoming established in various crops and are moving into younger plantings. Numbers have been highest in eggplant and tomato.

Around SW Florida, whiteflies numbers are spiking in a number of locations on a variety of crops including cucumbers, eggplant, tomato, squash and watermelon. High numbers of whiteflies are moving out of fall crops being terminated. Scouts report finding up to 20 adults on young plants a few days in the ground. Also contributing to the spike in numbers is that high prices have caused growers to hold onto crops longer than normal

Reports from Homestead indicate that whitefly numbers are building rapidly in all susceptible vegetable crops.

With whitefly populations beginning to build and continued warm weather, growers are advised to take precautions to protect spring crops especially those like tomato and watermelon where whitefly vectored viruses are a threat. NOTE - This week's cold weather was not sufficient to reduce populations.

Efficacy Ratings for Insecticides and Miticides on Tomato

MOA	Active Ingredient	Whiteflies	Other pests controlled			
		Whiteflies	Southern Armyworm	Spider mites	Stinkbugs	Leafminer
4A	dinotefuran	E**			G	
4A	imidacloprid	E**				
4A	thiamethoxam	E**			G	
4D	flupyradifurone	E**				
23	spiromesifen	E†		E		
23	spirotetramat	E†		G		
7C	pyriproxifen	E†				
28	cyantraniliprole	E**	E			E
1B	malathion	G*				
3A	beta-cyfluthrin	G*	F		G	
3A	bifenthrin	G*			G	
3A	esfenvalerate	G*	G			
3A	fenpropathrin	G*	F		F	
3A	lambda cyhalothrin	G*	F			
3A	permethrin	G*	G			
3A	zeta-cypermethrin	G*	G		F	
4A	acetamiprid	G				
9	pymetrozine	G†				
16	buprofezin	G†				
21 A	fenpyroxiamate	G		G		
4A	clothianidin	F**				
Unk.	horticultural oil	F†		G		
Unk.	Azadiractin	F†				
Unk.	Soap, insecticidal	F†				

* OP+Pyrethroids tank mix. † Effective primarily against nymphs ** Most Effective as a drench. Check labels before using any pesticide.

While whitefly populations remain low in most places, they can build up quickly, so growers should scout regularly to avoid being taken unawares later in the season. Preventative soil applications of either imidacloprid, thiamethoxam, dinotefuran, flupyradifurone or cyantraniliprole should be used preventatively in tomato and cucurbits.

Proper scouting is essential to manage silverleaf whitefly. Over the years, UF entomologists have developed usable action thresholds that have been successful for many tomato farmers. However, these thresholds are only guidelines. Farm managers may modify them to fit their particular situations and expectations. *

Silverleaf whitefly thresholds

0-3 true leaves 10 adults/plant*

3-7 true leaves 1 adult/leaflet

NOTE - *If the source of whiteflies is believed to be tomato or melons, where virus is present, the threshold will be lower!

Systemic insecticides applied to soil for whitefly control

Common name	Mode of Action	Trade Names	Rates
Imidacloprid	4A	Various	Check Label
Thiamethoxam	4A	Platinum 75 SG	1.66 - 3.67
	4A	Venom 70% Scorpion 35 SL Certador 10%	5 - 7.5 oz./ac 9 - 1 0.5 fl oz./ac 32.5 - 47.5 fl oz./ac
Flurpyradifuron	4D	Sivanto 200 SL	21-28 fl oz./ac
Verimark	28	Verimark 18.7%	5-10 fl oz./ac

Field hygiene should be a high priority and should be an integral part of the overall strategy for managing whitefly populations, whitefly vectored viruses, and insecticide resistance.

- **Disrupt the virus-whitefly cycle in winter by creating a break in time and/or space between fall and spring crops, especially tomato and cucurbits**
- **Destroy crops quickly and thoroughly after harvest, killing whiteflies and preventing re-growth.**
- **Promptly and efficiently destroy all vegetable crops within 5 days of final harvest to decrease whitefly numbers and sources of plant viruses.**
- **Use a contact desiccant (“burn down”) herbicide in conjunction with a heavy application of oil (not less than 3% emulsion) and a non-ionic adjuvant to destroy crop plants and to kill whiteflies quickly.**
- **Time burn down sprays to avoid crop destruction during windy periods, especially when prevailing winds are blowing whiteflies toward adjacent plantings.**

For more whitefly management tips – see: **Management of Whiteflies, Whitefly-Vectored Plant Virus, and Insecticide Resistance for Vegetable Production in Southern Florida** - <http://edis.ifas.ufl.edu/in695>

Leafminer

Around Southwest Florida, leafminers have been relentless and are showing up in new plantings. Growers report that leafminers are moving out beans as they are harvested and into nearby crops.

Around Homestead, reports indicate that leafminers are increasing and tearing up beans. Dak Seal entomologist at UF/IFAS TREC, reports that in some places leafminer pressure is getting worse, most probably, due to the frequent use of pyrethroids. Growers should reduce use of pyrethroids which suppress natural enemies.

Reports from the EAA, indicate that leafminer are causing some problems in celery and leafy vegetables.

On the East Coast, respondents indicate that leafminer pressure is building in a number of crops.

Leafminers are particularly damaging on celery, crucifers, cucurbits, okra, potato and tomato. In south Florida, populations peak between October and March while in central Florida they are a problem in both spring and fall.

The adults are small yellow and black flies about the size of a gnat. The female punctures or "stipples" the leaves with her ovipositor to lay eggs in the leaf tissue or to feed on sap.

Leafminer damage is easily recognized by the irregular serpentine mines in leaves. The tunnel is clear with a trail of black fecal material left behind as the maggot feeds.

Leafminer damage to foliage can render plants more susceptible to fungal or bacterial diseases, which can cause further harm to plants. Bacterial spot, Alternaria, target spot and other diseases often become established in leaf mines.

Worms

Around SW Florida, worm pressure has slowed but there are still some armyworms, loopers and fruitworms around. Growers continue to battle high melonworm pressure in squash and cukes.

Growers in the EAA report that worm pressure has been episodic, directed by frontal systems & celestial events.

On the East Coast, respondents indicate that worms have been mostly low.

Reports from Homestead indicates that worm pressure is increasing in sweet corn. Diamondback moths are present but remain low on cabbage.

Scouting is extremely important in detecting worms early before they can do significant damage. The Florida Tomato Scouting Guide indicates a pre-bloom threshold of 1 larva/6plants and post-bloom threshold of 1 egg mass or larva/field.

Fortunately, growers have a wide array of excellent worm control materials at their disposal these days.

Consult the UF/IFAS Vegetable Production Handbook for labeled products.

Thrips

Around Palm Beach County, thrips continue to increase and are showing up in more places. Pepper growers report populations range from low to high with multiple larvae etching fruit and stems in the worst-case scenarios. Thrips have also been causing some problems in young basil.

Around Miami Dade County, Melon thrips populations remain high around Homestead and are increasing in beans and squash. Growers are reporting difficulty in bring them under control. Reports indicate that Radiant is not working and growers are using anything they can to try and get control.

Common blossom thrips and western flower thrips numbers have also spiked in a number of places. In some green beans, high incidence of red node disease has been reported.

Scouts are finding 4-6 thrips/flower. The adults cause damage by feeding and ovipositing on foliage. In addition to red node there are also some reports of viral infection on beans which is testing positive for tospovirus (TCSV).

Cultural practices are effective in reducing thrips. Use reflective plastic mulch on field margins can help repel this virus carrying thrips. Some ornamental plants are hosts to flower thrips. If possible, growers should avoid planting tomato within 1,000 feet of a nursery. Planting non-host crop as a barrier can also help reduce flower thrips infestation on vegetable crops.

Reports from the EAA indicate that thrips are building up in green bean blossoms. Elsewhere thrips remain very low.

Pepper weevils

Around SW Florida, pepper weevils are increasing in mature pepper fields and growers are battling them in some locations. Respondents note that weevils are moving from old pepper into younger fields.

Around Homestead pepper weevils are a major problem in pepper. Serious infestations can be observed in all plantings irrespective of pepper varieties and planting location. Actara, Vydate, Diamides and pyrethroids can be used in a program to control this pest.

On the east coast pepper weevils are becoming more common in more locations in in Palm Beach and St Lucie Counties.

In addition to the pepper weevil (*Anthonomus euginii*), we are hearing scattered reports of Cuban pepper weevil showing up around South Florida. Cuban pepper weevil adults are easily distinguished from the glossy black *A. euginii*, bearing numerous rough or raised areas, and a considerable amount of brown coloration. Larva are similar in appearance to *A. euginii*.

Sanitation and a crop-free period, if accompanied by destruction of alternate hosts, can disrupt the life cycle. It is very important to eliminate wild solanaceous host plants if pepper weevil is to be managed effectively.

Adult population estimates are best obtained by visual examination and yellow sticky traps. **Action thresholds are one adult per 400 terminal buds or 1% of buds infested.**

Insecticides are commonly applied to the foliage at short intervals once buds begin to form. Insecticidal suppression is feasible, but insecticides vary considerably in effectiveness, and even in the presence of chemical insecticides some loss commonly occurs. Consult UF/IFAS recommendations for currently labeled insecticides for pepper weevil control in Florida.

Aphids

On the East Coast growers report that aphids are mostly low but note virus incidence is increasing rapidly in squash.

Around Immokalee, scouts report some winged aphids are blowing around but note that numbers remain fairly low.

In the EEA, respondents report finding the occasional aphid in corn silks. Aphids are also showing up in leafy greens.

Silk fly

Respondents in the EAA indicate that silk fly pressure is on the rise. Growers report most problems in higher risk areas like under power lines.

Silk fly are also becoming more common around Homestead as the season progresses.

Routine use of pyrethroids may suppress corn silk flies in sweet corn. Cultural practices also play an important role in suppressing corn silk fly population. Growers should avoid dumping culls and destroy rotten fruits and vegetables as these sources are preferred substrates for egg laying.

Broad Mite

On the East Coast, broad Mites have been persistent and are showing up in pepper, eggplant and basil.

Around SW Florida, broad mites continue to flare up in peppers.

Reports from Homestead indicate that broad mites are widely present in a variety of crops.

Diamondback moth

Growers and scouts are beginning to report finding diamondback moth larvae and pupae in cabbage and other crucifers from central Florida down to Homestead.

This insect has become increasingly difficult to control and in recent years, resistance to insecticides has become widespread and includes most classes of insecticides including some Bt (*Bacillus thuringiensis*) products.

Pheromone traps should be used to monitor adult populations. One or more hole per plant is often used as a threshold for control.

Since adults may carry over between crops on plant debris, cultural controls such as separation of crops in time and space and sanitation including rapid crop destruction after harvest are important.

Growers should be very careful to inspect transplants when they arrive from the nursery to make sure larvae are not present.

Larvae and pupae are often killed by one of several wasp parasitoids. Reduction of insecticide use, in particular pyrethroids and use of soft pesticides can sometimes improve diamondback control by favoring survival of natural enemies.

Protection of crucifer crops from damage often requires application of insecticide to plant foliage, sometimes as frequently as twice per week. Complete coverage especially the undersides of leaves where larvae are most often found.

Mixtures of chemical insecticides, or chemicals and microbials, are often recommended for diamondback moth control. Growers should consider using multiple modes of action in rotation including relatively recent chemistries such as the diamides (group 28, like Exirel and Coragen) and spinosyns (group 5, like Radiant). However, this is not a guarantee that the applications will be effective if the grower has a resistant population.

Systemic protection to diamondback moth is provided by the diamide insecticides Coragen (chlorantraniliprole) and Verimark/Exirel (cyantraniliprole) (MoA group 28). Radiant SC (spinetoram)

and Proclaim (emamectin benzoate) can be used as rotational partners with Bt products and diamide insecticides for diamondback moth management.

Radiant (MoA group 5) and Proclaim (restricted use; MoA group 6) have translaminar activity, providing residual efficacy. Avaunt 30 WDG (indoxacarb, MoA group 22) and Rimon 0.83 EC (novaluron, an insect growth regulator, MoA group 15) can also be included in a diamondback moth programs.

Several broad-spectrum insecticides in the carbamate, organophosphate and pyrethroid classes are registered for use on diamondback moth.

Resistance to insecticides is widespread and includes most classes of insecticides including some *Bacillus thuringiensis* products. Rotation of insecticide classes is recommended, and the use of *B. thuringiensis* is considered especially important because it favors survival of parasitoids. Even *B. thuringiensis* products should be rotated, and current recommendations generally suggest alternating the kurstaki and aizawai strains because resistance to these microbial insecticides occurs in some locations.

Although broad-spectrum insecticides might work (e.g., Lannate, Warrior II), they will harm beneficials and should be only be used later in the season as a cleanup if needed.

Partial list of insecticides registered for use on cabbage for management of diamondback moth and other caterpillars.			
MoA	Trade Name (Active Ingredient) *Restricted	REI	PHI
5	Radiant SC (spinetoram)	4	1
6	*Proclaim (emamectin benzoate)	12	7
11A	Agree WG (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	4	0
11A	Biobit HP (<i>B. thuringiensis</i> subsp. <i>kurstaki</i>)	4	0
11A	Crymax WDG (<i>B. thuringiensis</i> subsp. <i>kurstaki</i>)	4	0
11A	DiPel DF (<i>B. thuringiensis</i> subsp. <i>kurstaki</i>)	4	0
11A	Javelin WG (<i>B. thuringiensis</i> subsp. <i>kurstaki</i>)	4	0
11A	Xentari DF (<i>B. thuringiensis</i> subsp. <i>aizawai</i>)	4	0
15	Rimon 0.83 EC (novaluron)	12	7
22	Avaunt (indoxacarb)	12	3
28	Coragen (chlorantraniliprole)	4	3
28	Exirel (cyantraniliprole) foliar	12	1
28	Verimark (cyantraniliprole) soil	N/A	4
un	Aza-Direct (azadirachtin)	4	0
un	Prokil Cryolite (cryolite)	12	7
Courtesy of Dr Hugh Smith: UF/IFAS GCREC			

Check UF/IFAS recommendations for currently labeled insecticides for diamondback larvae control in Florida crucifers.

Stinkbug

Growers and scouts are reporting increasing problems with stinkbugs in tomato around South Florida. In the past stinkbug have primarily been a problem in organic tomato and were rarely seen in conventional tomato crops but this situation appears to be changing and some growers have reported increasing difficulty in controlling stinkbug when they show up.

Diseases

Lettuce downy mildew

Dr Rick Raid, Pathologist at EREC advises that an outbreak of lettuce downy mildew has been confirmed in the EAA. Due to preventative spray programs, damage thus far has been limited.

Growers are urged to initiate a more rigorous fungicide program, including some of the oomycete specific fungicides to avoid any catastrophic outbreaks.

These can be alternated with a preventative program of mancozeb and phosphite tank-mixtures and these should be alternated with a good translaminar or systemic fungicide more specific to downy mildew.

There is a large selection to choose from and growers should rotate among dissimilar chemistries for management of fungicide resistance.

Consult the UF/IFAS Vegetable Production Handbook for fungicides labeled for lettuce downy mildew in Florida.

Downy mildew is a serious foliar disease of lettuce which has a direct effect on yield and quality, as it affects the marketable portion of the crop. In addition to losses in the field, downy mildew's impact is accompanied by significant postharvest losses. In Florida, yield losses of up to 100 percent have been reported for individual fields.

Lettuce downy mildew is caused by the fungus *Bremia lactucae* which is the class of fungi known as the Oomycetes. Downy mildew is capable of infecting any growth stage from seedling to mature plant. Head, leaf, and cos lettuce are all susceptible.

Symptoms of downy mildew appear initially as chlorotic yellow spots on the upper leaf surface. Under favorable conditions, a white cottony-like fungal growth indicative of sporulation may be seen on the lower leaf surface.

During the early stages, leaf spots are often delineated by the veins of the leaf, giving an angular appearance. Lesions become increasingly chlorotic and eventually turn brown. Although downy mildew is most severe on the older outer leaves, the disease may become systemic over time, infecting heads internally. Lesions may also provide entry for secondary fungi such as Botrytis.

Downy mildew is spread by spores called conidia or sporangia. These may be rain-splashed or windblown to uninfected tissue, inciting new infections. Although rain-splash dissemination normally ranges from several inches to several feet, sporangia may be windblown tens to hundreds of miles and still maintain their infectivity.

Many thousands of sporangia can be formed in each lesion under favorable conditions, allowing downy mildew to spread rapidly over large areas. Sporulation and infection are favored by relatively cool temperatures and humid conditions. For this reason, epidemics in Florida usually occur during the period of December to March. Five to 7 hours of high humidity or leaf wetness are required for successful infection and sporulation.

Cultivar resistance when available is the most economically feasible form of downy mildew control. In the event of a regional outbreak, susceptible cultivars should be protected with fungicides to avoid major losses.

Due to downy mildew demonstrated ability to develop resistance, growers are advised to rotate chemistries to avoid problems - FRAC numbers on labels will help avoid using similar active ingredients repeatedly.

The list of fungicides currently labeled for lettuce downy mildew control includes maneb, fosetyl Al, metalaxyl, and several copper compounds. Recently some newer compounds including Orondis Ultra, Orondis Gold, Presidio, Previcur Flex, Reason, Revus, and Zampro have been added to growers control options. Resistance in *B. lactucae* to the fungicide metalaxyl was reported in Florida during 1989, and therefore its efficacy may be somewhat reduced.

Applications must be made prior to infection if adequate control is to be maintained. If downy mildew is known to be present in the area, growers should launch a fungicide program immediately.

Several cultural practices, such as the establishment of a lettuce-free period, crop rotation, and the destruction of possible weed hosts, are also recommended control measures.

Given the current susceptibility of Florida cultivars, downy mildew is extremely difficult, if not impossible, to maintain at non-economic levels once a major outbreak has occurred. For this reason, prevention and early detection are of the utmost importance.

Crucifer downy mildew

Reports from around South Florida indicate that crucifer downy mildew is increasing on cabbage, broccoli, collards, and mustard greens. Downy mildew of cruciferous crops is caused by the fungus *Peronospora parasitica*. All crucifers are susceptible.

Cool, wet conditions are conducive for the development of downy mildew. If temperatures are suitable, the disease will be more severe under overhead irrigation or conditions of high rainfall or heavy dews and fog,

All plant parts can become infected with this fungus. Leaf symptoms usually appear on the underside of the leaf as black or dark specks on young leaves. These spots are often irregular in shape and may appear net-like. The upper side of the leaf will also develop dark spots similar in shape and may be accompanied by leaf yellowing.

On older leaves, these spots will often coalesce resulting in larger areas of the leaf blade having large, sunken, paper tan-colored spots. Leaf yellowing may accompany these symptoms.

On the underside of the leaf spots, a white-grey, downy growth can often be observed with or without the aid of a hand lens, especially when leaves are wet. On mature cabbage, downy mildew can appear as dark sunken spots on the head or wrapper leaves.

Cauliflower curds and broccoli heads can become infected with blackened areas on the outside of the tissue. The infection can become systemic and turn inner curd and stem tissue dark.

Downy mildew is controlled primarily by fungicides at the present time. Protectant fungicides should be applied at least weekly beginning when nighttime temperatures are conducive for sporulation and disease development and when rains, dews or irrigations are frequent or heavy.

Some of the newer fungicides are highly effective in controlling the disease but will typically have a limited number of applications and should be rotated between FRAC classes to reduce the possibility of the development of resistance and to help lengthen the effective lifespan of these fungicides.

Consult the UF/IFAS Vegetable Production Handbook for fungicides labeled for downy mildew of crucifers in Florida.

Bacterial Spot

Foggy mornings and heavy dew is keeping bacterial spot active on tomatoes and specialty peppers in SW Florida. Bacterial spot is severe in some specialty and a few non-resistant bell pepper fields which are dropping leaves and suffering from defoliation of the lower canopy.

On the East Coast, bacterial spot continues to work on tomato and pepper where it is present.

Respondents in Homestead indicate that bacterial spot incidence and occurrence is increasing in tomato and pepper.

In the Manatee Ruskin area, bacterial spot remains present and active in specialty pepper still in production.

An integrated approach is needed to manage this disease. At the field level, most inocula comes from infected transplants, volunteer plants or infected plant debris in the soil. Entry into the plant occurs through stomata or wounds made by wind driven soil, insects, or cultural operations. Temperatures of 75-87°F are ideal for bacterial spot but infections can occur at higher or lower temperatures.

Exclusion is the best means of managing bacterial spot on tomato. Unfortunately, even the best bactericidal treatment offers only limited protection when environmental conditions are favorable for rapid disease development, especially during periods of heavy, wind-driven rains.

Sanitation is important. Pepper and tomato volunteers and solanaceous weeds should be destroyed between crops. Purchase only certified disease-free transplants and seed.

Infected transplants can provide for long distance transplant of the disease. To reduce the incidence of disease, transplant houses should be located away from tomato or pepper fields. Transplant trays should be inspected daily for signs of disease and trays should be rouged out and destroyed at the first sign of disease. Transplant house workers should wash and sanitize their hands frequently to avoid movement of bacteria from tray to tray and house to house.

Since water movement spreads the bacteria from diseased to healthy plants, workers and farm equipment should be kept out of fields when fields are wet because the disease will spread readily under wet conditions.

No resistant tomato varieties are available commercially. In pepper, a number of excellent varieties with resistance to races 1 -10 are available.

It is important to apply sprays before and during rainy periods. If conditions are favorable, frequent spraying may not be enough to maintain bacterial spot below damaging levels.

The traditional recommendation for bacterial spot control consists of copper and maneb or mancozeb. Attention to application techniques is as important as choice of material in achieving adequate control. The effectiveness of copper is limited, because of the widespread occurrence of copper tolerance among strains of *Xanthomonas*.

In the past few years, a few products have come on the market that have given good results in research trials when used in rotation or together with traditional controls such as copper. These include Tanos (Dupont) as well as the SAR elicitor Actigard (Syngenta), Leap (Valent), Double Nickel 55 (Certis), Regalia (Maronne Bioinnovations) and Serenade and Sonata (AgraQuest). Leap is unique among the products mentioned above as it contains two active ingredients providing growers with disease management and caterpillar control.

In replicated trials at UF, two products Actigard (acibenzolar-S-methyl) and Cueva (copper octanoate) consistently performed better in the management of bacterial spot over standard applications copper hydroxide in repeated trials alone or when combined with other products.

Attention to application techniques is as important as choice of material in achieving adequate control.

Consult UF/IFAS recommendations for formulations, rates, and intervals of currently labeled materials for bacterial spot in Florida.

Target spot

Growers and scouts around Immokalee report that target spot remains active and continues to increase in tomato.

Target spot is also present in some tomato on the East Coast and in Homestead as well. Target spot is also present in some eggplant around Palm Beach County.

As the season progresses, growers and scouts should be look for target spot as canopies develop and remain wet for extended periods in the morning.

Currently, target spot is controlled primarily by applications of protectant fungicides. It should be noted that tank-mix sprays of copper fungicides and maneb do not provide acceptable levels of target spot control.

Widespread resistance has been documented to QoI fungicides including both strobilurins and non-strobilurin fungicides in FRAC Group 11 and their use is not recommended for target spot control.

In addition, moderate resistance has been documented in the SDHI fungicides FRAC Group 7 which includes boscalid, penthiopyrad, fluopyram and fluxapyroxad. These should be used with caution and attention paid to rotating with alternative modes of action.

In recent efficacy trials, at the University of Florida – Approvia Top, Inspire Super, Luna Tranquility, Revus Top, Rhyme, and Scala are top performers. Contact protectant fungicides like mancozeb and Bravo are effective and should be used early in the crop cycle switching to more efficacious materials once disease is present.

Target spot is also causing some scattered problems in cucumber.

Consult UF/IFAS recommendations for currently labeled fungicides for target spot control in Florida vegetables.

Phytophthora

Reports from the east Coast indicate that phytophthora remains active and is creeping along in squash and pepper where it was already present.

Around Immokalee, phytophthora is present at low levels in pepper and squash.

Phytophthora is causing problems in squash around Homestead in low lying areas.

Fusarium

Around Immokalee, fusarium is affecting some tomatoes in wet areas.

Reports from East Coast growers indicate that fusarium is dropping some older pepper in a few fields.

Fusarium wilt fungus is able to survive in the soil for long periods of time by forming spores, thick walled reproductive structures. It also survives in infested plant debris and in the roots of weeds such as Malva and Amaranthus. It can be moved readily from field to field in infested soil that may adhere to cultivation or other equipment or in surface irrigation water runoff from infested fields.

The disease is more common on acidic, sandy soils.

Where fusarium is a concern, growers should use resistant tomato varieties. Resistant varieties are common for Race 1, and many are also resistant to Race 2. Fusarium wilt race 3 has a narrow host range. Therefore, genetic resistance can be very effective in controlling the disease, in many cases it is the only viable means of control. A few varieties are resistant to all three races.

Growers should attempt to limit the spread of infested soil by cleaning farm equipment. Avoid root knot nematode infestations because nematode feeding can overcome the plant resistance to Fusarium wilt. Long rotations out of tomatoes for several years will reduce inoculum level, although Fusarium is long-lived and even rotations of 7 years or more will not completely remove the fungus from the soil.

Other less effective means of control, that have been tried including soil pasteurization with steam or fumigants, raising low pH soils to 6.5 - 7.0, using nitrate nitrogen instead of ammoniacal nitrogen and even adding mycorrhiza and organic matter to the soil.

Anthraco

Respondents report that anthracnose is showing up on pepper around South Florida

On the East Coast, respondents indicate that anthracnose present in most pepper fields and incidence ranges from high to low.

Anthraco is becoming widespread on older pepper around SW Florida.

Infection typically occurs during warm, wet weather. Temperatures around 80° F are optimum for disease development, although infection occurs at both higher and lower temperatures. Severe losses occur during rainy weather because the spores are washed or splashed to other fruit resulting in more infections. The disease is more likely to develop on mature fruit that is present for a long period on the plant, although it can occur on both immature and mature fruit.

Control of this disease is best accomplished through integrated management techniques. Since the disease may be introduced on seed, only clean pathogen-free seed should be planted. Disinfection of seed with hot water treatment of seed is useful in reducing potential infections. Transplants should be kept clean by controlling weeds and Solanaceous volunteers around the transplant houses.

Fields should be well drained and be free from infected plant debris. If disease was previously present in a field, crops should be rotated away from Solanaceous plants for at least 2 years. Sanitation practices in the field include control of weeds and volunteer pepper plants.

For late-maturing peppers, when disease is present, apply a labeled fungicide several weeks before harvest. Products such as Chlorothalini (Bravo), various strobilurin fungicides (Amistar, Cabrio, Flint, Heritage, or Quadris) and Tanos will help control the disease. Anthracnose can be controlled under normal weather conditions with a reasonable spray program. At the end of the season, remove infected plant debris from the field or deep plow to completely cover crop residue.

Sclerotinia

Growers and scouts report that Sclerotinia (white mold) is showing up on pepper in a couple locations on the East Coast and its incidence is low but is fairly common in some places.

In the EAA, growers are reporting some problems with Sclerotinia drop in lettuce.

A good indicator of Sclerotinia disease is the presence of small, black sclerotia (resting structures) of the fungus. Sclerotia can form on the surface of plant parts as well as inside the stems of pepper and tomato. The sclerotia enable the fungus to survive from season to season and are the source of inoculum to infect crops.

Another common indicator of Sclerotinia diseases is the presence of white, cottony-like mycelium of the fungus when weather conditions are cool and moist.

Symptoms vary between crops. White mold in beans usually appears after flowering. The disease often appears in leaf axils and advances into the stem, producing water-soaked spots that increase in size, girdling the stem, and killing it above the point of infection. The disease can also enter the plant through leaves or pods that touch the soil where sclerotia or infected plant parts act as inoculum.

In tomato, potato and pepper, infection typically starts at flowering. Water-soaked spots are usually the first symptom, which is followed by invasion of the stem, girdling, and death of the upper part of the stem that turns a light gray. The disease can also begin where the plant contacts the soil or infected plant debris. Large portions of the field may become diseased, producing large, circular, areas of dead plants. The black sclerotia formed by the fungus are often found inside infected stems.

Almost all Sclerotinia diseases are field diseases, but when they occur in post-harvest situations, they can be very damaging. In beans, the fungus may create a mass of diseased pods that is stuck together by fungal growth, resembling a nest (hence, the name "nesting").

Under cool moist conditions, the fungus can invade a host plant, colonizing nearly all of the plant's tissues with mycelium. Optimal temperatures for growth range from 15 to 21 degrees Celsius. Under wet conditions, *S. sclerotiorum* will produce an abundance of mycelium and sclerotia. The fungus can survive in the soil mainly on the previous year's plant debris. High humidity and dewy conditions support the spread and increases the severity of infections.

In beans, fungicides including Botran 75 W, Endura 70 WG, Iprodione 4 L Quadris F, Rovral 4 F and Switch applied at bloom stage have been effective in controlling white mold. Iprodione and Rovral 4 F have been used with good results in lettuce. For potato, Iprodione 4 L, Rovral 4 F and Topsin M WSB and 4.5 L are recommended for Sclerotinia control while in tomato Amistar 80 DF has given good results. Biologicals like Contans WG, Serenade Max and Sonata have also provided various degrees of control alone and in combination with other fungicides.

Consult UF/IFAS recommendations for currently labeled fungicides for sclerotinia control in Florida vegetables.

Powdery mildew

Powdery mildew is widely present and increasing in squash and beans in several locations around South Florida from Ruskin down to Homestead.

Tolerance or resistance to powdery mildew is available in some vegetable crops. Most commercial cucumber varieties grown in Florida have acceptable levels of resistance.

In addition to resistance, economic control can be achieved with chemicals. Under low disease pressure, some materials applied preventatively for downy mildew may provide satisfactory control of powdery mildew. However, under moderate to heavy mildew disease pressure, micronized sulfur (Thiolux) and the strobilurin fungicides such as Flint, Nova and Quadris are recommended. Newer materials such as Pristine and Quintec have also performed well in University trials.

Growers should be aware that sulfur could injure plants, especially at higher temperatures.

When using strobilurin fungicides growers should be sure to follow manufacturer's recommendations and practice resistance management by avoiding consecutive applications. Some of the bio-fungicides like Regalia, Rhapsody and Sonata may provide good rotation partners.

Options for organic growers include the use of resistant varieties, cultural practices that ensure proper plant nutrition and plant vigor in addition to sulfur and potassium bicarbonate sprays for disease control.

Consult UF/IFAS recommendations for currently labeled insecticides for powdery mildew control on cucurbits in Florida.

Downy Mildew

Around Southwest Florida, respondent indicate downy mildew pressure has been high in squash and cukes.

Gummy stem blight

Around SW Florida, gummy stem blight has been found in some watermelon transplants.

Southern Corn Leaf Blight

Respondents indicate that the incidence of Southern corn leaf blight is present on sweet corn around South Florida.

Northern corn leaf blight

With cooler weather northern corn leaf blight is becoming more common sweet corn in the EAA. Northern corn leaf blight caused by the fungus *Exserohilum turcicum* was one of the most important sweet corn diseases in southern Florida causing significant losses some years. Resistant varieties have helped reduce the impact of northern corn leaf blight in recent years.

Initial symptoms of the disease include yellow spots that develop on the foliage. These enlarge to form tan or straw-colored dead areas about 4 to 6 inches long and one-half inch wide. NCLB produces a long, elliptical lesion, while those of southern corn leaf spot tend to be oblong and much smaller than those produced by NCLB. Southern blight lesions are also lighter in color (light tan to brown) and have parallel sides rather than the tapering sides of lesions caused by *E. turcicum*.

Northern corn leaf blight, like southern corn leaf blight, moves from the lower canopy to the upper canopy. Fungal sporulation may be observed with a hand lens on foliar lesions following periods of high humidity. When severe, lesions may become so numerous that they coalesce and turn the entire leaf necrotic.

Fungicides should be applied when lesions first become visible on the lower leaves or when disease is reported to be in the area. Threat is highest from mid Feb into April, but it may be seen during the fall as well.

Triazoles and strobilurins both provide control, with some pre-mixes giving superior control. These products should be used with a broad-spectrum protectant to minimize development of fungal resistance.

Use EDBC fungicides such as mancozeb as a protectant before disease is present. Apply 4- 6 sprays on a 5 – 7-day basis. Use a surfactant/sticker as corn leavers are waxy and spray tends to run off. Rotate with a strobilurin such as Headline etc. As corn matures or disease becomes present, rotate between triazoles such as Folicur, Monsoon, Propimax etc and strobilurins or premixes of the two.

Consult UF/IFAS recommendations for currently labeled fungicides for northern corn leaf blight control in Florida.

Bean red node/Tobacco Streak Virus

Bean growers in Homestead are reporting severe issues with red node - caused by the thrips vectored tobacco streak virus. Bean red node is caused by a member of the genus Ilarvirus and is also known as Tobacco Streak Virus.

In beans, red node infection causes a reddish discoloration of nodes at the point of attachment of leaf petioles to stems. In severe cases, infected plants will flex or break at a discolored node. The veins and veinlets of infected leaves exhibit a red to reddish-brown streaking. Red to reddish-brown concentric rings form on pods which become shriveled or puffy and do not produce seeds. Plants can be severely stunted and killed by the virus.

In tomato, downward curling of leaf blades of tomato infected with tobacco streak is common. Leaf veins become necrotic which can lead to necrotic blotches, especially on young leaves. Fruit may develop necrotic ringspots. Necrotic streaks on young stems extend to flowers and leads to flower drop.

Tobacco streak virus has wide host range infecting more than 200 plant species. In addition to beans, other known hosts of the virus include cowpea, cucurbits, sweet clover, tomato and a number of weeds such as wild mustard and thistle.

Tobacco streak virus (TSV) or red node is efficiently transmitted vectored in the field by several species of thrips including western flower thrips, *Frankliniella occidentalis*, and onion thrips, *Thrips tabaci*.

Control of TSV is difficult. Chemical controls have not been developed for red node. Thrips control is ineffective but maintaining insect control programs is advised even though controlling insect vectors alone will probably not provide sufficient control of TSV.

The primary controls for this disease are mostly cultural. *It is always wise to use virus-free seed and to control weed hosts. No biological control strategies have been developed for the management of red node.*

Good ditch bank weed management and growing beans in large tracts to minimize border to field area ratio are the most effective means of controlling this disease. Typically, this requires advanced planning. Once beans are in the ground, there is little that can be done, so keep this in mind for next season.

Consult UF/IFAS recommendations for currently labeled insecticides for thrips control in Florida vegetables.

Tomato Yellow Leaf Curl Virus

Around SW Florida TYLCV is present at mostly low levels. Growers and scouts report that they are beginning to find a few symptomatic plants in spring crops.

Respondents in Homestead indicate TYLCV incidence is increasing in a number of fields.

Tomato Chlorotic Spot Virus

Reports from Homestead report TCSV is increasing in tomato fields. TCSV is also showing up in some beans.

Growers and scouts in Palm Beach County report that TCSV is showing up couple pepper farms where incidence remains mostly low.

TCSV-infected tomatoes develop necrotic lesions of variable size, easily recognized necrotic and chlorotic spots, and ringspots on leaves, stems, petioles, flowers, and fruit. Symptoms are like those of GRSV and, to a lesser extent, some isolates of TSWV. Although apparently less common, chlorotic spots and ringspots may form prior to or at the same time as necrotic lesions. Following the onset of these symptoms, wilting and bronzing of the infected plant may occur. TCSV infections in young tomato plants may result in severe stunting and eventually death. Fruit from infected plants may show necrotic ringspots, necrotic spots, and distortion, rendering them unmarketable.

Symptoms in pepper plants include severe stunting, necrotic spots, necrotic ringspots, and severe leaf deformation. Fruit from infected pepper plants can be deformed and present ringspots and irregular coloring.

TCSV, like other members of the Tospovirus genus, is vectored by certain thrips species. As with other tospoviruses, TCSV is only acquired by the larval (1st and 2nd instar) stages of the thrips vector as they feed on infected plants.

TCSV is known to be transmitted by three species of thrips: common blossom thrips (*Frankliniella schultzei*), western flower thrips (*F. occidentalis*), and flower thrips (*F. intonsa*)

Surveys by Dr Scott Adkins et al have found TCSV on weeds such as purslane in production fields.

News You Can Use

Important EPA decisions coming

Brad Haire
Farm Progress
Jan 15, 2020

The EPA this year will deliver important decisions to U.S. agriculture, including on chlorpyrifos, glyphosate, the neonicotinoids, pyrethroids, atrazine and over-the-top dicamba.

The EPA this year will deliver important decisions to U.S. agriculture, including on chlorpyrifos, glyphosate, the neonicotinoids, pyrethroids, atrazine and over-the-top dicamba.

Rick Keigwin is the director of EPA's Office of Pesticide Programs. He spoke about the decisions and the agency's process for making them Jan. 10 at the Southeast Regional Fruit and Vegetable Growers Conference in Savannah.

Chlorpyrifos

More than a decade ago, chlorpyrifos came under fire by environmental groups that petitioned the EPA to revoke all tolerances of the organophosphate. The agency did not revoke the tolerances. Appeals followed and litigation started against the agency for denying the groups' petition, which, the agency says, failed to meet the legal burden under the law for EPA to revoke chlorpyrifos.

Keigwin could not speak on the current litigation, but said the agency and registrants are discussing possible changes to the chlorpyrifos registration to better estimate runoff levels into water resources.

"We are in the process of updating our assessments on chlorpyrifos. They will be available this summer for public comment, and then by October, we will also issue a proposed regulatory decision for chlorpyrifos."

According to Tim Hearnden reporting in Western Farm Press, "The training wheels are about to come off for growers test-driving alternatives to chlorpyrifos, which is being phased out by California regulators this year (2020). Under an agreement between the state and manufacturers, chlorpyrifos will not appear on store shelves after Feb. 6, and farms must use any they have on hand by the end of 2020."

Glyphosate

Early this calendar year, the agency will issue a final decision for glyphosate registration. The EPA, along with every other regulatory body and science organization around the world, concluded the chemistry is not a carcinogen, he said.

"We received a half million comments on our proposed decision from last year. We're in the final stages of wrapping up and developing responses to those comments," he said.

For glyphosate, EPA did propose better management practices farmer can take to target sprays, protect pollinators and reduce resistance.

Neonicotinoids

The re-registration for the neonicotinoids has taken longer than the typical six years because the review, done together with Canada and the California Department of Pesticide Regulation, included four active ingredients: Imidacloprid, thiamethoxam, clothianidin and dinotefuran.

How these chemistries affect pollinators has been an important part of this review. EPA's preliminary pollinator assessment, he said, shows the potential for 'on-field risk' from some uses of neonicotinoids, but the agency considers risks low for chemistry used as a seed treatment, which is a large part of how it is used in agriculture. Early this year, he said, the agency will release its proposed decision on neonicotinoids for public comment.

"We will propose some risk mitigation and what we'll want to hear from (farmers) is how easily (they) can implement that mitigation or if we've not calculated the benefits right from their use of these products. We would want to hear from (them) quantitatively and economically.

Pyrethroids

During November of 2019, EPA released a proposed interim decision for five pyrethroids and an ecological risk mitigation strategy for all pyrethroids, which addressed the potential risk to aquatic invertebrates, he said. The

public comment period for those actions ended Jan. 13, but there will be other public comment periods for the pyrethroids review in 2020.

"There are some data that have become available about potential risks to pollinators and we're working through a risk management proposal for dealing with potential pollinator risk from pyrethroids and that will come out probably later this spring," he said.

Atrazine

As part of its review process, the agency proposed a decision last month for the widely used herbicide atrazine. For crop uses, the agency doesn't propose much change, but it does propose to add protection equipment to protect workers, mandatory label directions for spray drift management and reduce weed resistance risk. The agency does propose reducing the maximum rate for turf application 'to protect children who crawl or play on atrazine-treated grass."

<https://www.farmprogress.com/regulatory/important-epa-decisions-coming>

Operation Clean Sweep

The Florida Department of Environmental Protection and the Florida Department of Agriculture and Consumer Services announces the 2019-2020 Operation Clean Sweep program, a mobile pesticide collection effort that provides a safe way to dispose of cancelled, suspended, and unusable pesticides. The free service is available to farms/groves, greenhouses, nurseries, golf courses, and pest control entities.

For more information, including how to sign up, click here:

<https://floridadep.gov/waste/permitting-compliance-assistance/content/operation-cleansweep-pesticides>.

2019 - 2020 UF/IFAS Vegetable Production Handbooks

Copies are available at the Hendry County Extension Office in LaBelle, the Miami Dade County Extension Office, the Palm Beach County Extension office in West Palm Beach, and at the UF/IFAS SW Florida Research and Education Center in Immokalee.

Up Coming Meetings

January 29, 2020 **Worker Protection Standard Respirator Workshop** **9 AM – 1 PM**

UF/IFAS Southwest Florida Research and Education Center
2685 SR-29 N
Immokalee, Florida 34142

Register online via Eventbrite

<https://www.eventbrite.com/e/wps-respirator-workshop-tickets-89300011739>

February 4, 2020 **Vegetable Growers Meeting** **9 AM – 1 PM**

Streamlining raised-bed drip-irrigated system for vegetables for reducing production risks and improving sustainability

UF/IFAS Southwest Florida Research and Education Center
2685 SR-29 N
Immokalee, Florida 34142

Please RSVP – 239-658-3400 or email Zoe Watson at zshobert@ufl.edu

February 20, 2020

WPS – Train the Trainer

8:30AM – 3:30PM

UF/IFAS Everglades Research and Education Center
3200 Palm Beach Road
Belle Glade, FL 33430

The Worker Protection Standard (WPS) applies to farm, forest, nursery and greenhouse operations that produce agricultural plants. **This workshop is approved to meet the new mandatory trainer requirements.**

The training is organized as an interactive presentation to update you on the new requirements and to meet the new mandatory trainer certification.

Cost: \$25.00 (includes lunch and handouts)

Call for details or any questions you may have at 561.233.1725 or email at EEScott@pbcgov.org

February 25, 2020

Vegetable Growers Meeting

9 AM – 1 PM

Focus on cucurbit and tomato viruses and their management

UF/IFAS Southwest Florida Research and Education Center
2685 SR-29 N
Immokalee, Florida 34142

Please RSVP – 239-658-3400 or email Zoe Watson at zshobert@ufl.edu

March 6, 2020 Bridging the GAPS: Approaches for Treating Irrigation Water On-Farm 8:30am - 4:00pm

UF/IFAS Everglades Research and Education Center
3200 Palm Beach Road
Belle Glade, FL 33430

Regional experts will discuss different approaches to treating water on-farm and how to implement pre-harvest water treatment systems, meet the water treatment requirements of the Produce Safety Rule, and how to verify that the system is operating as intended.

Cost to Attend: \$50. Cost includes the training materials, lunch, and refreshments. Seats are limited to 30. For questions, email Sarah McCoy at sarahmccoy@ufl.edu

Agenda

8:30 – Registration

9:00 – Welcome and introductions

9:15 – Agricultural Water Treatment and FSMA

10:15 – Agricultural Water Treatment Tools

Under the newly revised Worker Protection Standard (WPS), training materials must be EPA-approved when officially training workers, handlers, and trainers. At present, the only EPA approved materials available can be found at the PERC website

- Expanded training concepts will be required starting January 2, 2018.
- Training must be delivered in a manner that can be understood, in a location relatively free from distractions.
- When training workers or handlers, the trainer must remain present at all times to be available to answer questions, even when showing a video.
- Trainers must be qualified, most often by holding a pesticide applicator's license or by completing an EPA-approved Train-the-Trainer course.

Training Materials for Workers and Handlers - <http://pesticideresources.org/wps/temp/training/index.html>

Need CEU's?

Here are a couple of ways to earn CEU's

1. Earn CORE CEUs for pesticide license renewal in your office or at home

CEU: Continuing Education Units

<http://citrusindustry.net/ceu/>

Earn CEU Credits NOW online through Southeast AgNet & Citrus Industry Magazine

The following series of articles and quizzes are available:

- 2019 #4: The fate of pesticides (10/31/2020)
- 2019 #3: Protecting soil and water while using pesticides (7/31/20)
- 2019 #2: At-a-glance safety information (4/30/20)
- 2019 #1: What is a pesticide, really? (1/31/2020)

Need more CORE CEUs – here is an easy way to obtain CORE CEU's on-line by reading an article and answering questions regarding the online. A passing score obtains one Core CEU.

Go to: CEU Series-Growing Produce

<https://www.growingproduce.com/crop-protection/ceu-series/>

- CEU Series: Mix and Load Pesticides Safely
- CEU Series: Protect Crops and the Environment
- CEU Series: Make Sure to Stow Your Pesticides before You Go
- CEU Series: Avoid Mishaps When Handling Pesticides
- CEU Series: Be Aware of Bees When Applying Pesticides
- CEU Series: Place Priority on Preventing Pesticide Poisoning
- CEU Series: Learning about Pesticide Resistance Is Anything but Futile

2. To earn Ag Row Crop, Ag Tree Crop or Private CEUs for pesticide license renewal, attend seminars/workshops at the Immokalee IFAS Center.

3. To earn CEUs for pesticide license renewal in any category, go to: <https://pested.ifas.ufl.edu/ceu/> note there is a charge for these.

Worker Protection Standard Train the Trainer Classes Now On-Line

Exam Administrators - Cesar Asuaje, UF/IFAS Palm Beach County has developed and made available a new EPA-approved WPS Train the Trainer online option. See the following:

The Environmental Protection Agency (EPA) approved this online Worker Protection Standard Train the Trainer (WPS TTT) course, and upon successful completion, the Florida Department of Agriculture and Consumer Service (FDACS) will issue a WPS TTT certificate.

This certificate provides the qualification to train agricultural workers and pesticide handlers under the Worker Protection Standard requirements. The course was developed in collaboration with Ricardo Davalos, Florida WPS coordinator from FDACS.

Cost is \$35

The course is available in the IFAS Catalog at the following link: Certificate version: <https://ifas-farmlabor.catalog.instructure.com/courses/wps-ttt>

EPA-approved Fumigant training program for certified applicators using methyl bromide, chloropicrin, chloropicrin and 1,3-dichloropropene, dazomet and metam sodium and potassium. Applicators must retrain every 3 years. - <http://www.fumiganttraining.com/>

Tomato Brown Rugose Fruit Virus – check out Hazera's training video and sanitation guide for dealing with the ToBRFV virus. https://www.youtube.com/watch?v=Z_NLa0zNFzQ

Check out Southwest Florida Vegetable Grower on Facebook

<https://www.facebook.com/pages/South-Florida-Vegetable-Grower/149291468443385> or follow me on Twitter @SWFLVegMan - <https://twitter.com/SWFLVegMan>

UF/IFAS Palm Beach County Extension: <http://discover.pbcgov.org/coextension/Pages/default.aspx>

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The **South Florida Pest and Disease Hotline** is compiled by **Gene McAvoy** and is issued on a biweekly basis as a service to the vegetable industry.

Gene McAvoy

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Regional Vegetable Extension Agent IV Emeritus

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