



SOUTH FLORIDA VEGETABLE PEST AND DISEASE HOTLINE

February 26, 2019

Rainy weather at the end of January and early February brought heavy rains and some flooding to many areas with totals from 3 – 6 inches being reported for the period.

A cold front on January 21 brought the coldest weather of the season with temperatures in Okeechobee dipping below freezing for a brief period. Temperatures over the past few weeks have been unseasonably warm with daytime temperatures reaching to the upper 80’s and nighttime temperatures in the upper 60’s to low 70’s.

FAWN Weather Summary

Date	Air Temp °F		Rainfall (Inches)	Ave Relative Humidity (Percent)	ET (Inches/Day) (Average)
	Min	Max			
Balm					
1/21 – 2/18/19	34.42	90.01	3.02	78	0.09
Belle Glade					
1/21 – 2/18/19	37.86	89.78	5.80	86	0.09
Clewiston					
1/21 – 2/18/19	36.85	89.19	5.32	84	0.09
Ft Lauderdale					
1/21 – 2/18/19	43.95	89.80	6.25	81	0.09
Homestead					
1/21 – 2/18/19	40.85	86.94	3.84	84	0.09
Immokalee					
1/21 – 2/18/19	36.44	89.56	5.26	85	0.09
Okeechobee					
1/21 – 2/18/19	29.23	89.83	5.42	82	0.09
Wellington					
1/21 – 2/18/19	39.8	90.7	5.87	84	0.08

“Remember, when in doubt - scout.”

The National Weather Service forecasts indicates that the frontal boundary should lift north on Wednesday, turning winds more southerly. Showers (and perhaps a thunderstorm) remain possible, with the greater chances focused on northern and eastern portions of our area. High temperatures should reach into the 80s.

Thursday through Monday, low-level western Atlantic ridging will remain strong, likely keeping any disturbed weather to our north. Temperatures will remain on the warm side, with above normal values likely into the weekend.

For additional information, visit the National Weather Service in Miami website at <http://www.srh.noaa.gov/mfl/newpage/index.html>

Insects

Whiteflies

Around Immokalee, whiteflies numbers increasing in a number of areas but remain variable depending on location. Some growers are reporting high to very high whitefly numbers in a number of eggplant, squash, watermelon, and tomato fields and are spraying for whiteflies on a near daily basis, while in other places; growers are reporting low numbers and no problems. In locations with high populations, respondents indicate they are seeing small plants with 3-8 adults/plant a few days after being set in the field.

Reports from Palm Beach County indicate that whitefly numbers are increasing with growers continuing to battle whiteflies in some tomato and eggplant. Respondents report that high numbers are blowing into some squash from adjacent plantings.

Growers and scouts around Homestead report that whitefly numbers are high in a variety of vegetables including okra, eggplants, beans, cucurbits, and numbers are on the increase. Whitefly vectored viruses such as bean golden mosaic and TYLCV are also increasing.

Incidence of TYLCV is also spiking around SW Florida with some fields approaching 100% infection. Spring tomatoes could be a battle unless growers have TYLCV resistant varieties.

There is also the potential for problems in spring watermelons since we have not had enough cool weather to slow the wild cucurbit weeds and enough fall watermelons and scattered virus around to get the ball rolling. Growers should be alert to the potential migration of whiteflies to spring crops.

Studies have shown a strong correlation between weather and whiteflies. Populations plummet following adverse conditions and buildup during periods of mild weather. Given that fact that we have had a relatively mild fall, there has been no check on populations or weedy hosts of whitefly transmitted cucurbit viruses, so without a weather related check in populations, there is significant potential for a buildup of whitefly populations and increases in whitefly-transmitted viruses this spring.

As fall crops come off, field hygiene including rapid and timely crop destruction and clean up should be a high priority and should be an integral part of the overall strategy for managing whitefly populations, TYLCV incidence, and insecticide resistance. These practices will help reduce the onset of the initial infestation of whitefly, regardless of biotype, and lower the initial infestation level during the cropping period.

Disrupt the virus-whitefly cycle in winter by creating as long a break in time and/or space as possible between fall and spring crops, especially tomato, cucurbits and other crops where whitefly vectored viruses are an issue.

Promptly and efficiently, destroy all vegetable crops within 5 days of final harvest to decrease whitefly numbers and sources of plant viruses like TYLCV. Destroy old crops quickly and thoroughly after harvest, killing whiteflies and prevent re-growth.

Spray first with a tank mix of pyrethroids and Malathion to kill whiteflies in the old crop. 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.

Treat spring plantings of tomato with a systemic insecticide in the transplant water. Preventative soil applications of either imidacloprid, thiamethoxam, dinotefuran, flupyradifurone or cyantraniliprole should be used as a routine practice in tomato and cucurbits. (Table 1).

If on drip, make a second soil application in 30 days using a systemic insecticide of different mode of action.

Scout crops every week and apply insecticides as needed to maintain control. Target nymphs once the threat of immigration from old crops has passed. (Table 2).

Growers should also consider the use of metalized (UV reflective) mulch as an additional management practice for day-flying pests such as whiteflies, thrips, aphids, pepper weevil and even broad mites, which use flying insects to move around.

Scouting is important for early detection of migrating whiteflies and contact insecticides should be used to knockdown incoming whiteflies.

Dr Dak Seal, Entomologist at UF/IFAS TREC reports that in trials, Sivanto applied on foliage and on soil as drench application provided significant reduction of whitefly eggs, nymphs and adults.

Admire and Verimark as a soil drench followed by Knack, Movento and Assail also provided significant reduction of whitefly related plant health problems in research trials.

Table 1; 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
Dinotefuran	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

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		
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	fenpyroximate	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.

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>

Pepper Whitefly

Whiteflies are also present in some pepper fields as well. Although, samples have not been submitted for ID, these could be pepper or solanum whitefly (*Aleurotrachelus trachoides* Back) which is becoming more common on pepper in Florida. .

Heavy infestations may lead to stunting and reduced yields, as well as negatively affect quality through the production of wax and honeydew, which provides an excellent substrate for the growth of sooty mold.

Early nymphal instars are flat, round to oval shaped, light to golden yellow in color, and may bear eight spherical patches on the dorsal surface. As the nymphal instars mature, they become more convex, their color

turns darker, and they produce a dense, cottony wax and long, thin, waxy filaments. The puparium of this species has a distinct pattern comprised of three dorsal brown patches which, when under magnification gives the appearance of a mid-dorsal horizontal stripe on an otherwise light or nearly colorless body.

Being a new pest of economic importance, not much information is available about effective management practices for *Aleurotrachelus trachoides*. As with other whiteflies, soaps and horticultural oils can be used to suppress early infestations, and effective control can be achieved using application of systemic insecticide

Pepper Weevils

On the East Coast, reports indicate that pepper weevils are reaching high numbers in some pepper and eggplant.

Around Immokalee, pepper weevil numbers are increasing in a number of older fields and are showing up in new locations.

Weevils are a major problem in the Homestead area and serious infestations are being reported in a number of plantings irrespective of pepper varieties and location.

The pepper weevil (*Anthonomus eugeni*) is a key pest of all pepper varieties grown in Florida.

Scouting is important as with other pests to detect infestations at an early stage. Since adults tend to move to lower, more protected and less visible plant parts as temperatures increase, scouting efforts should concentrate on a search for adults in leaf whorls, flowers and fruit during morning hours. Commercially available pheromone traps may also aid in early detection. These should be placed around the borders of pepper fields in an effort to detect early stages of infestation before flowering. Once infestations are detected, applications of pesticides to kill adults will help reduce numbers.

Infested fruits can be recognized before they fall by the yellow calyx and the presence of oviposition punctures that look like small dimples. Hot peppers like Jalapeno and Serrano's are often the first peppers to be affected. Fruit and flower buds should be examined for damage and fallen fruit and buds examined for presence of larvae. If possible, all damaged and fallen fruit should be removed and destroyed.

Chemical control is difficult because all stages but the adult are protected within the fruit, so that only the adult weevil is vulnerable to insecticides. Frequent sprays may be necessary starting in the initial stages of infestation in order to avoid unacceptable levels of damage.

Spraying needs to commence at the first sign of weevils or with flowering in fields with a history of problems. Vydate has been the standard control and has given pretty good results when sprayed weekly in trials at the Southwest Florida Research and Education Center. A total of 24 pts can be applied for the season.

Growers may also want to look at Actara, diamides such as Exeril as well as Rimon, and Dimilin in a program with Vydate along with pyrethroids to knock down adults. Growers should be aware that you cannot spray your way out of this problem but need to take a pro-active IPM approach throughout the season including good sanitation and destruction of old fields and separation of planting in time and space with a crop-free period between fall and spring plantings where practicable.

Once weevils are well established in a field it is difficult to spray your way out of the problem and crop destruction may be the best option.

Aphids

Scouts in SW Florida report seeing more winged aphids moving around over the past week or so. Populations are reaching high levels in some weedy hosts.

A few aphids are showing up on lettuce and are widely present in celery in the EAA.

On the East Coast, growers and scouts are reporting increased aphid activity in herbs and some pepper with populations getting heavy in some places.

Aphids remain mostly low around Homestead but can be a threat to a variety of crops.

The green peach aphid, *Myzus persicae* (Sulzer), readily infests vegetables and can be transported long distances by wind and storms. Green peach aphid feeds on hundreds of host plants in over 40 plant families and is one of the most important vector of plant viruses.

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In Florida, aphids persist as active nymphs and adults on hardy crops and weeds throughout the winter months. As aphid densities increase on host plants, winged forms are produced, which then disperse to summer hosts. They often deposit a few young and then again take flight. This highly dispersive nature contributes significantly to their effectiveness as vectors of plant viruses.

As aphid densities increase or plant condition deteriorates, winged forms are again produced to aid dispersal. The dispersants typically produce about 20 offspring, which are always wingless. This cycle is repeated throughout the period of favorable weather.

The wide host range of green peach aphid makes crop rotation a difficult tactic to implement successfully. Crops grown down-wind from infested fields are especially susceptible because aphids are weak fliers and tend to be blown about. Infested crops should be destroyed immediately after harvest to prevent dispersal.

Excessive and unnecessary use of insecticides should be avoided. Early in the season, aphid infestations are often spotty, and if such plants or areas are treated in a timely manner, great damage can be prevented later in the season.

Sulfoxflor (Closure) is the best insecticide to control green peach aphid. Softer pesticides including insecticidal soaps such as M-Pede), nicotinoids like Admire, Provado, Assail and others including Beleaf, Movento and Fulfill will provide good control and help reduce impact on beneficials.

Leafminer

Around Southwest Florida, leafminers numbers are widely present and numbers appear to be increasing and continue to be a threat to susceptible crops.

In Palm Beach, County, reports indicate that leafminer pressure is remains mostly low.

Around the EAA, leafminers are mostly low but continue to be a nuisance in some celery.

Reports from Homestead indicate that leafminer are present in susceptible crops.

The two major species of leafminer that cause problems in vegetables in Florida are the vegetable leafminer (*Liriomyza sativae*) and the American serpentine leafminer (*L. trifolii*).

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.

Leafminers have a relatively short life cycle. The time required for a complete life cycle in warm environments such as Florida is often 21 to 28 days, so numerous generations can occur annually.

An integrated pest management program that stresses conservation of natural enemies is important for the successful control of leafminer. Therefore, it is important that the scouting program include not only an assessment of the number of leafminers present but also the natural enemies.

Cyromazine (Trigard) alternated with abamectin (Agrimek) are effective against leafminer in tomato. Both of these products have limited crop registrations and must not be used on unregistered crops. Dow Radiant (Spintoram) has also given good results and is labeled on a wide range of crops. Some other materials that may be used to conserve beneficials include azadirachtin (Neemix) and insecticidal oils. Both products are approved for use by organic growers as is Conserve (spinosad).

The newest additions to the grower's arsenal of control are Coragen (chlorantraniprole) and Exirel/Verimark (cyantraniliprole) which have shown good results. Consult UF/IFAS recommendations for currently labeled insecticides for leafminer control in Florida.

Worms

With the exception of diamondback moths, worm populations are mostly low around South Florida.

In the EAA, there have been some sporadic up-ticks in worm activity in corn.

Diamondback moths are high in cabbage and other crucifers and appear to be increasing in a number of areas around South Florida.

The diamondback moth, (*Plutella xylostella*), is one of the most destructive pests of crucifers in Florida. Virtually all cruciferous vegetables are attacked.

Diamondback moths are gray in color with a wingspread of less than one inch, and move rapidly when disturbed. Males display 3 yellowish diamond shaped markings on the back when the wings are folded together.

Larvae are light green, slightly tapered at each end, and are covered with tiny, erect black hairs. When full grown they are about 1/3 inch long. They wiggle rapidly when disturbed, often dropping from the plant and hanging by silken threads.

Plant damage is caused by larval feeding. They may feed on all parts of host plants chewing small holes in leaves, or may feed superficially, leaving a thin layer of intact tissue, creating a windowpane effect.

Although diamondback larvae are very small, they can be quite numerous, resulting in complete removal of foliar tissue except for the leaf veins. This is particularly damaging to seedlings, and may disrupt head formation in cabbage, broccoli, and cauliflower.

The presence of larvae can result in rejection of produce, even if the level of plant tissue removal is insignificant.

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

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.

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.

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.

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.

Growers should inspect transplants as starting with clean transplants is a very important step in reducing potential problems later in the season.

Many excellent worm materials are present on the market so growers have a number of options available. *Bacillus thuringiensis*, and Spear-T provide effective control of worms. Growers should avoid using broad spectrum insecticides.

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 aizawa strains because resistance to these microbial insecticides occurs in some locations. 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.

Proclaim has worked well in the past and should be worked into a rotation along with Avaunt, Knack and Rimon. Some growers have indicated that tank mixes with Bt's seem to have improved control.

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.

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

Thrips

Around Palm Beach County, thrips levels are increasing in a number of fields where they were low and reaching higher numbers in places where they were already high.

Growers and scouts in Homestead report that thrips populations are high. Reports indicate that common blossom thrips populations appear to be higher than previous years and TCSV incidence is reaching alarming levels in some fields. Around Homestead, the presence of alternate hosts such as weeds and ornamentals provide an important source of thrips that move readily to vegetables. Some of these hosts have been found to be positive for TCSV.

Thrips vectored TCSV incidence in tomato is high in a number of Homestead tomato fields. In some tomato fields, infestation level is running 40-60%. Florida 40 and Sanibel are very susceptible to TCSV. Many growers are planting Red Bounty, which seems to be resistant to TCSV.

Around Homestead, the melon thrips situation is growing worse on a wide variety of susceptible crops. In some places, counts of 800 adults and larvae were found on a sample of five (four-week old) eggplant leaves. Dr Dak Seal reports that applications of Radiant, Torac, Exirel, and Novaluron in weekly rotation looks effective in controlling melon thrips.

Growers should consider use reflective plastic mulch at least at field margins to repel this virus carrying thrips. Since some ornamental plants are more preferable as flower thrips as hosts than vegetable crops, growers should avoid planting tomato within 1,000 feet of a nursery if possible. Planting non-host crop as a barrier may also help reduce flower thrips infestation on vegetable crops.

Elsewhere around South Florida, thrips numbers remain mostly low but becoming more prevalent in pepper blossoms and other crops.

Broad Mite

Respondents on the east coast report that broad mites are common in pepper and eggplant. Pressure ranges from low to moderate depending on location.

Growers in Southwest Florida report that broad mites are still around in some older pepper.

Around Homestead, broadmites are patchy in occurrence some pepper and eggplant.

Spider Mites

Around Homestead, spider mites are around and can be found in pepper, beans, eggplant, corn and tomato depending on location.

In Palm Beach, a few spider mites are showing up in eggplant.

Spider mites are increasing in older eggplant and some tomato around SW Florida.

Around Plant City, respondents report that mites are picking up in chemically controlled fields, but remain under control in fields where predator mites have been released.

Use of pyrethroids can increase the incidence of mites due to impacts on beneficials.

Stinkbug

Stinkbug are causing some problems in pepper, tomato and eggplant in a number of locations around South Florida.

Corn silk fly

Around the EAA, corn silkfly populations are beginning to build.

Reports from Homestead indicate that silkfly populations remain mostly low.

Populations will increase this spring as temperatures increase. Growers should manage cull piles, as these sources are preferred substrates for egg laying. Use of pyrethroids routinely may provide suppression of corn silk flies in sweet corn.

Diseases

Target spot

Around Immokalee, target spot remains active in tomato and respondents report increased activity in some places.

Reports from the East Coast indicates that target spot is becoming active in tomato.

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.

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

Bacterial Spot

Around SW Florida, growers and scouts report some new bacterial spot infections on tomato but note that it is not as bad as might be expected with recent rains.

Some bacteria is showing up in some East Coast tomatoes, but respondents report that peppers including susceptible varieties remain clean.

Bacterial Blight

Dr Richard Raid, Pathologist at UF/IFAS EREC reports that common bacterial blight has been active in green beans around Belle Glade. He notes that while normally lesions mainly affect foliage there has been some damage to pods as well.

With common bacterial blight, caused by *Xanthomonas campestris* pv. *phaseoli*, the first evidence of infection appears in the form of water-soaked spots on the leaves. With age, lesions enlarge and coalesce. The entire leaf finally turn brown and drops.

Stem lesions appear as long, reddish colored spots. When the plant begins to set fruit, lesions are formed at the nodes, which girdle the stem.

The disease can cause spots on the pods, which start as water-soaked (greasy) areas and later become surrounded by a brick-red border. Such spots cause severe quality loss in both fresh market beans and may result in rejection of an entire field.

This disease may be seed-borne. Entry into the plant is through the leaf stomata. Rain and damp weather encourage development of bacterial blight. Common blight is more of a problem in warm weather.

Since the disease can be seedborne, one of the most effective controls is to plant certified blight-free seed grown in drier areas of the western United States. Even a trace of infected seed when planted can initiate severe infection of entire fields.

It is especially important to avoid spreading the disease by keeping pickers and cultivators out of the field when the foliage is wet to reduce the amount of spread in the field.

Spraying with fixed copper is of some benefit if applied at first signs of the disease.

Early Blight

Low levels of early blight are starting to show up on tomato in a couple of locations around South Florida.

Phytophthora

On the East Coast, Phytophthora incidence is high in some pepper and older squash. Incidence is increasing in some places but occurrence is patchy and many fields remain clean.

Phomopsis

Phomopsis has been reported at moderate levels in some East Coast eggplant.

Growers and scouts are also reporting problems with Phomopsis on eggplant around SW Florida.

Phomopsis blight, caused by the fungus *Phomopsis vexans*, is a destructive disease of eggplant worldwide. Young seedlings can be attacked soon after emergence. Dark lesions may form slightly above the soil line, become sunken, and eventually result in cankers that girdle the stem. Seedlings affected in this manner will typically collapse and die.

The fungus will attack leaves throughout crop development; older leaves are most susceptible. Lesions are usually circular, gray to brown, and develop a light center as they mature. Numerous fruiting bodies of the

fungus, called pycnidia, can often be seen in the center of the older lesions. They appear as tiny, black pimples embedded in the host tissue. Affected leaves may turn yellow and drop prematurely. Spots and cankers can also form on mature stems and branches.

The most important symptoms are those that occur on the fruit, as these render the fruit unfit for market. Injury begins as pale, sunken, circular to oval areas on the surface. These later enlarge, and become markedly depressed.

Several spots may coalesce, affecting large portions of the fruit. The key to diagnosis of Phomopsis fruit rot is the observation of the pycnidia or fruiting bodies embedded in the flesh of the lesion interiors. These black pimple-like structures are often arranged in a roughly concentric pattern.

The causal fungus survives between crops in plant debris in the soil. Since the non-cropping season in southern Florida is very short, enhancing the survival potential of the pathogen. Spores of the fungus ooze out of the pycnidia in a sticky matrix. The major means of spread of the pathogen is in splashing rain.

Phomopsis blight is favored by hot, wet weather.

Since Phomopsis persists on and in seed, and overwinters in residue from diseased plants prompt destruction of infected plant material after the cropping season is important in reducing initial inoculum. In transplant production, use of certified seed and pathogen-free planting media is essential. Growers should ensure that transplants taken to the field are free of disease.

A spray program with a protectant fungicide is necessary to maintain yield and quality. Various copper fungicides are labeled for this purpose.

Fusarium

Fusarium remains active in some tomato around Immokalee.

Respondents on the East Coast report that Fusarium is increasing in some tomato and older pepper around Palm Beach County.

Sclerotinia

Respondents in Palm Beach County report that sclerotinia is active and increasing in incidence in some mature pepper fields.

Low levels of sclerotinia are also taking out individual plants here and there in some pepper and tomato fields around SW Florida probably as result of infections initiated a few weeks ago when cooler temperatures and high humidity prevailed.

Growers and scouts report finding a low incidence of white mold in snap beans (close to harvest) in the Clewiston area.

Powdery Mildew

Growers and scouts around Palm Beach County report that powdery mildew is high in many mature squash field but remain low in younger fields.

Reports from SW Florida indicate that powdery mildew is getting high in squash and is now showing up in some older pepper as well.

Around Homestead, powdery mildew is active in squash and some beans.

Downy Mildew

Respondents indicate that downy mildew remains active around South Florida in cucurbits like squash and cucumber.

Downy mildew is also causing problems with basil.

Respondents in the Belle Glade area report that crucifer downy mildew has picked up hitting kale, arugula, cabbage and some of the spring mix crops, like mizuna and tatsoi. Dr Rick Raid, Pathologist at ERC recommends that growers should be on a preventative program, hitting the crop soon after emergence if downy has been spotted in the immediate area.

Dr Rick Raid, Pathologist at EREC reports that lettuce downy mildew, caused by *Bremia lactucae*, has been observed and is active in the EAA.

He advises growers to be on a consistent preventative program using mancozeb and a phosphite rotated with a fungicide specific for oomycetes such as Revus, Zampro, Orondis, Ranman, Reason, Forum, Presidio, Previcur flex, Alette, etc.

Growers can check with their suppliers and read the label carefully before using for plant back, use patterns, and rates. Dr Raid asks that growers submit samples if they suspect they have downy mildew.

Gummy Stem Blight

Around SW Florida, gummy stem blight is present on some watermelon but progression has slowed in recent weeks.

Gummy stem blight can be successfully managed using a combination of control strategies. Control of primary sources of inoculum is important. Growers should purchase clean seed and avoid transplants that have gummy stem blight or other diseases.

Multiple applications of fungicides are necessary to control gummy stem blight. It is important to begin a fungicide program prior to the first sign of gummy stem blight. In south Florida, the spray program should be initiated soon after emergence. In other areas of the state, fungicide spray programs can be initiated when the vines begin to “run.” Fungicides like mancozeb or Bravo in rotation will provide good protection before disease is established in the field

In recent years, strains resistant to the strobilurin fungicides have been detected throughout the Southeast, so it is important that growers practice resistance management and avoid repeated applications of these and all fungicides. Materials such as Folicur (Tebuconazole), Pristine (BASF) a mixture of boscalid and pyraclostrobin, and Topsin (thiophanate methyl) have shown good efficacy against resistant strains of the disease.

Tomato Yellow Leaf Curl Virus

Around SW Florida, respondents indicate that TYLCV is starting to increase in a number of tomato fields, both in older planting as well as in some younger fields. Incidence has reached 100% in some locations.

Around Homestead, reports indicate that TYLCV in tomatoes is increasing but remains fairly low at 1-2% incidence in most fields.

Tomato Chlorotic Spot Virus

Around Homestead, respondents report tomato chlorotic spot virus is reaching alarming levels (>40%) in some fields.

Around Palm Beach County, tomato chlorotic spot virus remains very low with only a few isolated plants being reported here and there.

Bean Golden Mosaic Virus

Respondents from Homestead report that bean golden mosaic virus (BGMV) is present in snap beans.

Northern Corn Leaf blight

Around the EAA, northern corn leaf blight caused by the fungus *Exserohilum turcicum* has flared up over the past few weeks

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.

Resistant varieties are available and should be considered, particularly for spring plantings.

Fungicide application can effectively control Turcicum when applied at the right time. Fungicide 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 stobulurin 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.

News You Can Use

SOUTH FLORIDA WEATHER SUMMARY FOR JANUARY 2019

Near Normal Temperatures and Wetter Than Normal

January started out warm and dry across South Florida as high pressure aloft kept cold fronts from moving through our area. As we approached the middle of the month, however, the high pressure aloft gave way to a more active jet stream pattern over the southern United States. This pattern change led to more frequent cold frontal passages along with enough moisture to cause cooler and wetter conditions for most of the second half of the month.

The end result for the month of January was near normal temperatures and above normal rainfall for the vast majority of South Florida. Below are the temperature and precipitation statistics for the 4 main climate sites.

TEMPERATURES

The warmest period of January was during the first week when high temperatures reached the mid 80s area-wide. The coldest period was on the heels of a strong cold front that swept through South Florida on Sunday the 20th. Low temperatures the following morning dipped into the 30s over most of interior South Florida, with a lowest reading of 32F at Ortona in western Glades County. Lows over metro sections of both the Atlantic and Gulf coasts were in the lower to mid 40s.

Other noteworthy statistics and data:

- Miami International Airport: the highest temperature recorded was 84 degrees set on the 4th and 24th, and the lowest temperature recorded was 46 degrees on the 21st. The temperature reached or exceeded 80 degrees on 8 days, below the 30-year mean of 11 days. The number of days below 50 degrees was one (1) which is below the 30-year mean of 4.
- Palm Beach International Airport: the highest temperature recorded was 84 degrees set on the 4th and 13th, and the lowest temperature recorded was 42 degrees on the 21st. The temperature reached or exceeded 80 degrees on 8 days, below the 30-year mean of 9 days. The number of days below 50 degrees was six (6) which is below the 30-year mean of 7.
- Fort Lauderdale/Hollywood International Airport: the highest temperature recorded was 84 degrees set on the 4th, and the lowest temperature recorded was 44 degrees on the 21st. The temperature reached or exceeded 80 degrees on 6 days, below the 30-year mean of 8 days. The number of days below 50 degrees was two (2) which is below the 30-year mean of 4.
- Naples Municipal Airport: the highest temperature recorded was 87 degrees set on the 2nd, and the lowest temperature recorded was 44 degrees on the 21st and 29th. The temperature reached or exceeded 80 degrees on 8 days, below the 30-year mean of 9 days. The number of days below 50 degrees was six (6) which is below the 30-year mean of 8.

Precipitation

Several rain episodes in the middle to latter part of January in association with the cold fronts that moved through South Florida resulted in above normal rainfall over almost all areas (see rainfall maps below the table). Several locations in Palm Beach County and in Southwest Florida ranked in the top 20 on record for the month of January

Following are January 2019 rainfall totals, departure from normal in inches and ranking for selected locations:

Location (Beginning of Period of Record)	January 2019 Rainfall (inches)	Departure from Normal	Rank
Brighton Reservation (Glades Co.)	3.87	+1.78	
Canal Point (1941)	4.85	+2.70	
Cape Florida	2.67	+0.27	
Devils Garden (1957)	5.76	+3.76	5th Wettest
Fort Lauderdale/Hollywood Int'l (1912)	4.21	+0.58	18th Wettest
Fort Lauderdale Executive Airport	3.95	+1.43	
Fort Lauderdale Dixie Water Plant	4.53	+1.91	
Fort Lauderdale Beach	4.75	+2.11	
Hialeah (1940)	2.40	+0.48	
Hollywood (1963)	4.03	+1.37	
Homestead General Airport (1990)	2.57	+1.15	
Immokalee (1970)	4.63	+2.45	
Juno Beach (2002)	7.02	+4.30	3rd Wettest
LaBelle (1929)	4.79	+2.75	7th Wettest
Loxahatchee NWR	3.92	+1.08	
Marco Island	3.73	+1.65	
Miami Beach (1928)	1.92	-0.17	
Miami International Airport (1895)	2.00	+0.38	
Moore Haven (1918)	5.25	+3.50	7th Wettest
Muse	4.56		
North Miami Beach	4.27	+2.13	

Outlook for February

The February outlook by the NOAA Climate Prediction Center calls for an increased likelihood of above normal temperatures, with equal chances of above, below, and near normal precipitation. This is a reflection of a pattern change towards lower temperatures in the western United States and milder air across the eastern part of the U.S., essentially the opposite of the mid-late January pattern.

For the latest south Florida weather information, including the latest watches, advisories and warnings, please visit the National Weather Service Miami Forecast Office's web site at weather.gov/southflorida.

On Farm Readiness Review

The Florida Department of Agriculture and Consumer Services (FDACS) is working with the FDA to provide outreach and education to Florida fruit and vegetable growers who will be impacted by the "Standards for the Growing, Harvesting, Packing and Holding of Produce for Human Consumption" (commonly referred to as the Produce Safety Rule).

The Produce Safety Rule requires one representative from a farm to attend the Produce Safety Alliance Grower Training (or other FDA-recognized curriculum). The Produce Safety Alliance Grower Training helps growers to understand each part of the regulation and how to comply.

FDACS is collaborating with the University of Florida Institute of Food and Agricultural Sciences Extension Service to deliver Produce Safety Alliance Grower Trainings and On-Farm Readiness Reviews.

FDACS is offering growers/packers/harvesters an opportunity to participate in a free On-Farm Readiness Review to determine what they might encounter in a FSMA inspection.

An On-Farm Readiness Review is an educational opportunity intended to walk producers through what an actual inspection on their farm may look like, before a real inspection is conducted.

To sign up or learn more about the free, educational On-Farm Readiness Review program, complete and submit the form below.

<https://www.freshfromflorida.com/Business-Services/Fruit-and-Vegetables/Food-Safety-Modernization-Act-Produce-Safety-Rule/On-Farm-Readiness-Review>

Someone from FDACS as well as UF/IFAS will conduct the OFRR to help prepare you for future inspections which will begin in 2019.

For more information on the program, contact:

Sydney S. Armstrong
FSMA Coordinator
Division of Fruit and Vegetables
Florida Department of Agriculture and Consumer Services

(863) 578-1944 OFFICE

(863) 298-2011 CELL

Sydney.stone@FreshFromFlorida.com

Upcoming 2019 UF/IFAS Food Safety Workshops

Produce Safety Alliance Grower Training - a one-day course for fruit and vegetable growers and packers who fall under FSMAs Produce Safety Rule

04/09/19 – Dade City - <https://psa040919.eventbrite.com>

04/23/19 – Wimauma - <https://psa042319.eventbrite.com>

05/01/19 – Kissimmee - <https://psa050119.eventbrite.com>

06/06/19 – Homestead - <https://psa060619.eventbrite.com>

Beyond Basic Produce Food Safety: A Hands-On Analysis - this one-day course is targeted at those who have already attended a food safety training and are looking for a more in-depth and hands-on experience. It is not a substitute for a PCQI or PSA Grower Training for FSMA.

03/14/19 – Lake Alfred - <https://beyondbasic031419.eventbrite.com>

04/16/19 – Live Oak - <https://beyondbasic041619.eventbrite.com>

Preventive Controls for Human Food- Preventive Controls Qualified Individual (PCQI) Training

This three-day course for those covered under FSMAs Preventive Controls for Human Food Rule

03/19-21/19 – Lake Alfred - <https://fspca031919.eventbrite.com>

HACCP for Florida Fresh Fruit and Vegetable Packinghouses - this two-day course is not a requirement of FSMA rules, but may be required by some third party audit schemes

Questions or need help with registration, contact Travis Chapin – tkchapin@ufl.edu or (863) 956-8642.

Up Coming Meetings

February 27, 2019

Lettuce Advisory Meeting

12:00 PM

Everglades Research & Education Center
3200 E Palm Beach Rd.
Belle Glade, FL 33430

March 28, 2019

Smart Agriculture and Smart Technologies

8:30 AM – 2:30 PM

UF/IFAS SWFREC
Immokalee, FL

Module 1 – Title: Field demonstration (Dr. Ampatzidis and Dr. Kanissery) – 60 minutes

The smart technology demonstration will include: (i) a smart sprayer for weed management (sprays only on specific weeds, not the crop or ground; it is environmentally friendly and can potentially reduce the herbicide use), developed at the Precision Ag. Engineering lab (Dr. Ampatzidis lab) at SWFREC; and (ii) precision pest management; and (iii) a UAV demonstration for site-specific crop management.

Module 2 - Presentation Title: Smart machinery and technologies (Dr. Ampatzidis) – 30 minutes

This presentation will enable IFAS Extension personnel and stakeholders to better understand smart technologies for agricultural applications and promote adoption of these of state-of-the-art technologies and techniques. It will also enable them to improve profitability and environmental sustainability of Florida's fruit and vegetable industry.

Module 3 - Presentation Title: Precision weed management (Dr. Kanissery) – 30 minutes

The topic of precision weed management integrates biological methods and engineering approaches for managing a problem that has troubled crop production forever: “weeds.” From plant identification apps to herbicide spraying robots, weed management in cropping systems has advanced rapidly in the adoption of new technologies in the last few decades. This presentation will be focused on novel and precision weed control technologies and will touch base with topics like the precision placement of herbicides and targeted application systems. Aspects of utilizing unmanned aerial systems (UAS) and plant recognition technologies for informed weed management decisions will also be discussed.

Module 4 - Presentation Title: Implementing smart irrigation systems (Dr. Guzman) – 30 minutes

Smart irrigation uses controllers and sensors that monitor environmental and water changes to run automatic watering schedules. These smart systems have the potential to significantly improve water use efficiency if they are well implemented. In this presentation, we describe the type of sensors available and provide information on how to select, install and maintain those sensors in the field.

Module 5 - Presentation Title: Remote sensing applications in precision agriculture (Dr. Singh) – 30 minutes

Remote sensing technologies such as unmanned aerial systems (UAS/drones) have the potential to revolutionize farm operation and management by providing timely and accurate information on crop growth, progress, and performance. However, it is also important to recognize possible shortcomings of these technologies depending

on applications and combinations of sensors utilized. This talk will compare and contrast the efficiencies of certain combination of sensors available in the market today, and also apprise participants of recent sensor development efforts at UF/IFAS.

Module 6 - Presentation Title: Factors affecting precision agriculture adoption (Dr. Wade) – 45 minutes
Precision agriculture adoption has the potential to reduce production inputs, reduce farm costs, increase farm productivity and efficiency, and increase environmental stewardship. Far more is known about technology adoption in program crops than in specialty crops. This module examines national trends in technology adoption as well as new adoption data from surveys of Florida specialty crop growers. Participants will gain knowledge in the factors affecting adoption and identify common barriers to increased precision agriculture use.

Please call Sri Charan at 239-324-4794 or send an email to charanksri@ufl.edu for more information

Websites

Food Safety Modernization Act – draft guidance issued. FDA will call for comments.

Draft Guidance for Industry: Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption

<https://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/ucm606284.htm>

Guide to Minimize Food Safety Hazards of Fresh-Cut Produce: Draft Guidance for Industry

<https://www.federalregister.gov/documents/2018/10/22/2018-23005/guide-to-minimize-food-safety-hazards-of-fresh-cut-produce-draft-guidance-for-industry-availability>

PERC is the **Pesticide Educational Resources Collaborative** – the website provides a wealth of resources to help you understand and comply with the 2015 Revised WPS including training materials, the “new” WPS poster, handouts and WPS respiratory guide. <http://pesticideresources.org//index.html>

PERC - WPS Compliance Suite — Training Materials

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 CORE CEU's? – 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.

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

Go to <http://www.growingproduce.com/?s=CORE+CEUs>

Interactive geological map plots your address over 750 million years of Earth's history. - Our planet is alive and ever-changing, shifts over hundreds of millions of years are nothing short of dramatic. This interactive map can show you how the earth under your current address changed over the course of some 750 million years.

http://dinosaurpictures.org/ancient-earth?fbclid=IwAR1QgNI-83bNwCJD6CF79dDRHClq_aPYGKVKbSgdLC3VZ10SZDv26-Zvx8M#0

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>

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

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