



# SOUTH FLORIDA VEGETABLE PEST AND DISEASE HOTLINE

October 20, 2019

**September was extremely dry across South Florida.** Usual rainy season produces around 43 inches of rain. This summer's total of 35 inches and September's meager contribution resulted in an 8-inch deficit from normal.

**Unsettled weather in October and Tropical Storm Nestor last week brought much needed rain to the area.** Balm recorded the highest rainfall at over 7 inches with most other locations receiving 2 – 4 inches.

### FAWN Weather Summary

Date	Air Temp °F		Rainfall (Inches)	Ave Relative Humidity (Percent)	ET (Inches/Day) (Average)
	Min	Max			
<b>Balm</b>					
9/23 – 10/20/19	63.45	93.90	7.41	82	0.13
<b>Belle Glade</b>					
9/23 – 10/20/19	61.65	92.21	3.96	86	0.13
<b>Clewiston</b>					
9/23 – 10/20/19	64.56	92.14	4.14	84	0.13
<b>Ft Lauderdale</b>					
9/23 – 10/20/19	67.55	92.50	3.94	74	0.13
<b>Homestead</b>					
9/23 – 10/20/19	63.93	91.02	3.07	83	0.13
<b>Immokalee</b>					
9/23 – 10/20/19	62.64	95.65	2.25	82	0.13
<b>Okeechobee</b>					
9/23 – 10/20/19	62.01	92.17	1.85	86	0.12
<b>Wellington</b>					
9/23 – 10/20/19	65.93	93.27	2.56	85	0.13

**“Remember, when in doubt - scout.”**

**Temperatures have been warm with daytime highs in the upper 80's and low 90's; night have been mainly in the 70's.** A cool front at the end of September saw a few nights in the 60's.

**Hot dry windy conditions in September caused some wind burn on plants.** Growers are also reporting some salt damage as well as pollination issues in some crops.

**The National Weather Service forecast through next weekend indicates that the frontal boundary will drift northward tomorrow reducing chances of precipitation.** Generally benign and seasonal weather conditions will return early next week with high pressure establishing in the wake of Nestor, and with the frontal boundary over the region finally lifting and dissipating. Models are hinting at a second frontal system impacting the region at the very end of the forecast period. Temperatures will remain close to seasonal values or slightly warmer with afternoon highs in the upper 80s to around 90. For additional information, visit the National Weather Service in Miami website at <http://www.srh.noaa.gov/mfl/newpage/index.html>

## **Insects**

### **Worms**

**Worm pressure exploded in many places over the past few weeks.**

**Growers in the EAA, are reporting constant fall army worm pressure in sweet corn with many new hatches reported leading up to last week's full moon.** Previous isolated hotspots have expanded to nearly every planting. Fall armyworms have been abundant along with corn earworm's also showing up in a few places. following. Beet and southern armyworms have exploded in celery and leaf greens.

**Respondents in SW Florida report that worm pressure has increased sharply across the area.** Scouts report finding a mixed bag of tomato fruitworms, southern, beet and fall armyworms, and tomato hornworms with southern armyworms remaining the most common. Melonworms have come on heavy in some squash and cucumbers.

**Several respondents report obtaining good control of most species but note that beet armyworms seem to be harder to control or at least slower to die.**

**In the Manatee Ruskin area, reports indicate that tomato growers have been battling worms in several locations.**

**On the East Coast, growers and scouts indicate that beet armyworms have been very active in pepper and eggplant.** Melon worms have been a significant issue on cucurbits if growers are not on a stiff management program.

**Around Homestead, growers are battling a variety of leps including fall armyworm on corn, melonworms in cucurbits and southern and beet armyworms in tomato and peppers.**

**Fall is worm time in south Florida.**

**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.

**The different armyworms especially the younger instars are similar in color, size and markings and can be difficult to tell apart.** The following information from the Florida Tomato Scouting Guide to help growers identify these different worms.

- **Beet armyworm: (*Spodoptera exigua*) is generally less numerous than southern armyworm but is more difficult to control.** The larva are generally green, mottled with white spots with black spot over the middle pair of true legs. 1 – 1.25 in. long at maturity. The adults have light brownish gray front wings with indistinct lines and are active at night. The eggs are laid in masses of 50 to 75 eggs covered with a felt like mass of scales from female's body. Eggs are generally found on underside of leaves and hatch in 3 days.

- **Southern armyworm: (*Spodoptera eridania*) the larva are dark caterpillars with a yellowish brown head and a yellowish line along the side of body that is interrupted by a large dark spot on first abdominal segment.** Approximately 2 in. long at maturity. Large larvae have 2 rows of dark triangles on dorsal surface. The young larvae feed on under surface of leaflets leaving upper epidermis intact to give a "window pane" appearance. The adult has the front wing streaked with cream, gray, light brown and black and hind wing white with some dark on margins. Large masses of 100 - 200 eggs covered with moth body scales are found on underside of leaves

- **The yellowstriped armyworm: (*Spodoptera ornithogalli*), has a brownish head with a pale yellow inverted V on the upper front.** It has distinct bright yellow lines on the top of the sides of the body. The yellowstriped armyworm occurs with both overall pale and dark colored bodies. It has two rows of black triangle shaped markings running the length of the body. Each row is offset from the center of the back. A thin white line runs lengthwise through each series of dark triangles. The yellowstriped armyworm is more common in north Florida.

- **Tomato fruitworm: (*Helicoverpa zea*) larval color is variable, ranging from very dark to light green or pink with alternating longitudinal dark and light stripes.** The skin is covered with short sharp micro spines. Adults are active at night, with a 1½ in. wing span. Males display a cream colored forewing with orange or olive cast, while females have a light yellow brown forewing with indistinct vertical lines. Eggs are waxy white and ribbed, with a flat base, and are deposited singly usually on lower surfaces of leaves adjacent to or near flowers. Eggs hatch in 2-3 days.

- **Cabbage or soybean looper: (*Trichoplusia ni* or *Pseudoplusia includens*) Larva are pale green with white line alongside of the body and only 3 pair of prolegs.** Mature size 1 – 1 1/4 in. Adult is a grayish brown moth that is active at night. Front wings marked near center with a figure 8 shaped, silver white spot. Eggs are greenish white, ridged but flattened laterally and are found singly on upper or lower leaf surfaces of upper canopy leaves. Hatches in 2 3 days.

**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.**

### **Diamondback moth**

**Growers and scouts are beginning to report finding diamondback moth larvae and pupae in cabbage and other crucifers around south and central 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 complete rejection of produce, even if the level of plant tissue removal is insignificant.

**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.

**For insecticide recommendations, check UF/IFAS recommendations for currently labeled insecticides for diamondback larvae control in Florida crucifers.**

**Dr. Hugh Smith Entomologist at UF/IFAS GCREC indicates that rotations of Coragen, Proclaim, Radiant, Avaunt, have been effective.** Hugh indicates that the Bts also have a place especially if you can use them early and often for the small larvae.

### **Whiteflies**

**Growers and scouts in the Manatee/Hillsborough are reporting relatively low whitefly pressure in tomato with higher numbers being reported in cucurbits such as squash, melons and cantaloupe and in eggplant.**

**On the East Coast, whitefly numbers remain mostly low in tomato, pepper and eggplant.**

**Around SW Florida, whiteflies pressure has been variable depending on the location.** Reports indicate that whitefly numbers are mostly low in pepper and tomato with moderate to high pressure in cucumbers, squash, and eggplant.

Several growers using reflective mulches with good results in keeping whiteflies at bay.

**Around Homestead, whiteflies are building in squash.**

### 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	pyriproxyfen	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.

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.

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, the last of these which use flying insects to move around.

## 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

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 Hillsborough and Manatee counties, leafminer numbers are increasing in tomato and cucurbits and respondents indicate some plantings have needed spraying as threshold levels are reached.

Reports from the EAA, indicate that leafminer pressure is building in celery and leafy vegetables.

Around Immokalee, growers and scouts report finding the occasional leafminer on tomato with moderate numbers showing up in eggplant.

### Broad Mite

On the East Coast, respondents indicate that broad mites are showing up fairly early in pepper plantings with lower numbers present in some eggplant.

A few broad mites are also showing up on pepper and eggplant around SW Florida.

### Spider Mites

Unusually dry weather in September saw some spider mites showing up in cucurbits, eggplant and tomato.

Some problems with spider mites have also been reported in melons in Central Florida.

### Stinkbug

Growers and scouts are reporting a few stinkbugs showing up in tomato around South Florida. Some growers have reported increasing difficulty in controlling stinkbug when present,

### Thrips

On the East Coast, thrips remain mostly low in pepper and are primarily Florida flower thrips.

Some melon thrips are showing up on cucurbits around Homestead.

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

## Diseases

### Choanephora Blight

**Growers and scouts are reporting low levels of Choanephora blight on beans, squash and peppers around South Florida with the onset of wet weather.**

**Choanephora blight or wet rot, caused by the fungus *Choanephora* sp., is an occasional problem on vegetables in South Florida especially during the early fall during wet periods.**

*Choanephora* sp. is common throughout the tropics on many vegetables including Southern peas, eggplant, green beans, pepper and squash, and poinsettia, however, its occurrence on bean and pepper plants in Florida is not common.

**Symptoms are visible on apical growing points, flowers and fruits.** Initially, water-soaked areas develop on leaves and leaf margins, leaf tips and apical growing points become blighted. Older lesions appear necrotic and dried out. Later the fungus grows rapidly downward causing dieback. The dark-gray fungal growth is apparent on some lesions. Close inspection under magnification will reveal silvery, spine-like fungal structures and dark spores.

**Symptoms may be confused with Phytophthora blight (*Phytophthora capsici*) when young or spray burn on bean plants with older symptoms.**

**A black soft rot can develop in fruit.** Young squash fruit often develop a dark whiskery fungal growth on the blossom end before the fruit softens and rots

**This fungus is a weak parasite; it colonizes dead or dying tissue before it actively invades living tissue.** The fungus may invade the old flowers and advance into the fruits. Spores may be dispersed by insects such as bees from flower to flower.

**Infection can occur with or without wounding of host tissue caused by insects or mechanical means.** However, the disease may appear more frequently and with greater severity where such damage provides an entry point for the fungus.

**Spores of the fungus can survive in the soil and in association with host plant debris.**

**Extended periods of rain, high humidity and high temperature favor fungal sporulation and disease development.** The fungus is spread via wind and splashing water, and on clothing, tools and cultivation equipment.

**There are few management techniques available, but fungicidal sprays applied for the control of other diseases will provide some control of this disease also.** Good spray coverage where dense foliage occurs is important.

**Dense plantings can lead to poor air circulation and extended periods of leaf wetness.** Well-drained production sites and the use of drip irrigation rather than overhead irrigation will help decrease relative humidity and leaf wetness within a dense plant canopy.

## **Bacterial Spot**

**With recent rains, bacterial spot is showing up in specialty pepper and some young tomato on the East Coast.**

**In the Manatee Ruskin area, bacterial spot is becoming more widespread in tomato but remains mostly low in the bush but is becoming more active in some older tomato plantings.**

**Growers and scouts report that bacterial spot is present around SW Florida, but incidence is mostly low, and remains significantly below normal for this time of the season.** There have been a few confirmed reports of infected transplants coming from the plant house.

**Frequent rain over the past few days may favor an increase in incidence of bacterial spot and other diseases.**

**Bacterial spot is one of the most serious diseases of tomato and pepper in Florida because it can spread rapidly during warm periods with wind driven rains, and because fruit symptoms reduce marketability.**

**Bacterial spot is caused by several species of *Xanthomonas* spp.** Four species have been identified on tomato: *X. euvesicatoria*, *X. vesicatoria*, *X. perforans*, *X. gardneri*. In Florida, the major species encountered is *X. perforans*.

**Symptoms of bacterial spot appear as small, water-soaked, greasy spots on infected leaflets.** On tomatoes, distinct spots with or without yellowing occur. Individual leaf spots may coalesce with each other, resulting in the browning of entire leaflets. Fruit spots often begin as dark specks with or without a white halo. As spots enlarge, they become raised and scab-like.

**Entry into the plant occurs through stomata or wounds made by wind driven soil, insects, or cultural operations.** Bacterial spot can be seed transmitted, but most inocula comes from volunteer plants or infected plant debris in the soil. Temperatures of 75-87°F are ideal for bacterial spot but infections can occur at higher or lower temperatures.

***Xanthomonas perforans* is seed-borne, which allows for the movement of strains on a global scale.**

**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 sufficient 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 number of 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.**

### **Bacterial blight**

**Low levels of bacterial blight has been reported on green beans in Homestead and Belle Glade.**

## **Target spot**

**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.**

**Dr Gary Vallad, plant pathologist at UF/IFAS SWFREC cautions growers to keep an eye out for target spot on tomatoes, as recent rains and ‘cooler’ temps favor disease development (temps >86°F greatly limit growth and sporulation of *Corynespora*).**

**Scouts around Immokalee report that they are starting to see low levels of target spot showing up in early tomato plantings.**

**Target spot is frequently misdiagnosed as in its early stages as symptoms are difficult to recognize and can be confused with bacterial spot and early blight.** Scouting is important to detect early signs of the diseases Growers are often taken by surprise as in the beginning of the season while we are still experiencing frequent rains they are targeting bacterial spot and then as the rains subside and canopies develop target spot emerges as a larger concern.

**The name derives from the bull’s eye appearance that is often displayed in lesions caused by the disease.** Since concentric rings are not always visible and not all lesions with concentric rings are target spot, it is recommended that a laboratory diagnosis be obtained to ensure that a correct diagnosis is made.

**On tomato leaves and stems, foliar symptoms of target spot consist of brown-black lesions with subtle concentric rings giving them a target-like appearance.** These can sometimes be confused with early blight. With early blight, the lesions are often associated with a general chlorosis of the leaf.

**On tomato fruit, lesions are more distinct.** Small, brown, slightly sunken flecks are seen initially and may resemble abiotic injury such as sandblasting. As fruits mature the lesions become larger and coalesce resulting in large pitted areas. Advanced symptoms include large deeply sunken lesions, often with visible dark gray to black fungal growth in the center. A zone of wrinkled looking tissue may surround the margins of lesions on mature fruit. Placing suspect fruit in a moist environment for 24 hours will often induce the growth of dark gray mycelia providing telltale diagnostic evidence of target spot infection.

**Optimum conditions for disease development include temperatures from 68° - 82°F and long periods of free moisture.**

**In trials, wounding was essential for reproduction of the fruit symptoms.** Wind-blown sand is probably important in outbreaks of target spot on tomato fruit in the field.

**Strategies for the management of this disease require an integrated approach for best results.**

Growers should rotate fields to avoid carryover on crop residue and avoid rotations among solanaceous crops. Eliminate any volunteers and weed species that can act as a host.

**Start with clean, healthy transplants and maintain proper fertility as nitrogen deficiencies favor the development of early blight.**

**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.**

### **Pythium**

**Pythium remains mostly low around South Florida**

**Growers around Belle Glade and Homestead are reporting some issues with Pythium causing some stand-loss on early planted beans especially where dry weather prompted the use of big gun irrigation to germinate seed.**

**Respondents around SW Florida are reporting some issues with Pythium in a few locations on peppers and squash.** Incidence remains low to very low in most fields.

### **Phytophthora**

**Reports from the east Coast indicate that Phytophthora just recently showing up at low levels in isolated locations where it is traditionally a problem.** Both eggplant and pepper have been affected.

### **Powdery mildew**

**Growers and scouts are reporting finding low levels of powdery mildew on some squash in a number of locations around South Florida.**

**Symptoms of the disease typically appear on older leaves and stems.** The yields of crop are reduced due to pre-mature foliage loss. In melons severe leaf infection can result in lower fruit sugar content and subsequent reduction of fruit quality. In addition to reducing plant vigor from leaf infection, mildew can attack the calyx and reduce the marketability of fruit.

**The fungus first appears as subtle, small, round, yellowish or whitish spots on leaves and sometimes stems.** These spots enlarge and coalesce rapidly. As the white, fluffy mycelium grows over plant surfaces and produces spores, it gives the lesions a powdery appearance resembling talcum powder, which is evident on the upper surface of older leaves or other plant parts. Young leaves are almost immune.

**Heavily infected leaves appear dull and chlorotic and eventually become dry and brown.** Extensive premature defoliation of the older leaves can occur if the disease is not controlled. Yield reduction from defoliation is proportional to the severity and length of time plants are infected.

**Powdery mildew fungi can reproduce under relatively dry conditions.** Increased humidity can increase the severity of the disease, and infection is enhanced during periods of heavy dew. Unlike downy mildew, powdery mildew can become severe during periods of low rainfall in the winter and spring months in Florida.

**Crop rotation and many other cultural practices have little effect on the incidence and development of powdery mildew.** It has been noted however, that healthy, vigorous leaves and stems are less prone to infection. Plants under nutritional stress in most cases will develop powdery mildew much sooner than plants the same age grown under a good nutritional program.

**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**

**Reports indicate that downy mildew is starting to show up on squash around Immokalee as well as the Manatee Ruskin area.**

### **Gummy stem blight**

**Very low levels of gummy stem blight are being reported on fall watermelons around Southwest Florida.**

### **Southern Corn Leaf Blight**

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

**Southern corn leaf blight is caused by the fungus *Bipolaris maydis*.** Although seedling blights can also be caused by *B. maydis*, symptoms of Southern corn leaf blight typically occur on leaves. Mature foliar lesions can be rounded on the sides, but they tend to be parallel-sided, often restricted by the veins.

**Lesions are light tan in the center with a reddish-brown border.** A greenish growth near the center of the lesion may be evident if spores are present. Mature lesions range from 1/4 to 1 1/2 inches in length and may be tapered, flat or serrated on the ends.

**Lesions caused by southern corn leaf blight are much smaller (up to 1/2 inch wide and 1 inch long) than those caused by northern corn leaf blight.** 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*.

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

**Typically, lower leaves are infected first progressing upward to higher leaves over time.** Occasionally, infections of the ear husk, silks, kernels, cob, and floral bracts in tassels occur.

**Sources of spores for infection include volunteer corn, old corn debris on the soil from previous crops, stored corn seed, fodder, and nearby corn plantings.** Teosinte and some wild grasses are also susceptible.

**Southern corn leaf blight is most prevalent during the fall growing season in south Florida but may also appear at the end of the spring growing season, particularly if unseasonably warm.**

**It is favored by warm to hot temperatures (68-90° F) and periods of extended leaf wetness.** With optimal weather conditions, the time from infection by germinating spores to lesion formation with new spores may be as short as 3 to 5 days.

**Temperatures near 73° F are ideal for production of spores, formation of germ tubes, infection, and formation of lesions.** As temperatures ranging from 59° F and 86° F, the fungus is still active but progress of the disease will be delayed. Six hours of leaf wetness is all that is needed for spore germination and infection. Leaf wetness is not required for lesion expansion.

**Although some control can be reducing inoculum through the use of crop rotation and deep plowing of old crop debris, control of Southern corn leaf blight is best achieved with resistant varieties.** Resistant varieties are available and should be considered, particularly for fall plantings.

**Where resistance is lacking, spraying with fungicides may be necessary, particularly with sweet corn produced in peninsular Florida.** Spray programs with recommended fungicides should commence at the first sign of disease if favorable weather is likely.

**Fungicides should be applied early, particularly if the forecast is for warm, humid weather.** As with northern corn leaf blight, the sterol inhibitors and strobilurin fungicides are most efficacious. These products should be used together with a broad spectrum protectant to minimize development of fungal resistance.

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

### **Tomato Yellow Leaf Curl Virus**

**Very low levels of TYLCV – mostly a few plants here and there in a couple of fields - are being reported on tomato around South Florida.**

## Cucurbit Crumple Leaf Virus

**Very low levels of cucurbit crumple leaf virus are beginning to show up in squash and melons around South Florida.** Incidence and occurrence remains largely restricted to a few plants here and there.

### News You Can Use

#### **Virus in imported tomatoes worries agriculture officials**

The News Service of Florida  
October 10, 2019

TALLAHASSEE, Fla. - The Florida Department of Agriculture and Consumer Services expressed concern Wednesday about a virus dangerous to tomatoes and peppers that has been found in tomatoes imported from Mexico.

State Agriculture Commissioner Nikki Fried asked the U.S. Department of Agriculture to "step up, initiate tracebacks to Mexican producers, and fulfill its responsibility to protect American growers and consumers."

Fried's department reported inspectors found tomato brown rugose fruit virus, known as ToBRFV, in packaged Mexican tomatoes in Naples and Gainesville.

The tomatoes were destroyed, a department news release said.

According to the University of Florida's Institute of Food and Agricultural Sciences, the tomato and pepper virus can be easily spread through the use of contaminated tools, hands and plant-to-plant contact.

"This virus is more severe for young plants and can result in 30 (percent) to 70 percent yield loss," the university estimated.

There are no known health risks to humans from the virus.

"Tomatoes showing symptoms of ToBRFV infection are still safe for human consumption, but may appear less attractive than other tomatoes," the state Department of Agriculture said.

The state estimates Florida-grown tomatoes account for \$262 million a year in economic impact.

See attached for more information on ToBRFV.

See also <https://www.fdacs.gov/News-Events/Press-Releases/2019-Press-Releases/Virus-in-Mexican-Tomatoes-Causing-Concern-USDA-Action-Needed>

Tomatoes were found in grocery stores in Naples and Gainesville

#### **Pest-Alert: Tomato brown rugose fruit virus (Tobamovirus, ToBRFV)**

Kishore Dey; Bureau of Entomology, Nematology and Plant Pathology DPIHelpline@FreshFromFlorida.com or 1-888-397-1517

**INTRODUCTION:** Tomato brown rugose fruit virus (Tobamovirus, ToBRFV) is a highly virulent virus that can cause severe fruit loss in tomatoes and peppers. Although ToBRFV has not been detected in Florida, major

outbreaks exist in many parts of the world. With Florida's increasing reliance on tomato imports, there is a potential risk of introducing ToBRFV into the state.

**DISTRIBUTION:** ToBRFV was first identified on tomatoes in Israel in 2014 (Luria et al., 2017) and has since been detected in Germany, Italy and Mexico in 2018. ToBRFV was detected in a tomato greenhouse in California and was eradicated in 2018 (Ling et al., 2018). In the Mexican state of Michoacan, Yurecuaro and Tanhuato municipalities, ToBRFV was found in commercial tomatoes and pepper crops (Beltran et al. 2019).

**HOSTS:** Tomato (*Solanum lycopersicum*) and pepper (*Capsicum* sp.) are the two major hosts for ToBRFV. However, the virus could be experimentally transmitted to European black nightshade, *Chenopodium* spp, *Chenopodium* spp, and *Petunia* spp when directly inoculated.

**SYMPTOMS:** The symptoms are very similar to those caused by tobamoviruses including Tobacco mosaic virus (TMV) and Tomato mosaic virus (ToMV), which include yellowing of leaf veins, yellow spots and brown rugose symptoms on fruit (Luria et al., 2017). Necrotic lesions may also be seen in calyx, peduncles and pedicels of the fruit (Figure 1). The disease is more severe at a young age and usually develops within 12 to 18 days of infection. It can result in 30 to 70% yield loss.

**TRANSMISSION:** This virus, just like other members of the Tobamovirus genus, are very stable outside their host and can be easily transmitted by mechanical means, such as contaminated tools, hands, clothing, direct plant-to-plant and propagation material (grafts, cuttings). They can also survive in crop debris, soil and on implements for years. Seed transmission of ToBRFV is strongly suspected but has not been verified. The pathogen is found in the seed coat and the endosperm, which might explain their presence even after rigorous seed disinfection treatment. Recent glasshouse experiments have shown ToBRFV could be carried by bumblebees (*Bombus terrestris* (Linnaeus)) and transmitted to healthy tomato plants during pollination (Levitzky et al., 2019). As bumblebees are routinely used in pollinating tomatoes, bees could be an important mode of spread.

Once the virus is introduced in an area, control measures are very limited and mainly rely on elimination of infected plants and following strict sanitation measures, such as regular hand washing of the workers, and cleaning boots before entering the green houses. The major resistance genes (Tm-1, Tm-2, Tm-22) in tomato that provide broad resistance to this group of viruses is not effective for this virus (Luria et al., 2017).

Both molecular and serological test are available for detecting this virus.

See <https://www.fdacs.gov/content/download/83755/file/pest-alert-tomato-brown-rugose-fruit-virus.pdf> for more info and photos.

Bottom line – This virus is bad news - if you see virus like symptoms in tomato, contact your local UF/IFAS Extension Office or UF/IFAS Plant Disease Clinic for assistance in obtaining a diagnosis.

### **Chuck Obern, a curious cultivator, is Florida Farmer of the Year**

Vegetable Grower News  
Aug 26, 2019

Curiosity pulled Charles “Chuck” Obern from a family garden north of Pittsburgh to a minimum-wage nursery job on the East Coast. It pulled him to an agriculture degree and 10 acres in Florida. Today, he’s at the head of C&B Farms, a 1,500-acre operation growing herbs and vegetables.

The first-generation grower’s successful journey into southern specialty agriculture was recognized in July, when the Sunbelt Expo and Swisher International named Obern its 2019 Florida Farmer of the Year.

## Growing curious

Obern said he first felt the itch as a youngster living in Pennsylvania who was charged with growing peppers, tomatoes and other vegetables for his mother.

“I was tasked with farming and maintaining a vegetable garden,” he said. “That’s the beginning. (I) had to make a vegetable garden and carry it all the way to harvest. My mother loved to freeze and can. That struck me as something fun to do and interesting to do, challenging.”

He was drawn further in at college, where he worked at a nursery. The job didn’t pay much, but he enjoyed it so much that he moved from Washington, D.C.’s American University to the University of Florida’s Institute for Food and Agriculture Sciences (UF/IFAS) to study agriculture. He worked for other growers at first, and his first independent effort as a grower occurred in 1986 with 10 acres outside of Immokalee, Florida.

Today, he grows 30 different vegetables and herbs on 1,500 acres in central Florida, including green beans, eggplant, baby bok choy, green cabbage, peppers, greens, radishes, basil, cilantro and other herbs. Some of the crops are organic, others are grown conventionally. All the crops are sold or committed before they are planted, Obern said. Retail customers include Publix, Winn-Dixie and Walmart. His son and daughter-in-law, Charles “Boots” Obern and Miranda Obern, are the operation’s vice president and CFO, respectively.

Obern has stayed curious over the years, collaborating on trials with researchers at Rutgers University, UF/IFAS, Rupp Seeds and the USDA.

Eva Webb, a district field representative for the Florida Farm Bureau Federation, nominated Obern for the farmer of the year because of his dedication, curiosity and innovative farming methods.

“He did not come from a farming background but has a passion for the land and research, which he has generously shared with others,” she said. “He began with very few resources, but through sheer determination and great effort, created a farming legacy to pass on to his children who share his love of farming.”

## The art of organic

In 2006, Obern got into custom organic growing, and today close to one-third of his farm is farmed organically. But it hasn’t been a pleasure cruise.

“Organics is not what the media likes to portray,” he said. “The risk of growing in organics is high because you don’t have the tools like you have in conventional production to combat weeds and pests.”

Not only is the risk higher, but the costs are also higher. Weeding has to be done manually, either with mechanical cultivation tools or by hand. Fertility is expensive, especially in a growing region known for its weak soils.

“Our soils are not rich, so we have to add the majority of the inputs back into the soil for every crop,” he said. C&B Farm composts bedding from a nearby horse racetrack.

While organics are expensive to grow, risky and for a limited niche of the market, Obern said there are benefits. “It makes you be a better farmer, because you have to be much more attentive to what you’re doing and try to predict things that are going to happen and then also try to figure out solutions – if it’s possible – with the tools that you have,” he said.

## Help from friends

Obern attributes his success to his colleagues, friends and customers who have helped him over the years. One example is getting an enviable contract to grow peppers for the Pace salsa company in the 1990s – a turning point for the farm.

“By 1992, I was up to 60 acres of a part-time farm, and we always grew jalapeños on this part-time farm, and we just grew a lot more of them,” he said. “Pace Foods used a lot of jalapeños in their hot sauce, so they made the decision. They had the need and they had been buying jalapeños from us in bin boxes, so they already had been a buyer, but not in a big way. And that’s when they made the decision that they liked what they saw and they needed a grower that could provide a large quantity of product. So that’s when the owner contacted me and offered me this option. It was fantastic.”

He reflected on that opportunity.

“You’ve got to get a lot of breaks as you grow, and a lot of people have to help you,” he said. “It’s not about me; it’s about all the people who helped me along my journey. I have many, many people all the way from the beginning who helped me to be where I’m at.”

He said there were too many helpers over the years to count. A few examples: Immokalee neighbors Cecil Howell and Jerry Rainwaters laid plastic for him, and let him borrow fuel on evenings when he would tend to his part-time farm. Eva Webb helped him secure his first commercial loan. Dr. David C. Brown III, a former farmer who’s now an eye doctor, once gave Obern a handshake deal to buy farm equipment, and with very favorable terms: annual payments after harvest for three years.

Obern repeated: “It’s not really about me. It’s about everybody along the path.”

## **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**

**Lettuce Advisory Committee Meeting**  
UF IFAS Everglades Research and Education Center  
3200 E Canal St S, Belle Glade, FL 33430

**October 24th**  
Lunch begins at 12PM

CEUs will be offered

## **Produce Food Safety Workshops: Fall 2019**

### **Produce Safety Alliance Grower Training**

This is the one-day course for fruit and vegetable growers and packers who fall under FSMA's Produce Safety Rule.

**WHO SHOULD ATTEND:** Fruit and vegetable growers and others interested in learning about produce safety, the Food Safety Modernization Act (FSMA) Produce Safety Rule, Good Agricultural Practices (GAPs), and co-management of natural resources and food safety are encouraged to attend. The PSA Grower Training Course is one way to satisfy the FSMA Produce Safety Rule requirement.

**WHAT TO EXPECT:** The trainers will spend approximately seven hours of instruction time covering content contained in these seven modules:

- Introduction to Produce Safety
- Worker Health, Hygiene, and Training
- Soil Amendments
- Wildlife, Domesticated Animals, and Land Use
- Agricultural Water (Part I: Production Water; Part II: Postharvest Water)
- Postharvest Handling and Sanitation
- How to Develop a Farm Food Safety Plan

In addition to learning about produce safety best practices, key parts of the FSMA Produce Safety Rule requirements are outlined within each module. There will be time for questions and discussion, so participants should come prepared to share their experiences and produce safety questions.

**BENEFITS OF ATTENDING:** The course will provide a foundation of Good Agricultural Practices (GAPs) and co-management information, FSMA Produce Safety Rule requirements, and details on how to develop a farm food safety plan.

After attending the entire course, participants will be eligible to receive a certificate from the Association of Food and Drug Officials (AFDO) that verifies they have completed the training course. Here's the list of upcoming PSA courses.

- 11/18/19-Belle Glade <https://psa111819.eventbrite.com>

### **Preventive Controls for Human Food Preventive Controls Qualified Individual (PCQI) Training**

This three-day course for those covered under FSMA's Preventive Controls for Human Food Rule

- 11/4/19-11/6/19-Orlando <https://fspca110419.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

- 11/19/19 – 11/20/19 – Belle Glade <https://haccp111919.eventbrite.com>

All workshops require advanced registration. <https://crec.ifas.ufl.edu/extension/events/> Registration questions?

**Questions?** - Contact Sarah McCoy at [sarahmccoy@ufl.edu](mailto:sarahmccoy@ufl.edu)

**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.

- 11/12/19 – Naples <https://beyondbasicproducefoodsafetycollier.eventbrite.com>

**Produce Safety Alliance Train-the-Trainer** This two-day course is for those interested in becoming PSA Trainers

- 12/11/19-12/12/19-Apopka <https://psattt121119.eventbrite.com>

**November 7, 2019 EREC Open House - Growing with Nature 8:00 am – 3:00 pm**

UF/IFAS EREC  
3200 E. Palm Beach Road  
Belle Glade, FL 33430-4702

Register online with Eventbrite: <https://www.eventbrite.com/e/open-house-tickets-60942906875>

**November 14, 2019 SWFREC Open House – Before the Bounty 10:00 am – 2:00 pm**

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

Open to the public – tours of fields and labs – come and find out about the cutting edge agricultural research happening in Immokalee

RSVP – 239-658-3415 or email [jderleth@ufl.edu](mailto:jderleth@ufl.edu)

**November 19-20, 2019 Farm Labor Supervisor Training**

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

For schedule and registration information, click here:

[https://swfrec.ifas.ufl.edu/docs/pdf/economics/SWREC\\_FarmLaborSupervisorTrainingProgramFlyer2019.jpg](https://swfrec.ifas.ufl.edu/docs/pdf/economics/SWREC_FarmLaborSupervisorTrainingProgramFlyer2019.jpg)

**November 21, 2019 Florida Ag Expo 7:30 a.m. – 5:00 p.m.**

Gulf Coast Research and Education Center  
14625 Co Rd 672  
Wimauma, FL 33598

Register - <https://tmp.wufoo.com/forms/z5m7tdg0jivjtn/>

**December 16, 2019 Discussion of Local Agricultural Issues with Legislators 1:00 pm—3:00pm**

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

1:00 – Welcome, Dr. Kelly Morgan, Center Director

1:10 – Success of the Best Management Practices Program in the Everglades Agricultural Area – Dr. Samira Daroub, Professor, Soil and Water Sciences, Everglades Research and Education Center, Belle Glade

1:30—Payment of Environmental Services in Northern Everglades Associated with Dispersed Water Storage – Dr. Sanjay Shukla, Professor, Agricultural and Biological Engineering, Southwest Florida Research and Education Center, Immokalee

2:00— Next Step in BMP research and Implementation – Mr. Christopher Pettit, Director, Office of Agricultural Water Policy, Florida Department of Agriculture and Consumer Services, Tallahassee

2:20 – Grower Panel Discussion and Questions

2:40 – Discussion Led by Legislators. Expected to attend: Senator Ben Albritton, Representative Bob Rommel and Representative Byron Donalds.

3:00 Adjourn

CEUs will be available. Pre-registration is requested.

To register, call 239-658-3400 or email Jennifer Derleth at [jderleth@ufl.edu](mailto:jderleth@ufl.edu)

## Websites

**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>

**The Last Harvest** - Check out Driscoll's award winning video at <http://www.thelastharvestfilm.com>

More than 75% of fresh fruit in the U.S. is hand-harvested. Critical labor shortages are forcing farmers to abandon valuable crops. Our food system and communities need solutions.

**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 as a service to the vegetable industry.

*Gene McAvoy*

Gene McAvoy

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