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SOUTH FLORIDA VEGETABLE PEST AND DISEASE HOTLINE

January 23, 2019

January has bought a cool down with a series of cold fronts moving across the peninsula weekly since January 10, dipping nighttime temperatures across the region into the upper 30s and 40s for a few days before climbing back into the 50's. The front, which came through early this week, bought the coolest temperatures of the season with temperatures in Okeechobee dipping below freezing for a brief period. Daytime temperatures have ranged from the mid 60's to the mid 80's.

FAWN Weather Summary

Date	Air Temp °F		Rainfall	Ave Relative Humidity	ET (Inches/Day)
	Min	Max	(Inches)	(Percent)	(Average)
Balm					
1/4 - 1/21/19	34.42	81.39	0.58	76	0.06
Belle Glade					
1/4 - 1/21/19	37.86	85.48	1.13	83	0.06
Clewiston					
1/4 - 1/21/19	36.85	85.39	0.53	80	0.06
Ft Lauderdale					
1/4 - 1/21/19	43.95	85.26	0.49	76	0.07
Homestead					
1/4 - 1/21/19	40.85	83.53	0.53	80	0.06
Immokalee					
1/4 - 1/21/19	36.44	85.23	0.97	80	0.06
Okeechobee					
1/4 - 1/21/19	29.23	84.96	0.04	78	0.06
Wellington					
1/4 - 1/21/19	39.38	86.22	0.73	80	0.06

"Remember, when in doubt - scout."

Conditions have been relatively dry with a few scattered showers accompanying fronts over the past few weeks. Immokalee and Belle Glade reported the highest rainfall coming in around an inch while Okeechobee reported less than a tenth for the period.

Growers continue to feel the effects of high winds the week before Christmas with higher than usually culls being reported in fruiting vegetables like eggplants and peppers. Heavy winds associated with subsequent cold fronts is also furthers impacting plants and fruit quality.

Growers in the Manatee Ruskin are beginning to crank things up and are planting spring crops. Homestead production is increasing while SW Florida transitions between fall and spring crops.

The National Weather Service reports that a cold front will move through today bring rain to most areas.

Behind the front, cool temperatures will return to South Florida. Towards the end of the weekend, we could see another front and increased rain chances and another cool down.

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

Insects

Whiteflies

Around SW Florida, whiteflies are the big news. Whitefly population going into the spring crop appear to be higher than normal, most likely due to a relatively warm mild dry fall and winter**.**

Reports from growers and scouts indicate that whiteflies are variable depending on location but report that populations are high to very high in number of eggplant, squash, watermelon, and tomato fields. In some cases, respondents indicate they are seeing small plants with 3-8 adults/plant a few days after being set in the field.

Respondents in Palm Beach County report that whitefly numbers are high in some mature eggplant and control has been elusive. Whitefly adults are migrating out of older fields and putting pressure adjacent crops.

Reports from Homestead indicate that whitefly are present in a variety of vegetables including okra, eggplants, beans, cucurbits, and numbers are on the increase. TYLCV in tomatoes is 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 cyanatraniliprole 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.

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

		Whiteflies	Other pests controlled			
MOA	Active Ingredient	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	fenpyroxiamate	G		G		
4A	clothianidin	F**				
Unk.	horticultural oil	F†		G		
Unk.	Azadiractin	F†				
Unk.	Soap, insecticidal	F†				
* OP+Pyrethroids tank mix. † Effective primarily against nymphs ** Most Effective as a drench. Check labels before using any pesticide.						

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, pepper weevils are showing up in more and more places including some localized hot spots with high activity especially in older planting and in some younger planting adjacent to these areas.

Around Immokalee, respondents have noted that pepper weevils seem to be coming on earlier than usual and have reached high numbers in some places. They are also beginning to disperse and show 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 eugenii*) is a key pest of all pepper varieties grown in Florida.

Scouting is importance 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. Fruit and flower buds should be examined for damage and fallen fruit and buds examined for presence of larvae.

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.

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, aphids remain mostly low with a few small colonies forming in some older pepper.

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 help reduce impact on beneficials.

<u>Leafminer</u>

Around Southwest Florida, leafminers numbers are widely present and numbers appear to be increasing and continue to be a threat on susceptible crops. Scouts report seeing significant pressure on young tomato and watermelons a few days after planting.

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

Around the EAA, leafminers have slowed but continue to be a nuisance in 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 Radient (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.

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.

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.

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

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

Thrips

Around Palm Beach County, thrips levels are below normal in general but are increasing in a few places with larvae in blooms and starting on fruit.

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 usch 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 susceptive 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 where 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 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 hanging 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 eggplant, corn and tomato depending on location.

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

Around Immokalee, spider mites are increasing in older eggplant and some tomato.

Stinkbug

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

Corn silk fly

Corn silkfly populations remain low in the EAA and around Homestead. The population 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.

Silk flies are spotty around Belle Glade but there have been some isolated reports of some high numbers showing up around Pahokee.

Diseases

Target spot

Around Immokalee, target spot continues to work on mature tomatoes.

Reports from the East Coast indicates that target spot is present in scattered locations on tomato at low levels.

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 Qol 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 soft rot

Reports indicate that bacterial soft rot continues to cause a few problems in some East Coast pepper. Growers should avoid working in or putting pickers in fields before they dry off completely in the morning to reduce spread of this disease.

Bacterial Spot

Around SW Florida, growers and scouts report that new bacterial spot infections are declining on tomato in most places.

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

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 continues to work on some pepper and older squash. Incidence is patchy.

Phomopsis

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

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.

<u>Fusarium crown rot</u>

Some fusarium remains active on some older tomato around Immokalee.

Fusarium crown rot is caused by the fungus *Fusarium oxysporum f. sp. radicis-lycopersici,* a close relative of the Fusarium wilt pathogen.

FCR is becoming more common and widespread in Florida. The disease causes significant yield losses and yield reductions of 15 to 65% have been reported.

Symptoms typically begin to show when plants are nearing the mature-green fruit stage. On more mature plants, the initial symptoms include a yellowing of the oldest leaves. The yellowing gradually progresses up the plant to the younger leaves as the disease develops, and symptoms may be restricted to a single branch of the plant. Affected leaves may wilt during the heat of the day but recover overnight, and in some cases, flowers may wilt and die. These symptoms are similar to those associated with Fusarium wilt.

Prominent lesions develop on the hypocotyl (lower stem) and on the tap- and lateral-roots. These lesions are typically round in shape and chocolate brown in color. A brown discoloration in the cortex can extend beyond the externally visible lesions, up to 10 inches above the soil-line, but the discoloration will not move up into the upper parts of the plant as is seen with Fusarium wilt.

Adventitious roots may proliferate above the affected stem tissues, and sometimes-white mats of fungal growth with pink spore masses will develop on dead tissues. Plants can be killed when the disease is severe.

The pathogen survives in the soil as spores and on the roots of alternate hosts including eggplant, peppers, some legumes and cucurbits, beets, spinach, carrot, cabbage, and several weed species. The pathogen can spread by infected transplants and through the movement of infested soil and equipment.

The FCR pathogen infects tomato root systems through wounds created by emerging lateral roots. The disease develops best in areas with low soil pH levels, high chlorine salt levels, applications of ammonia forms of nitrogen, and waterlogged soils. The pathogen can spread from plant to plant during the season through root contact. The pathogen can also spread through wind-blown spores to re-infest fumigated soils.

Management strategies focus on preventing infection and limiting the spread of the pathogen. Growers should plant only pathogen-free seed and transplants.

In the field, maintain soil pH levels in the 6 to 7 range, and avoid the use of ammonia–based fertilizers. Minimize plant stress throughout the growing season. Incorporate crop debris promptly after harvest to promote rapid decomposition. Long-term rotation to non-host crops, such as corn and other monocots, can help prevent the buildup of inoculum in the soil. Soil fumigation is usually not effective for controlling FCRR because the fungus can quickly recolonize fumigated soil.

A single dominant gene for resistance to FCR (Fr1) has been identified, and it is used in some tomato varieties. However, most commercial tomato varieties are susceptible to this disease.

Sclerotinia

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

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

Since cooler temperatures and high humidity favor this disease, growers should remain vigilante for the disease on beans, lettuce, peppers and other susceptible crops.

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 has been going strong in squash.

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 dramatically, hitting kale, 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.

Downy mildew has not yet been seen in lettuce but Dr Rick Raid, Pathologist at ERC indicates that growers should be alert for the disease and asks that growers submit samples if they suspect they have downy mildew.

Rhizoctonia

Growers and scouts around Belle Glade report that rhizoctonia has increased across leafy vegetable plantings as morning fogs and dews linger until later in the day.

Gummy Stem Blight

Around SW Florida, gummy stem blight is starting to show up in some young watermelon.

Gummy stem blight caused by the fungus (*Didymella bryoniae*) typically progresses from the central stem of the plant to growing tips. Leaf spots are variable in shape, red-brown in color and initial infections are generally seen on leaf margins and veinal areas.

Symptoms appear as light to dark brown circular spots on leaves or as brown to black, lesions on stems. Wilting, followed by death of young plants may occur. Stem lesions enlarge and slowly girdle the main stem resulting in a red-brown-black canker that cracks and may exude a red to amber gummy substance. Vine wilting is usually a late symptom.

Use of a hand lens will reveal small, clear white (when young) to black (when older), pycnidia embedded in older diseased tissue.

Because other plant disorders can cause exudation of a gummy substance, "gummy-ness" should not be relied upon for diagnosis of gummy stem blight.

Growers often comment on this disease occurring "overnight." What they are actually seeing are the results of secondary spread, which is more difficult to control than primary spread simply because of increased spore numbers with increased diseased tissue.

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

I**n 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 (Tebuconozole), 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 is approaching 10% 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.

Southern Corn Leaf blight

SCLB caused by the fungus *Bipolaris maydis* has slowed a bit but continues to cause problems in sweet corn

With cooler temperatures, NCLB starting to become more common.

Northern corn leaf blight caused by the fungus *Exserohilum turcicum* was one of the most important sweet corn disease in southern Florida causing significant losses some years. It is still a potential threat, occurring every spring and occasionally late fall. Resistant varieties have helped reduce the impact of northern corn leaf blight in recent years.

Initial symptoms of the disease include yellow spots that develop on the foliage. These enlarge to form tan or straw-colored dead areas about 4 to 6 inches long and one half inch wide.

NCLB produces a long, elliptical lesion, while those of southern corn leaf spot tend to be oblong and much smaller than those produced by NCLB. Southern blight lesions are also lighter in color (light tan to brown), and have parallel sides rather than the tapering sides of lesions caused by *E. turcicum.*

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

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

EFFECT OF PH ON PESTICIDE STABILITY AND EFFICACY

Have you ever wondered why the insecticide or herbicide you applied did not provide the control expected? You may have attributed the reduction or lack of control to either a bad batch of chemical or poor coverage, or pest resistance, or, maybe application error.

Have you ever bothered to check the pH of the water prior to mixing the chemical?

If you look closely at the pesticide label, chances are you may find a statement cautioning you against mixing the pesticide with alkaline materials such as lime or lime sulfur. The reason for this is that many pesticides; particularly the organophosphate and carbamate insecticides undergo a chemical reaction in the presence of alkaline materials that destroys their effectiveness. This reaction is called alkaline hydrolysis and occurs when the pesticide is mixed with alkaline water; water with a pH greater than 7. The more alkaline the water, the more rapid the breakdown of the pesticides.

Lime and lime sulfur are often mentioned on pesticide labels because they are sometimes added to spray tanks. However, they are not the only materials that provide sufficient alkalinity for this reaction to occur. Caustic soda, caustic potash, soda ash, magnesia or dolomitic lime, liquid ammonia--all of these provide alkaline conditions in which susceptible pesticides can readily be hydrolyzed to inactive organic compounds.

It has been shown recently that in many areas of the U.S. including Florida where much of our groundwater comes from a limestone aquifer, water supplies have sufficient natural alkalinity to cause hydrolysis of certain pesticides. This means that a pesticide may begin to break down as soon as it is added to the tank. In practical terms, this means that the degree of pest control may be somewhat less than desirable, or even nonexistent, because a certain amount of the active ingredient will be decomposed to an inactive form before it ever reaches the plant and the pest. If a spray rig is allowed to stand several hours or overnight before spraying out the contents of the tank, as much as 50% or more of the active ingredient may be decomposed.

Chemistry of Alkaline Hydrolysis

To better understand the phenomenon of alkaline hydrolysis, let's look at the chemistry using one of the organophosphate insecticides as an example.

In a typical organophosphate insecticide, the phosphorous atom sort of divides the compound into two parts. Organophosphate insecticides are effective when the two parts of the chemical are together. When the parts are separated, the OP pesticides are generally ineffective.

As you know, water is made up of H and O . . . 2 parts H, one part 0 = H20. You also find charged particles or ions in water; both H+ and OH, and depending on where the water comes from, there may be an abundance of either H+ in the water, or an abundance of OH ions. The more H+ in the water, the greater the acidity; the greater the OH, the more alkaline the water.

This may seem rather elementary, but it is necessary to understand the chemistry of water in order to understand alkaline hydrolysis.

The OH ion reacts readily with the OP molecule and breaks the molecule into two parts. The more alkaline the water (more OH), the more rapid the breakdown. This is what happens to most of the OP and carbamate

pesticides in the presence of alkaline water; the rate of breakdown varies according to the alkalinity and the temperature of the water, and the length of time the spray mix sits in the tank.

pH of Natural Water Sources - If the pH of your spray water is higher than 7.5, it is alkaline enough to affect some pesticides. A pH of 7.5-8.5 is common in many areas of the U.S. and in many surface and ground water sources in Florida.

There are water sources in Florida that have pH values between 7 and 9, (from neutral to alkaline). This is the case wherever water comes from a limestone aquifer, such as the Floridan (majority of groundwater withdrawal in Florida) or Biscayne (south Florida), or from lakes or canals that cut into limestone. There is some variability in these values even if they are within the same hydrologic region of the state. Both surface and ground water pH values fluctuate over time and even seasonally. One factor that influences the pH of open water is the amount of resident plant life. In these systems, there are high concentrations of carbonate in the water. The pH of the water may rise in poorly buffered systems because carbonate leads to increases of pH. Therefore, in some Florida water bodies with high levels of healthy aquatic plants, it is possible for pH to reach a measurement of 9 or 10.

pH - Hillsborough River (FL) - 7.1 - 8.2

Which Pesticides Are Affected by Alkaline Water?

Although there is a great deal of variability, in general insecticides are affected more severely by alkaline water than fungicides and herbicides. Among the insecticides that the OP and carbamates are decomposed much more rapidly than the chlorinated hydrocarbons. While this is a general rule

Many manufacturers provide information on the rate at which their products hydrolyze. This rate is usually expressed as 'half-life' or the 'time it takes for 50% hydrolysis or breakdown to occur'. With trichlorfon or DYLOX, for example, the time for 50% hydrolysis at pH 8.0 is but 63 minutes; at pH 7.0 50 % breakdown occurs in 386 minutes. and at pH 6, 80 hours.

This means that if the pH of your spray water is 8 and one hour elapses between the time you add the insecticide to your spray tank and the spray dries on the foliage, 50% of the active ingredient has already decomposed. However, if your water has a pH of 6, it is not likely that you will lose any significant activity during the process of application.

Let's take a look at a few more examples:

Carbaryl (Sevin)		Imidan	
pH	Half-life	pH	Half-life (20 degrees C)
6	100-150 days	4.0	15 days
7	24-30 days	7.0	1 day
8	2-3 days	8.3	4 hours
9	1 day	10.0	1 min.

Lower the pH in Your Spray Tank - If your water supply is alkaline, especially if the pH is 8 or greater, and you are using a pesticide that is sensitive to hydrolysis, you should lower the pH of the water in the spray tank. A pH in the range 4-6 is recommended for most pesticide sprays.

If you know that your mix water has a pH of 7.5 or greater, consider lowering the pH, especially if you are applying a pesticide that is sensitive to high pH. A pH of 4 to 7 is recommended for mixing most pesticides; a

value of 5.5 to 6.5 is ideal. If your spray rig will be left to stand for several hours before the contents are applied, consider adding an acidifying agent to prevent alkaline hydrolysis.

Some product labels will direct you to avoid mixing the pesticide with alkaline water or other specific alkaline materials such as lime, lime sulfur, or Bordeaux mixtures (Figure 1). You may also see statements that the activity of the pesticide will be reduced under alkaline conditions. The directions will state that a buffering or acidifying agent should be added to the spray tank. There are a few pesticidal materials that should not be acidified under any circumstances: sprays containing fixed copper fungicides (Bordeaux mixture, copper oxide, basic copper sulfate, copper hydroxide, etc.) and lime and lime sulfur. Their labels will contain specific statements.

You can adjust your spray solutions to the 4-6 pH range by the use of adjuvants that are marketed as acidifiers or buffering agents. Acidifiers and buffering agents are a type of pesticide spray mix adjuvant. All adjuvant materials are added to the chemical formulation or spray tank to make the application more effective, safer, or easier for the applicator. Various commercially available acidifying agents will lower the pH of spray solution. Buffers are capable of changing the pH of a water solution to a level which will be maintained even if the pH of the solution changes. Like pesticides, their labels should be read and followed closely. The amount to add will depend upon the initial pH, the volume of water, and the desired final results.

A question that is sometimes asked is whether acidification increases the residual time of the pesticide on the plant, thus affecting such factors as re-entry time and pre-harvest intervals. Residue tests on foliage sprayed with acidified and unacidified parathion sprays have failed to show any differences in the rate of degradation. This would be expected since the pH of the foliage runs around 7.

There are a few pesticide materials which should not be acidified under any circumstances. Sprays containing fixed copper fungicides (including Bordeaux mixture, copper oxide, basic copper sulfate, copper hydroxide, etc.) and lime or lime sulfur should not be acidified. But, if the product label tells you to avoid alkaline materials, chances are good that the spray mixture will benefit by adjusting the pH to 6 or slightly lower.

The major benefit from acidification is obtained during the time the pesticide is in the spray tank; that is, from the time the pesticide is added to the water in the tank to the time the spray has dried on the foliage. If your water source is alkaline, addition of a buffering agent to the spray preparation is an easy and economical way to guarantee maximum results from your pesticide applications.

Flumioxazin—An Herbicide Case Study in Florida

Flumioxazin is an herbicide registered for use in a wide range of agricultural commodities under the trade names Chateau®, Payload®, SureGuard®, Valor® and Broadstar™. Flumioxazin has been shown to provide consistent control of several broadleaf weed species, but this molecule is susceptible to alkaline hydrolysis. At pH 5, flumioxazin is very stable and will persist in water for several days. However, as pH increases to 7 the half-life decreases to approximately 24 hours, and at pH 9 the half-life is a mere 15 minutes. Hence, mixing flumioxazin with high pH water can cause this herbicide to degrade and completely lose its herbicidal activity before it can be applied. When using Flumioxazin, it is important to know whether the available water should be acidified to enhance herbicidal activity. Otherwise, it is possible to lose herbicidal efficacy simply because high pH water was used to fill the sprayer.

Summary: Determining the pH of the spray mix water and adding an acidifier, if necessary, is inexpensive compared to the cost of losing a pesticide's effectiveness. There are water sources in Florida that are alkaline by nature, and the addition of an acidifying agent to the spray mix is an easy and economical way to guarantee maximum results from your pesticide applications.

Table 1. Half-lives of commonly used pesticides

Active ingredient	pH 6	pH 7	pH 8	pH 9
Azinphos-methyl		10 days		12 hours
Captan		8 hours	10 minutes	2 minutes
Carbaryl	100–150 days	24–30 days	2–3 days	1–3 days
Dimethoate	12 hours			1 hour
Malathion		8 days	3 days	19 hours
Phosmet		1 day	4 hours (pH 8.3)	1 minute (pH 10)

Excerpted from: W. Hock, Effect of pH on Pesticide Stability and Efficacy, Pesticide Safety Education Program (PSEP). Cornell University. 2012.and Frederick M. Fishel and J. A. Ferrell. Water pH and the Effectiveness of Pesticides. Publication PI-156, one of a series of the Agronomy Department, Pesticide Information Office, UF/IFAS Extension. Gainesville, Florida. Revised 2016.

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

Beyond the beaches: Farm tours offer a look at Florida's other economic powerhouse

Amy Bennett Williams
Fort Myers News-Press
Jan. 19, 2019

Agriculture is one of Florida's major economic pillars, but for the millions who stick close to the beach, it's an out-of-sight, out-of-mind powerhouse.

The UF/IFAS Hendry County Extension Office and the Hendry County City Farm Tour Council are working to change that with their 38th annual Hendry County Farm Tours Feb. 2 and March 9.

The multi-stop, $90 day trips highlight some of Florida's most sophisticated cattle, citrus, sugarcane and vegetable operations.

Modern tour buses will take visitors from site to site, which include U.S. Sugar's mill, Hilliard Brothers ranch and Duda farms. There will also be fresh Florida orange juice breaks at strategic stops along the way, including a 16-ounce ribeye lunch at the Hendry County Fairgrounds in LaBelle, which UF/IFAS Hendry County Extension Service Director Gene McAvoy promises will be melt-in-your-mouth delicious.

Agritourism is a natural for Florida, since the industry plows $240 billion into the economy each year.

Hendry County is one of the largest agricultural counties in the state and is its largest producer of oranges, with over 75,000 acres of groves. In addition, Hendry is the second largest producer of sugarcane, third largest in vegetable production and fifth largest in beef cattle.

Profits from the tour go to local 4-H Club programs and scholarships for kids planning agriculture majors in college. But the aim goes beyond that, McAvoy says. He wants to foster greater understanding and respect for the state's agricultural families. As he told a busload on a past tour "Without agriculture you'd be hungry and you'd be naked."

Agriculture is second only to tourism as an economic engine, he notes, adding that it's one of the oldest sustainable industries: "We take light, water and soil, and make reusable products," he says.

If you want to go - Hendry County farm tours are Feb. 2 and March 9. Guests can get picked up either at the U-Save on Palm Beach Boulevard in Fort Myers or the Hendry County Extension office. Deadline for ticket sales for the February trip is Jan. 25 and Feb. 22 for the March trip.

For additional information about the tour and how to purchase tickets, stop by Hendry County Extension Service Office, which is located at 1085 Pratt Blvd., LaBelle, or call 863-674-4092; email drourks@ufl.edu.

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

01/30/19 – West Palm Beach - https://psa13019.eventbrite.com
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

02/28/19 - 03/01/19 – Wimauma - https://haccp022819.eventbrite.com

Questions or need help with registration, contact Jessica Lepper - jal20xox@ufl.edu or Sarah McCoy - sarahmccoy@ufl.edu

Up Coming Meetings

February 6, 2019 Certified pile burner class

Pre-registration is required to attend, and class size is limited to the first 50 people.

The class is already half full. Send your registration form and check as soon as possible. This class usually gets full 3 weeks before the event.

PRE-REGISTRATION WILL NOT BE ACCEPTED WITHOUT PAYMENT OF THE REGISTRATION FEE.

Registration fee: $50

The $50 fee covers the training sessions, a booklet with all the presentations in color, other handouts, refreshments, and lunch.

Location: UF/IFAS SWFREC
Immokalee

The Florida Division of Forestry and University of Florida Cooperative Extension Service will be conducting a Certified Pile Burners Course that will show you how to burn piles legally, safely and efficiently.

Most importantly, it could save a life. If you burn piles regularly, do not put off registering for this training. When the weather is dry, certified pile burners will receive priority for authorization to burn. In addition, certified pile burners are allowed to burn up to two hours longer per day and get multiple day authorizations. Do not wait. The number of trainings offered and attendance at each training is LIMITED. This training will be held from 8:00 am until 4:30 pm at the Southwest Florida Research and Education Center in Immokalee**.**

Contact Dr Mongi Zekri for more information or to register. Email: maz@ufl.edu

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

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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Wishing you and your families all the best for a Happy and Healthy New Year.

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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