



UNIVERSITY OF  
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E X T E N S I O N

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# SOUTH FLORIDA VEGETABLE PEST AND DISEASE HOTLINE

February 14, 2016

**The El Niño weather pattern has dominated South Florida weather for the past few months and intensified in January.** Some forecasters now predict it could surpass the 1997–1998 event as the strongest El Niño on record.

**Rainfall in the south Florida region was 139% above average in November, 199% above average in December, and 350% above average in January, with many places setting all-time records for January rainfall totals.** Widespread flooding affected many areas and increased the level of Lake Okeechobee to over 16 feet resulting in back pumping and massive releases of water to tide to protect inland communities.

**An el Nino- like pattern has bought cooler wetter weather to South Florida.** A parade of fronts impacted south Florida over the past few weeks and bringing cooler temps, unsettled weather, high winds, and abundant rainfall. Heavy rains and foggy mornings have provided conducive conditions for disease development.

### FAWN Weather Summary

Date	Air Temp °F		Rainfall (Inches)	Ave Relative Humidity (Percent)	ET (Inches/Day) (Average)
	Min	Max			
<b>Balm</b>					
1/18 – 2/14/16	33.71	84.13	3.05	71	0.07
<b>Belle Glade</b>					
1/18 – 2/14/16	35.29	82.40	7.83	86	0.07
<b>Clewiston</b>					
1/18 – 2/14/16	37.45	83.48	7.72	82	0.07
<b>Ft Lauderdale</b>					
1/18 – 2/14/16	43.01	80.24	4.32	78	0.07
<b>Homestead</b>					
1/18 – 2/14/16	38.56	81.19	4.62	82	0.07
<b>Immokalee</b>					
1/18 – 2/14/16	36.56	86.31	6.57	80	0.07
<b>Okeechobee</b>					
1/18 – 2/14/16	39.82	83.80	5.72	78	0.06

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Crops coming to market include light volumes of cabbage, collards, cucumber, eggplant, green beans, herbs, lettuce, kale, pepper, squash, sweet corn, Swiss chard, tomato, and various specialty items. The unusual weather this fall and winter has had negative impacts on yields and quality. High winds have battered plants and scaring fruit and tearing leaves. Some plantings in central Florida were hit hard by frost. In some places, excessive moisture has caused soft rot issues on greens, pepper and tomato. Low yields have led to high prices for many items.

**The National Weather Service models indicate a trough currently pushing through the Central US will lift north through the Northeast States during the day on Tuesday, with its trailing cold front pushing through south Florida by Tuesday afternoon.**

**Most of the systems energy and deep moisture will remain north of our region, and the fast moving front is forecast to bring only around a tenth of an inch of rain to the area with some showers possibly lingering across southeast Florida late Tuesday before the front moves into the Atlantic Tuesday night.**

**Long term a surface high will build into the Deep South behind the front for Wednesday, with a reinforcing high over the east coast becoming dominant late in the week keeping any additional systems deflected to the north. Weather will be dry with seasonable temperatures in the mid-upper 70s during the day and upper 50s-mid 60s for lows.**

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

## **Insects**

**Cool wet weather and heavy winds over the past few weeks appears to have beat back insect pressure in most places.**

### **Leafminer**

**One exception has been leafminer which is increasing in most places around South Florida.**

**Around Southwest Florida, leafminers have been busy in a number of locations and a number of growers have had to treat fields once or more over the past few weeks.**

**On the East Coast, leaf miner pressure remains mostly low.**

**Reports from Homestead indicate that leafminers are increasing in a variety of vegetable crops.**

**Respondents in the EAA report some leafminer activity in the leaf crop.**

### **Whiteflies**

**Around Immokalee, whiteflies are mostly low and occurrence is spotty but respondents note they are rebounding in fairly high number in some places on warm days.**

**Reports indicate that whitefly are common in Miami-Dade County and growers are finding adults and other developmental stages on a variety of vegetable crops.**

**In the Manatee Ruskin area, growers and scouts report seeing some whiteflies in tomatoes with counts up to 1-2/plant at 5-6 leaf stage.**

**On the East Coast, respondents indicate that whiteflies are mostly low.**

**Reports from the EAA indicate that whiteflies are present in low numbers in some cole crops.**

### **Pepper Weevil**

**Respondents in Palm Beach County report pepper weevil numbers range from fairly low to extreme pressure in areas near old pepper crops.**

**Around Immokalee, weevils haven't stopped and in some places they are migrating from old fields into young fields.** On young plants, weevils can lay eggs in the growing points and flower buds and the larvae will cycle through them while waiting for fruit to set.

**Growers and scouts in Hillsborough County report no weevil pressure at this time.**

**Respondents in Homestead, report that weevils are widely present in many plantings.**

**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 applied weekly in trials at the Southwest Florida Research and Education Center. A total of 24 pts can be applied for the season. Unfortunately, there is very little Vydate available due to an industrial accident at the manufacturing facility.

**Other products that have performed well in trials include Capture (bifenthrin), Kryocide (cryolite), Venom (dinotofuran) and Actara (thiomethoxam).** The diamides such as Coragen may provide some suppression.

**Unfortunately applications are limited and growers are still trying to work out the timing of applications to achieve the best results.**

**Consult UF/IFAS recommendations for currently labeled insecticides for pepper weevil control in Florida vegetables.**

### **Broad Mites**

**Around Southwest Florida, broad mites continue to cause problems in pepper and eggplant.**

**On the East Coast, broad mites are fairly common and are persistent in many in pepper and eggplant fields.**

**Broad mites remain spotty around Miami Dade County**

### **Aphids**

**Grower and scouts in the EAA are reporting some problems with in leafy vegetables.**

**Elsewhere around South Florida aphids remain mostly low.**

## Worms

**Growers and scouts in SW Florida report that worm pressure is low but note they have seen some hatches in recent days.**

**In the EAA, worms continue to cause problems in leafy greens, corn and crucifers.**

**Around Homestead, reports indicate that melonworm is active in squash and cucumber.** Armyworms are present in a variety of vegetable crops in low numbers. Diamondback moth remains an issue in cole crops.

## Thrips

**Around Southwest Florida, *Thrips palmi* have showed up on some farms causing problems in pepper, eggplants and beans.**

**Reports from Palm Beach County indicate that thrips remain mostly low but are beginning to increase in some pepper fields.**

**In Miami Dade County, thrips remain numerous and include common blossom thrips, melon thrips, and Florida flower thrips.** Growers indicate they are having problems controlling thrips with insecticides and are trying other measures including using metalized plastic mulch and adjusting timing of planting.

## Corn Silk Fly

**Around Belle Glade, silk fly adults are present in corn and numbers seem to be declining.**

**In Miami Dade County corn silk fly adults are showing up in most corn fields but populations remain low.**

## Spider Mites

**Reports indicate that spider mites remain mostly low but are becoming problematic in eggplant requiring treatment in a number of locations around South Florida.**

## **Diseases**

### Bacterial Spot

**Around Southwest Florida, bacterial spot continues to cause problems in tomatoes.** Despite favorable conditions reports indicate infections remain low in the bush in many places although some older planting where disease was established have lesions clear to the top of the plant. Bacterial spot remains sporadic in peppers with some fields dropping leaves while others are still clean depending on the resistance package of the cultivar.

**On the East Coast, bacterial spot is increasing in severity and incidence in a lot of pepper and tomato.** Bacteria is widely present in most hot varieties. Scouts report some bacteria showing up in race 1-5 resistant bell peppers. Growers report that race 1-10 resistant pepper varieties remain clean while bacterial spot is starting to become widespread in many fields where other varieties have been planted.

**Bacterial spot is increasing in severity and occurrence in pepper and tomato in the Homestead area.**

## Target Spot

All areas are reporting an exceptional amount of target spot this season.

Around Immokalee, target spot remains rampant in tomato and some growers indicate that is increasing inside the bush with warmer weather.

On the East Coast, target spot incidence is high in some older tomatoes and is also reaching high levels in some cucumber fields.

Newer fungicides such as Endura, Scala, Inspire Super, Reason Tanos and Fontelis have provided growers with new tools to manage this disease. Consult UF/IFAS recommendations for currently labeled fungicides for target spot control in Florida tomatoes.

## Early Blight

Early blight is increasing on tomatoes around South Florida

Foliar symptoms generally occur on the oldest leaves and start as small, pencil-point-size, brownish to black lesions. These leaf spots enlarge up to ½ inch (1.3 cm) in and usually have readily visible, concentric rings that look somewhat like a bull's-eye. These concentric leaf spots are distinctive enough to make early blight one of the easier tomato diseases to diagnose.

The area around the spot may become yellow, as may entire severely affected leaves. Early blight symptoms are most pronounced in the lower canopy. Under favorable conditions, significant defoliation of lower leaves may occur, leading to sunscald of fruit.

Green or red fruit may be infected by the fungus which invades at the point of attachment between the stem and fruit, and through growth cracks and wounds made by insects. Dark lesions enlarge in a concentric fashion and may affect large areas of the fruit. Mature lesions in fruit are typically covered by a black velvety mass of fungal spores.

Stem lesions are dark, slightly sunken and enlarge concentrically. Basal girdling and death of seedlings may occur.

## Anthracnose

Anthracnose is spiking in a number of pepper fields around South Florida reaching high incidence and severity in a number of places especially in fields where plants were heavily battered by wind and rain.

Anthracnose of pepper is caused by fungi in the genus *Colletotrichum*, Anthracnose can become a major problem in pepper allowed to mature for colored fruit and in wet years.

*Colletotrichum* is capable of causing disease on virtually all parts of the pepper plant during any stage of plant growth. However, fruit lesions are the most economically important aspect of this disease. Fruit symptoms initially begin as water-soaked lesions that become soft, slightly sunken, and become tan. Circular or angular sunken lesions may develop on immature fruit of any size and multiple lesions may form on individual fruit.

In many cases, pink to orange masses of fungal spores in concentric rings may be observed on the surface of the lesions. In older lesions, black structures called acervuli may be seen. With a hand lens, these look like

small black dots; under microscopy, the spores bear tufts of tiny black hairs (setae). The pathogen forms spores quickly and profusely and can spread rapidly throughout a pepper crop.

**In some cases, the lesions are brown, not orange, and then black from the formation of setae and sclerotia (dark, fungal survival structures).**

**When disease is severe, lesions may coalesce resulting in up to 100% yield loss. Lesions may also appear on stems and leaves as irregularly shaped brown spots with dark brown edges.**

**The fungus survives in and on seeds. Anthracnose may be introduced into the field on infected transplants or may survive between seasons in plant debris or on weed hosts.**

**Diseased fruit act as a source of inoculum, allowing the disease to spread from plant to plant within the field.** During warm and wet periods, spores are splashed by rain or irrigation water from diseased to healthy fruit. Workers may also move spores with equipment or during handling of infected plants.

**Severe losses can occur during rainy weather because the spores are washed or splashed to other fruit resulting in more infections.**

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

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

### **Phomopsis**

**Phomopsis continues to plague some East Coast eggplant producers.** Most severely affected areas are on land repeatedly planted to eggplant land. As chemical controls are limited, growers need to get back to basics and rotate fields.

### **Black Rot**

**Growers and scouts are reporting major issues with black rot in cabbage and other cole crops this season in all area of South Florida.**

**Black rot is caused by the bacterium, *Xanthomonas campestris pv. campestris*.** Cabbage, broccoli, cauliflower, kale, collards, radish, and other members of the cabbage family are susceptible.

**In the field, the disease is easily recognized by the presence of large yellow "V"-shaped areas extending inward from the margin of a leaf, and by black veins in the infected area.** Usually only a few of the outer leaves are involved.

**Diseased areas enlarge and progress toward the base of the leaf, turn yellow to brown, and dry out.** The veins of infected leaves, stems, and roots turn black as the pathogen multiplies. On cauliflower, black rot commonly appears on the leaves as numerous, minute brown specks. The infected lower leaves of cabbage and cauliflower are usually stunted, turn yellow to brown, wilt, and drop prematurely. Occasionally, diseased plants have a long bare stalk topped with a small tuft of leaves. In extreme cases, heading may be prevented.

**If infection occurs in seedlings, the disease is usually more severe as the disease becomes systemic in the plant.** These plants remain stunted and the veins in the stems are black. The heads from these plants deteriorate rapidly after harvest.

**Although the distribution of diseased plants in the field may be uniform, symptoms are often more severe in wet or shaded areas.** If infected seedlings were set in the field, scattered pockets of diseased plants often appear. Diseased plants may appear in rows as a result of spread during cultural operations.

**The causal bacterium overwinters on and in seed and crop debris left in the field.** The organism survives especially well in plant debris, and on numerous cruciferous weeds including black mustard, field mustard, shepherd's purse, Virginia pepperweed, and cress.

**The bacteria are spread by splashing or flowing water, blowing of detached leaves or dust particles, shipping and handling of infected plants, and insects.** The bacteria are seedborne and as few as three infected seeds in 10,000 (0.03%) can cause black rot epidemics in a field.

**When seedlings emerge, bacteria pass from the cotyledons into young leaves directly or through the stomata.** The bacteria move intercellularly until they reach the xylem tissue and from there spread throughout the plant. The pathogen is spread from plant to plant by splashing rain, or in films of water moved by people, equipment, insects, and other animals.

**Plants may be affected with black rot at any stage of growth.** The bacteria most frequently invade the host plant through hydathodes at the leaf margins particularly when plants have been subjected to heavy rains or irrigation. In very susceptible crops, such as cauliflower, infection can also occur directly through the stomates. In either case, the result is initially a small, wilted, V-shaped infected area that extends inward from the leaf edge toward the midrib.

**The pathogen can also enter the plant through insect-feeding injuries, hail, or other mechanical wounds.** The bacterium which causes black rot enters the plant through mechanical injury occurring during the pulling and setting of transplants, and the growing of plants in the field. Wounds made to the root system during transplanting are ideal points of entry.

**Free moisture in the form of dew, fog, or rain is required for infection and disease development.** Under the optimum conditions, symptoms may appear on plants 7 to 14 days after infection.

**In warm and wet conditions black rot losses may exceed 50% due to the rapid spread of the disease.** The disease is usually most prevalent in low areas and where plants remain wet for long periods. Conditions favoring plant-to-plant spread of the bacterium has led to a total loss of crucifer crops.

**Black rot can be controlled by utilizing an integrated control program.** The control of this disease is based on sanitation. There are no commercially acceptable varieties resistant to the disease at this time. Spraying with copper fungicides may help reduce spread but are not recommended as copper sprays cause black spots on foliage.

**The following steps will help reduce losses from black rot:**

- 1) Rotate fields.
- 2) Purchase certified disease free seed.
- 3) Use only hot water treated seed
- 4) Make sure your transplant growers carries out protection measures, including inspections, seed treatments, and seed assays.

- 5) Irrigate from well water. It is less likely to carry disease organisms than water from other sources.
- 6) Plow down cruciferous fields immediately after harvest to incorporate debris and speed decomposition
- 7) Wait for plants to dry before working a field in order to reduce spread.
- 8) Boom sprayers are less apt to spread black rot compared to airblast sprayers

**Failure to implement a total control program can result in severe losses because of the many ways in which the black rot bacteria can be introduced or spread.** A total program is well worth the effort.

### Alternaria

**In the EAA, respondents report significant issues with Alternaria particularly on older beans which saw a lot of rain.**

**Alternaria is also being seen on cilantro around South Florida, mandating fungicidal sprays for disease-free cilantro.**

**Report from Homestead indicate that Alternaria leaf spot is increasing on some cucurbits such as bitter melon.**

### Erwinia soft rot

**A number of pepper and some tomato growers around South Florida are reporting problems with Erwinia soft rot causing usually high fruit losses in the field as fruit literally melt down just before harvest.** This problem has been favored by this season's high humidity, frequent rain fall and unseasonably warm temperatures.

**On pepper, the fleshy fruit peduncle is highly susceptible and is frequently the initial point of infection.** Both ripe and green fruit may be affected. Initially, the lesions on the fruit are light to dark-colored, water-soaked, and somewhat sunken. The affected areas expand very rapidly, particularly under high temperatures, and tissues lose their texture.

**The problem with bell pepper is the presence of openings around the calyx that can allow rain water to actually enter the fruit.** Any pathogens, such as Erwinia, would be carried inside to that warm, moist, protected environment. Once this occurs, no amount of postharvest sanitizing will remove it.

**In later stages, bacterial ooze may develop from affected areas, and secondary organisms follow, often invading the rotted tissue.** The affected fruit hang from the plant like a water-filled bag.

**Growers should avoid cultural operation and harvesting while plants are wet.** Tanos tank mixed with copper may provide suppression if applied preventatively in the field. Good irrigation management may reduce cracking and may also reduce problems with soft rot.

**In the Glades, bacterial infections have also been observed on lettuce, however, these do not appear to be caused by *Xanthomonas campestris* pv. *vitiensis*, the bacterial leaf spot pathogen.** Infections are almost invariably linked to extensive leaf miner activity. Controlling leaf miners should result in significant reduction in bacteria lesions.

### Bottom rot

**Dr Richard Raid, Pathologist at the UF/IFAS EREC, reports that bottom rot on lettuce caused by *Rhizoctonia solani* is causing major problems in the EAA.** The disease starts at the basal stem and infects leaves in contact with the ground, and the mycelial web moves right up into the head. Although you can cut



above it in some cases, trimming is sometimes so severe that you can't make head weight. Dr Raid notes that the disease may slow down with cooler weather but will not disappear. Fungicide programs pretty much have to be preventative, getting soil coverage at or even before thinning.

### **Rhizoctonia**

**Rhizoctonia has also been causing problems in beans and beets around South Florida.**

### **Downy mildew**

**Respondents in Palm Beach County report that downy mildew continues to affect squash and cucumber and has reached high levels in some plantings.**

**Around Southwest Florida, downy mildew remains a problem on cucumbers and squash and incidence is high in older squash and cukes.**

**Downy mildew is also active on cucurbits in the Homestead area.**

**Symptoms of cucurbit downy mildew are characterized by foliar lesions, which first appear as small chlorotic patches on the upper side of the leaves.** These lesions may appear water-soaked, especially during periods of prolonged leaf wetness caused by rainfall, dew, or irrigation. Later symptoms may coalesce into large necrotic areas, which may result in defoliation and reduction of yield and marketable fruit.

**Spray programs for downy mildew are most effective when initiated prior to the first sign of disease since once a planting becomes infected; it becomes more and more difficult for fungicides to control downy mildew.** A range of fungicides is available for the control of downy mildew depending on the crop. Newer oomycete specific products are useful in combatting the disease.

**Lettuce downy mildew, caused by *Bremia lactucae*, has been observed and confirmed in the Glades.**

Growers should be on a consistent preventative program using mancozeb and a phosphite, and now that the disease is present should consider working in some of the more specific fungicides with translaminar or systemic activity such as Revus, Zampro, Ranman, Reason, Forum, Presidio, Previcur flex, Aliette, etc. A new fungicide, Orondis, has been demonstrated as being very effective on *Bremia* in Florida, and could be a good candidate for the rotation. Growers can check with their suppliers and read the label carefully before using for plant back, use patterns, and rates.

**Downy mildew on crucifers (cole crops) has also been confirmed.** Given the cool, wet weather, growers should be on a preventative fungicide program. In general, fungicides that are labeled for lettuce downy mildew also perform well against *Hyaloperonospora parasitica*, the crucifer downy mildew pathogen. Again, check labels before applying.

### **Powdery mildew**

**Around Immokalee, powdery mildew is common in squash and cucumbers.**

**Powdery mildew is also showing up on some pepper around SW Florida.**

**On the East Coast, powdery mildew is present at low levels in squash.**

**Powdery mildew is also causing problems on squash around Homestead.**

## **Gummy stem blight**

**Gummy stem blight is present at low levels in many melon fields already.**

## **Phytophthora**

**Growers and scouts report that *Phytophthora capsici* is causing a number of problems in areas affected by recent heavy rains.**

**Around Homestead, severe losses are being reported in squash affected by recent flooding.**

**On the East Coast, Phytophthora is causing problems on peppers and squash especially in areas where it is traditionally a problem and soils have been saturated by recent rains.**

**Around Southwest Florida, Phytophthora is causing issues in peppers, squash and other crops especially in wet areas with a history of the disease.**

## **Pythium**

**Respondents in the EAA report that, aerial Pythium is present on snap beans in a number of locations. Like white mold caused by Sclerotinia, this can cause additional losses in during transport and storage.**

**Pythium is also causing problem in a number of areas affected by recent heavy rains. Cucumber growers around Homestead are reporting problems with cottony leak caused by pythium.**

## **Northern corn leaf blight**

**Northern corn leaf blight has made an appearance on corn with the arrival of cooler temperatures.**

## **Common Corn Rust**

**Common corn rust has been observed at low levels and may soon become a major factor now that conditions have become more favorable (cooler temperatures).**

**Both common rust and southern corn rust produce similar symptoms with the formation of spore-bearing, reddish-orange to brown pustules (uredia) on leaves or husks.**

**Common rust typically produces pustules without a peridium or covering over the pustule. The pustule of southern corn rust is normally persistent. The color of the spore mass of common rust tends to be chocolate brown while that of southern corn rust tends to be orange.**

**The shape of the pustule also varies between the two diseases. Common rust tends to have elongated pustules and southern corn rust has somewhat rounded pustules.**

**Another distinguishing characteristic is the fact that the formation of pustules on the lower surface of the leaf is delayed and often absent with southern corn rust.**

**Identification of which rust is present can be done quickly with a microscope. The rounded urediospores of common rust tend to be uniform in diameter whereas those of southern corn rust are oblong in shape.**

**Spray programs should begin at the first sign of rust. Foliar blights and rust may be successfully controlled using fungicides, if host-plant resistance is insufficient. Strobilurin and triazole fungicides work well should be used in a program with the broad-spectrum protectant mancozeb. Several sprays may be required.**

## **Bean Rust**

**Bean rust is starting to show on beans in the area, so growers should be on the lookout.**

## **Basil Downy Mildew**

**Downy mildew pressure in basil has been relentless and growers have to work hard to keep it in check.**

**Although few fungicides are specifically labeled for this disease, some broadly labeled fungicides which are labeled under the herb crop grouping on current labels, such as Ranman, Quadris and Amistar (Azoxystrobin) and the phosphonic acids have shown efficacy in managing the disease.**

**Recently Revus received a label for use in basil and provides excellent control of downy mildew when used early as a soil drench. These fungicides are most effective when applications are started before or just after initial symptoms are found.**

## **Tomato Chlorotic Spot Virus**

**Around Southwest Florida, scouts are reporting no significant tospovirus recently, with only a few scattered single plant here and there in a few tomato fields.**

**The situation is similar in Palm Beach County with only a few scattered infected tomato and pepper plants being reported.**

**Homestead remains the ground central for Tomato chlorotic spot virus and growers report that they are beginning to see more symptoms of the disease in tomato. Incidence has jumped in a number of fields reaching 50% in a couple of places.**

## **Tomato Yellow Leaf Curl**

**Incidence and occurrence of TYLCV remains mostly low and spotty on tomatoes around South Florida, although a few hotspots have been reported in a couple of fields where incidence is higher.**

**Respondents indicate that incidence in some fields in Homestead have reached 40% infection.**

**Growers are planting more virus resistant cultivars than ever and this has been a major help in keeping TYLCV levels low where employed.**

## **Mosaic**

**Mosaic virus – possibly papaya ringspot has become pretty common in some squash especially where high prices have encouraged extended harvest of some plantings which should have been cleaned up weeks ago.**

## **News You Can Use**

### **January 2016 Weather Summary**

#### **Record Rainfall**

**February 2nd, 2016: El Niño impacts were in full swing across south Florida in January as conditions were in place for several periods of heavy rainfall and severe weather. The end result was a wet and stormy January, a**

hallmark of El Niño winters in this part of the country. All reporting sites recorded above normal rainfall by at least twice the normal amount, with some areas as much as 6 times the normal. A total of 7 sites recorded their wettest January on record, with several others in the top 5. A full list of rainfall amounts and rankings is included in the table below.

Interior and western portions of south Florida received the most January rainfall, with many sites recording over 10 inches of rain and a maximum observed amount of 13.08 inches in Marco Island. Over eastern sections, rainfall was in the 6 to 9 inch range, with areas of western metro Palm Beach County over 10 inches. Two unofficial sites in western metro Palm Beach County measured 15 to 16 inches of rain. These amounts are more reminiscent of summer than winter!

With this much rain in January, hydrological impacts were noteworthy. The South Florida Water Management District recorded its wettest January since record-keeping began in 1932. As of February 1st, the level of Lake Okeechobee was over a foot above normal and Fisheating Creek in Glades County was at flood stage from January 29th through the present time.

Below is a list of January rainfall and departure from normal statistics (in inches) for select locations:

Location (Beginning of Period of Record)	Jan. 2016 Rain	Departure from Normal Rank
Big Cypress - Hendry County	10.64	
Brighton Seminole Campground	9.28	
Canal Point (1942)	10.55	+8.40 Wettest on rec.
Ft Lauderdale/Hollywood Int'l Airport (1912)	7.41	+3.78 8th wettest
Fort Lauderdale Beach	8.65	
Fort Lauderdale Executive Apt	7.28	
Hialeah (1941)	7.10	+5.18 Wettest on rec.
Hollywood (1963)	7.18	+3.55
Homestead General Airport (1990)	5.85	+4.43
Immokalee (1971)	10.36	+8.18 Wettest on rec.
Juno Beach	8.89	
LaBelle (1930)	10.36	+8.32 Wettest on rec.
Marco Island	13.08	
Miami Beach (1927)	7.35	+5.26 2nd wettest
Miami International Airport (1911)	7.57	+5.95 2nd wettest
Moore Haven (1918)	10.89	+9.14 Wettest on rec.
Muse	10.71	
Naples East/Golden Gate	11.83	
Naples Municipal Airport (1942)	7.54	+5.69 3rd wettest
North Miami Beach	8.62	
NWS Miami – Sweetwater	8.43	
Oasis Ranger Station (1979)	8.53	+6.69 Wettest on rec.
Opa-Locka Airport	6.62	
Ortona	11.46	+9.55 Wettest on rec.
Palm Beach Gardens	8.40	
Palm Beach Int'l Airport (1888)	9.90	+6.77 5th wettest
Pembroke Pines/North Perry Airport	5.82	
Pompano Beach Airpark	6.55	
Tamiami Airport – West Kendall	7.57	
The Redland - Miami-Dade County (1942)	7.08	+4.94 3rd wettest
South Bay/Okeelanta	11.47	

## Severe Weather

Another indicator of the presence of El Niño is an increase in storminess. This was certainly the case in January across south Florida. A direct sign of this is an enhanced subtropical jet stream extending from the Gulf of Mexico across the Florida peninsula. This southward displacement of the jet stream helps to set up the necessary conditions for severe weather across Florida, including moisture, instability and wind shear.

A total of six storm systems affected south Florida, with each bringing strong winds, localized flooding and a total of three tornadoes. The storm of January 17th brought widespread 40-50 mph winds across the area, with one storm producing an estimated 70 to 90 mph in the Naples area. A sharp increase in ocean levels accompanied the squall line that moved onshore the Gulf coast that morning, leading to what is believed to be a “meteotsunami” (increase in water levels similar to that of a tsunami but caused by meteorological, not seismic, factors). Beachfront streets on the south end of Naples Beach were flooded up to a foot in depth, but the water receded rather quickly following the passage of the squall line.

The storms of January 27th and 28th also produced widespread impacts, including three tornadoes in southeast Florida. The strongest of these was an EF-1 tornado that struck parts of Coconut Creek and Pompano Beach in Broward County on January 27th.

Damage consisted mostly of uprooted trees and broken tree branches, with an area of more extensive damage in the Wynmoor community and adjacent Florida Turnpike where apartment building sustained roof damage, as well as vehicles moved and even flipped in parking lots and on the Florida Turnpike. On the following day, an EF-0 tornado did mostly tree damage to portions of Delray Beach and Boynton Beach.

## Temperatures

The increased rainfall and resultant cloudy days had a direct impact on temperatures in January. Maximum daily temperatures averaged 1 to 2 degrees below normal, while the daily low temperatures were slightly above average. This is yet another marker of El Niño winters in south Florida in which a mainly below normal temperature signal is caused more by a decrease in daytime high temperatures than night/early morning lows. Despite the overall “coolness”, no freezing temperatures were noted anywhere in south Florida which is unusual for January. The coldest mornings were January 24th and 25th when minimums in the 30s were observed across interior sections of southwest Florida as well as around Lake Okeechobee. A reading of 34 degrees was registered in Muse (western Glades County) on January 25th. There was some patchy frost across interior sections on the morning of January 25th.

- Miami International Airport had an average January temperature of 67.4 degrees Fahrenheit. This is 0.8 degrees below the 30-year normal. The average high temperature was 74F and the average low was 60F. The warmest temperature was 84 degrees on the 1st, 2nd and 9th and the coolest was 46 degrees on the 24th.

- Palm Beach International Airport had an average January temperature of 65.5 degrees Fahrenheit. This is 0.2 degrees below the 30-year normal. The average high temperature was 74F and the average low was 58F. The warmest temperature was 84 degrees on the 1st and the coolest was 40 degrees on the 24th.

- Fort Lauderdale/Hollywood International Airport had an average January temperature of 67.3 degrees Fahrenheit. This is 1.7 degrees below the 30-year normal. The average high temperature was 74F and the average low was 60F. The warmest temperature was 84 degrees on the 2nd, 9th and 10th and the coolest was 44 degrees on the 24th.

- Naples Municipal Airport had an average January temperature of 65.2 degrees Fahrenheit. This is 0.7 degrees above the 30-year normal. The average high temperature was 73F and the average low was 57F. The warmest temperature was 84 degrees on the 1st and the coolest was 44 degrees on the 25th.

## **Outlook for February through April**

The NOAA Climate Prediction Center outlook for February through April is for equal chances of above, below and near normal temperatures and a high likelihood of above normal precipitation. This is essentially a continuation of the current El Niño-influenced pattern.

As a result, south Florida can expect periods of storminess and increased rainfall into the spring months. This means more opportunities for the necessary ingredients to come together to produce severe weather across the state, including strong thunderstorms, flooding and even tornadoes. All residents and visitors should remain aware of weather conditions and pay particular attention to upcoming significant weather events which may lead to severe weather.

Although freezing temperatures are less common in winters influenced by El Niño, they can still occur especially in the months of February and March.

Finally, the rip current risk increases in March as temperatures increase and more people head to the beach.

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

For complete report with graphics go to: <http://www.srh.noaa.gov/images/mfl/news/Jan2016Summary.pdf>

## **Water sampling for Food Safety Modernization Act rule compliance**

Recently, the U.S. Food and Drug Administration (FDA) published the Food Safety Modernization Act (FSMA) Final Rule on Produce Safety. One area that was tweaked in the final rule from the proposed rule was clarification around sampling when testing irrigation water for fresh produce.

Recall that the FSMA classifies two types of water used in the field: agricultural and indirect water. If water comes into direct contact with the harvestable portion of a plant, it is considered agricultural water. If a grower uses overhead sprinklers to irrigate a lettuce field, it would be considered agricultural water. In the case of indirect water, the water would not come into direct contact with the harvestable portion of the plant. If drip tape under plastic is used to maintain tomato plants, this would be considered indirect water.

Under FSMA, water testing is only required for agricultural water. How often a grower needs to test irrigation water that will be used as agricultural water is determined by its source. Surface waters are to be tested at least five times per year, as close to harvest as you can, but not all at the same time. Well water is proposed to be tested four times the first year, then once annually after that. The FDA will be working with the U.S. Department of Agriculture and others to bring sampling numbers required of Good Agricultural Practices standards into line with FSMA standards.

In both cases, the testing of the last four years is aggregated to create two numbers: the standard threshold value and geometric mean. If a grower's values for these two numbers are below a geometric mean of 126 colony-forming unit (CFU) per 100 milliliters and a standard threshold value of 410 CFU per 100 milliliters, then they continue to use the water as they have always done. Every year, the grower will compute a new geometric mean and standard threshold value by taking the last three year's data and combining it with the current year's data to compare it with the threshold values. If a grower's numbers exceed the threshold, the grower needs to take measures to mitigate the potential contamination. This testing and computation is for agricultural water ONLY. Indirect water is not required to be tested, regardless of the source.

This discussion is not a comprehensive look at the changes to FSMA in the proposed revisions or even in the changes to the water quality section in fresh produce.

To read more about the rule, visit FSMA Final Rule on Produce Safety at <http://www.fda.gov/Food/GuidanceRegulation/FSMA/ucm334114.htm>

## **Record Rainfall**

As you all know, thanks to El Nino, it has been unusually wet this fall and winter.

According to the South Florida Water Management District, rainfall in the South Florida region was 139 percent above average in November, 199 percent above average in December, and was nearly 350 percent above average for the month of January.

Here are links to a number of articles describing the impact on South Florida.

<http://www.wtsp.com/story/news/local/florida/2016/02/12/florida-crops-lost-during-rainy-winter-prices-skyrocket/80294712/>

<http://www.sun-sentinel.com/local/broward/fl-everglades-flooding-broward-20160209-story.html>

<http://www.winknews.com/2016/02/11/lake-o-cities-response-to-lee-county-mayors-we-deserve-flood-protection/>

<http://www.news-press.com/story/opinion/2016/02/05/heavy-rains-force-need-more-storage/79822948/>

## **Up Coming Meetings**

**February 15, 2016**                      **Sweet Corn Pest Management Research Update**                      **8:30 AM – Noon**

UF/IFAS EREC  
3200 E. Palm Beach Rd.  
Belle Glade, FL 33430

RSVP requested.

**February 16, 2016**                      **Vegetable Nutrition Update**                      **9:45 AM - Noon**

UF/IFAS Southwest Florida REC  
2685 SR 29 N  
Immokalee, FL 34142

Contact Debra at [dcabrera@ufl.edu](mailto:dcabrera@ufl.edu) or 863-674-4092 to save a place.

## **February 16 and 17, 2016    Marketing to Canada**

Are you doing business in Canada? Are you interested in the opportunity?

Join FFVA, the Canadian Produce Marketing Association and a panel of Canadian retailers to get the latest information on key issues affecting everyone who works with Canadian buyers and retailers.

Two free Town Hall meetings are set for:

Feb.16: 11:30 a.m. to 1:45 p.m. (includes complimentary lunch)  
Clayton E. Hutcheson Agriculture Services Center  
Palm Beach County Cooperative Extension Service  
559 N. Military Trail, West Palm Beach

Feb.17: 11:30 a.m. to 1:45 p.m. (includes complimentary lunch)  
Rogers Auditorium  
Manatee County Extension Center  
1303 17th St. West, Palmetto

Topics will include trade barriers, technology and innovation, food safety, and increasing consumption of fruit and vegetables. Also featured will be a moderated discussion of Canadian retailers, including The Grocery People, Loblaws and others.

Follow this link to register: <https://cpmaacdf.wufoo.eu/forms/florida-cpma-chairs-town-halls>

**February 19, 2016                      Miami Dade Co Annual Agricultural Farm Tour and Luncheon 8:00 AM**

Miami-Dade County Extension Office  
18710 S.W. 288th Street  
Homestead 33030

Tickets are \$50 and proceeds help fund scholarships.

Contact Lize at 305-248-3311 X 242 or Patty at 305-248-3311 X 225 for more information.

**February 24, 2016                      New Technology for Commercial Vegetable and Fruit Production IV  
Webinar**

When: 10:00 – 3:00PM,  
Where: UF/IFAS Southwest Florida Research and Education Center  
2685 Hwy 29 N  
Immokalee, FL 34142

Registration: includes lunch

CCA: 4 credits CEUs: 3 for - Private, Aerial, Ag Row, Ag Tree, Demo & Research, or Soil & Greenhouse Fumigation

Registration online at <https://www.eventbrite.com/e/new-technology-for-commercial-vegetable-and-fruit-production-iv-webinar-tickets-21427511263>

**Websites**

**Difficulties in sending Lake O water south- this slideshow will help you understand the difficulties involved.** <http://www.mypalmbeachpost.com/gallery/news/state-regional/slideshow-difficulties-sending-lake-o-water-south/gCQ2Y/#6780020>



**FDACs Office of Ag Water Policy - BMP Manuals** – In addition to the newly revised Ag Row Crop BMP manual you will also find link to enroll in a BMP program. Go to <http://www.freshfromflorida.com/Divisions-Offices/Agricultural-Water-Policy/Enroll-in-BMPs/BMP-Rules-Manuals-and-Other-Documents>

Food Safety Modernization Act Final Rule on Produce Safety at <http://www.fda.gov/Food/GuidanceRegulation/FSMA/ucm334114.htm>

**South Florida History - Five Centuries in Five Minutes**  
<http://www.sun-sentinel.com/video/originals/news/fl-dubious-history-century-premiumvideo.html>

## **Quotable Quotes**

The pessimist complains about the wind; the optimist expects it to change; the realist adjusts the sails. - William Arthur Ward

You can't plow a field simply by turning it over in your mind. - Gordon B. Hinckley

You miss 100% of the shots you don't take. - Wayne Gretzky

Life shrinks or expands in proportion to one's courage. - Anais Nin  
Too many of us are not living our dreams because we are living our fears. - Les Brown

There are no traffic jams along the extra mile. - Roger Staubach  
A man may smile and bid you hail yet wish you to the devil; but when a good dog wags his tail, you know he's on the level. - Anon

## **On the Lighter Side**

### **Lessons in Life**

1. Life isn't fair, but it's still good.
2. When in doubt, just take the next small step.
3. Life is too short to waste time hating anyone.
4. Don't take yourself so seriously. No one else does.
5. Pay off your credit cards every month.
6. You don't have to win every argument. Agree to disagree.
7. Cry with someone. It's more healing than crying alone.
8. It's OK to get angry with God. He can take it.
9. Save for retirement starting with your first paycheck.
10. When it comes to chocolate, resistance is futile.
11. Make peace with your past so it won't screw up the present.

12. It's OK to let your children see you cry.
13. Don't compare your life to others'. You have no idea what their journey is all about.
14. If a relationship has to be a secret, you shouldn't be in it.
15. Everything can change in the blink of an eye. But don't worry; God never blinks.
16. Life is too short for long pity parties. Get busy living, or get busy dying.
17. You can get through anything if you stay put in today.
18. A writer writes. If you want to be a writer, write.
19. It's never too late to have a happy childhood. But the second one is up to you and no one else.
20. When it comes to going after what you love in life, don't take no for an answer.
21. Burn the candles, use the nice sheets, wear the fancy lingerie. Don't save it for a special occasion. Today is special.
22. Over prepare, then go with the flow.
23. Be eccentric now. Don't wait for old age to wear purple.
24. The most important sex organ is the brain.
25. No one is in charge of your happiness except you.
26. Frame every so-called disaster with these words: "In five years, will this matter?"
27. Always choose life.
28. Forgive everyone everything.
29. What other people think of you is none of your business.
30. Time heals almost everything. Give time time.
31. However good or bad a situation is, it will change.
32. Your job won't take care of you when you are sick. Your friends will. Stay in touch.
33. Believe in miracles.
34. God loves you because of who God is, not because of anything you did or didn't do.
35. Whatever doesn't kill you really does make you stronger.
36. Growing old beats the alternative -- dying young.
37. Read the Psalms. They cover every human emotion.

38. Get outside every day. Miracles are waiting everywhere.
39. If we all threw our problems in a pile and saw everyone else's, we'd grab ours back.
40. Don't audit life. Show up and make the most of it now.
41. Get rid of anything that isn't useful, beautiful or joyful.
42. All that truly matters in the end is that you loved.
43. Envy is a waste of time. You already have all you need.
44. The best is yet to come.
45. No matter how you feel, get up, dress up and show up.
46. Take a deep breath. It calms the mind.
47. If you don't ask, you don't get.
48. Yield.
49. Life isn't tied with a bow, but it's still a gift.
50. "A REAL FRIEND IS ONE WHO WALKS IN WHEN THE REST OF THE WORLD WALKS OUT

### **The F16 vs C130**

There is a moral here!

A C130 was lumbering along when a cocky F16 flashed by. The jet jockey decided to show off. The fighter jock told the C130 pilot, 'watch this!' and promptly went into a barrel roll followed by a steep climb. He then finished with a sonic boom as he broke the sound barrier. The F16 pilot asked the C130 pilot what he thought of that?

The C130 pilot said, 'That was impressive, but watch this!' The C130 droned along for about 5 minutes and then the C130 pilot came back on and said: 'What did you think of that?'

Puzzled, the F16 pilot asked, 'What the heck did you do?' The C130 pilot chuckled. 'I stood up, stretched my legs, walked to the back, went to the bathroom, and then got a cup of coffee and a cinnamon bun.'

When you are young & foolish speed & flash may seem a good thing!!!

When you get older & smarter comfort & dull is not such a bad thing!!!

### **Kids Say the Darndest Things**

TEACHER: Maria, go to the map and find North America.

MARIA: Here it is.

TEACHER: Correct. Now class, who discovered America?

CLASS: Maria.

TEACHER: Glenn, how do you spell 'crocodile?'

GLENN: K-R-O-K-O-D-I-A-L'

TEACHER: No, that's wrong

GLENN: Maybe it is wrong, but you asked me how I spell it.

TEACHER: Donald, what is the chemical formula for water?

DONALD: H I J K L M N O.

TEACHER: What are you talking about?

DONALD: Yesterday you said it's H to O

TEACHER: Clyde, your composition on 'My Dog' is exactly the same as your brother's... Did you copy his?

CLYDE : No sir, It's the same dog.

TEACHER: Harold, what do you call a person who keeps on talking when people are no longer interested?

HAROLD: A teacher

**Note: State and local budgets cuts are threatening to further reduce our funding – if you are receiving currently receiving the hotline by mail and would like to switch over to electronic delivery – just drop me an email. It is much quicker and you will get the hotline within minutes of my completing it and help conserve dwindling resources at the same time. Thanks to those that have already made the switch.**

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*Gene McAvoy*

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