Hurricane Gordon passed well off the coast of SW Florida on September 16 and 17 bringing needed rain to the area. Most areas received between 2 and 4 inches of rain with light winds. In general, SW Florida fared well with few problems other than a few reports of some blossoms being knocked off crops in bloom. The exception was coastal areas of Lee including Pine Island and Matlacha and Charlotte Counties along Burnt Store Road, which received some 10 – 12 inches of rain flooding some fields along with some reports of wind damage. The FAWN Weather Station in Immokalee recorded a total of 2.34 inches of rain from the storm and a total of 3.61 inches of rain for the period.

Daytime temperature continue to remain in the high 80’s to low 90’s with nighttime temperatures consistently in the mid to lower 70’s. Penman evapo-transpiration levels have fallen appreciable over the past two weeks with most readings running between 0.170 and 0.199 inches per day. Increases in daily rainfall across the area have improved soil moisture levels and there have been few reports of heat stress or salt related problems over the past two weeks.

Some growers have noted that some so-called reflective mulches intended to repel insects are actually more of a gray color and heat up excessively under our fall conditions stressing plants.

The National Weather Service forecast for the next few days is for partly cloudy skies with a 40 percent chance of mainly afternoon shower or thunderstorms. Highs will be around 90 with winds east at 10 to 15 MPH.

**IMMOKALEE Weather Summary:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Air Temp °F</th>
<th>Rainfall (inches)</th>
<th>Hours Below Certain Temperature</th>
<th>(hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept 11 – 21, 2000</td>
<td>Min</td>
<td>Max</td>
<td>40°F</td>
<td>45°F</td>
</tr>
<tr>
<td>70.5</td>
<td>94.7</td>
<td>3.61</td>
<td>0.0</td>
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</tbody>
</table>
Planting is going well throughout SW Florida. Tomato and pepper planting is in full swing. Transplanting is on schedule. Recent high temperatures slowed the development of young plants but with more favorable weather conditions these are starting to grow out nicely.

Plantings of, cucumbers, eggplants, snap beans, squash and other crops is gaining momentum and potato planting should begin in the next few weeks. Growers are laying plastic, staking, and spraying for the control of insects and disease. Most reports indicate crops in good condition with new plantings beginning to establish and grow rapidly.

Armyworms continue to be seen in high numbers in tomato and pepper from across SW Florida. Scouts and growers have indicated that they are under heavy pressure from worms. Beet armyworm and southern armyworms make up the majority of the worms identified. Reports of high numbers of egg masses and high trap counts are being received from locations across the area.

Respondents are also seeing significant numbers of other worms species including loopers, hornworms, and tomato fruitworms.

Although armyworms are active year round in our area, numbers are typically highest from August through October. Pheromone traps can help provide relative estimates of moth activity within an area.

Hosts include many vegetables, agronomic crops and grasses. The worms prefer to feed on foliage but may attack the stems, fruit or even tubers of certain host plants. Most armyworms go through five larval stages within 14 to 21 days (species and temperature dependent). Young caterpillars tend to congregate in the vicinity of hatching for about 24 to 48 hours, after which they migrate to different plants and/or feeding sites. Young worms scarify the leaves as they feed, leaving a thin, windowpane appearance. As they grow, their ability to consume plant tissue increases and they can chew large holes in leaves or strip an entire plant. Damage can be extensive.

Beet armyworms are often the most difficult to control and cause the most damage on peppers, tomatoes and leafy vegetables. The different armyworms are similar in color, size and markings and can be difficult to tell apart. The Florida Tomato Scouting Guide has excellent color photographs to help you identify these and other common tomato pests. It can be found on the web at http://FTSG.ifas.ufl.edu/intro.htm

Scouting is extremely important in detecting worms early before they can do significant damage. The Florida Tomato Scouting Guide indicates a pre-bloom threshold of 1 larva/6 plants and post-bloom threshold of 1 egg mass or larva/field. In the past various, the routine use of Bt formulations was the core of a worm control program with a variety of chemical pesticides such as Ambush, Baythroid, Lannate, Pounce and others being called on when pressure increased.

Over the past few seasons, growers have a variety of new tools in the battle against armyworms. Rohm and Haas came out with Confirm last year; this is an insect growth regulator with specific action against lepidopterous worms that has given excellent results since its release. Grower’s reports indicate that Confirm has good rainfastness when compared to many of the Bts. Dow’s Spintor, DuPont’s Avaunt and the Novartis product Proclaim give growers a number of additional options for worm control with reduced impact on non-target pests.

For those interested in biological options for beet armyworm control, growers can add Spod-X (beet armyworm virus from Thermo-Trilogy), to the spray tank for the control of beet armyworm. Spod-X is relatively inexpensive at around $4 per acre. This product gives organic growers another tool besides Bt for safe effective worm control and provides conventional growers with another pest and resistance management option in the war against worms.
Growers are reminded to rotate between products of different chemical classes to avoid the buildup of possible pest resistance. The range of materials to choose from makes this task relatively easy to do.

There have been a few scattered reports of isolated leafminer activity on tomato and cucurbits.

There have also been some isolated reports of a few winged aphids around. In both instances, numbers have been too low to warrant control efforts.

Rainfall accompanying Hurricane Gordon seems to have pounded whiteflies back down to more seasonable levels in SW Florida. Most respondents are now reporting counts of well below one per plant for the most parts. There have been few reports of higher numbers around one per plant but nothing alarming.

Some growers have indicated that some of the whiteflies may becoming off volunteer plants on ditch banks and unplanted areas. This observation underscores the important role of sanitation in a complete integrated pest management strategy!

The last hotline indicated some isolated problems with TYLCV infested plants coming from transplant facilities outside of our area. There have been no further reports of this nature. Growers who received infected transplants have indicated they have been diligently rouging them out on identification and feel that they currently have the situation under control.

Use of imidicloprid in the greenhouse and at planting is recommended to control the whitefly vector. Upon identification, TYLCV plants should be rouged out and destroyed to slow the spread of the virus. Growers should also consider the source of their planting material; there have been several incidences over the past few years, where plants from high TYLCV incidence areas have caused problems locally. Growers should ensure that production facilities are taking aggressive steps to control whitefly and prevent TYLCV infection.

At present, imidicloprid – Admire is the top choice of an early season whitefly control program. Admire should be used in the plant house and at planting. There are pending labels for some new materials from Novartis that promise to expand the range of options available to growers. Labels are expected for thiamethoxam – Actara 25 WG and Platinum 2SC – second generation neonicotinoid insecticides which have demonstrated excellent long-term whitefly control in research trials.

Neemix 4.5 has looked pretty good in trials conducted by Phil Stansly in Immokalee and Dak Seal in Homestead for the control of whiteflies and the prevention of TYLC virus. Fulfill (pymetrozine) from Novartis has shown some activity in reducing TYLCV transmission from infected whiteflies and may have a place in reducing spread of the disease particularly in transplant production facilities. Both of these products along with the insect growth regulators Knack and Applaud could fit in well with a resistance management program for Knack and Applaud.

Pythium root rot has been reported in tomato and pepper. There has been some increase in the number of wilted plants following recent rains but the incidence remains low with most of the affected plants occurring at the end of rows and next to shovel ditches where water accumulates.

The heaviest disease pressure in southwestern Florida traditionally occurs with the fall crop, when rainfall is normally heaviest. Warm, wet conditions set the stage for this disease. While fumigation at the time of bed treatment provides some disease protection. Pythium can move back into the fumigated soil rapidly once the plastic has been opened and soil and equipment is moved around during by transplant operations. Since there are low levels of beneficial organisms present in the treated bed to suppress recolonization, the disease organisms
spread through the soil rapidly. This is particularly true with Pythium, which can infect the root system of a newly set transplant in three to six hours."

**Additional cultural controls include the following measures**: avoid planting in low, poorly drained areas or land with residual, undecomposed plant debris. Do not set weak unthrifty plants.

**Chemical control of rot roots and damping-off caused by Pythium spp. consists of mefanoxam applied pre-plant broadcast or in a banded application.** Ridomil Gold WSP at the rate of 2 lbs. per treated acre or Ridomil Gold EC at 2 pt. per treated acre.

**Heavy rainfall accompanying Hurricane Gordon along with in a general increase in overall rainfall for the period has lead to a widespread increase in reports of new bacterial leaf spot infections on tomato and pepper.** For the most part, the incidence is scattered and severity is light to moderate. Some respondents have indicated heavier infections in some tomato fields where blowing wind and rain have carried bacteria high into the canopy. Some early plantings of pepper are also showing high levels of infestation and are on the verge of serious defoliation.

**Bacterial spot of tomato and pepper is a serious disease because it has a high rate of spread, especially during warm periods with wind driven rains, and because fruit symptoms reduce marketable fruit.** Bacterial spot is caused by the bacterium, *Xanthomonas campestris pv vesicatoria*. Entry into the plant occurs when bacterial cells pass through natural plant openings (stomates and hydothodes) or wounds made by wind driven soil, insects, or culturing operations.

Tests support the traditional extension service recommendation of copper and maneb or mancozeb for bacterial spot control. When the weather conditions favor bacterial spot, growers may have to use this tank mix as their primary disease control material. Realistically, chemical control cannot be expected to be as effective for bacterial diseases as it is for fungal diseases. If conditions are particularly favorable, frequent sprayings may not be sufficient to maintain bacterial disease below damaging levels. Copper compounds when used excessively may also retard plant growth and cause copper "stain" of fruit.

The effectiveness of copper bactericides is limited, because of the widespread occurrence in Florida of copper tolerance among strains of *X. campestris pv. vesicatoria*. During periods of wind-driven rains, no available control measures are adequate. An integrated approach, which employs several tactics, is needed to manage this disease. Bacterial spot is most severe when night temperatures are above 65°F, but the bacteria can be active below that temperature. While all pepper varieties are susceptible to one or more races of the bacterium, differences in degree of susceptibility exist. There are a number of commercial varieties that are resistant to races 1, 2 and 3. There is some evidence that the pathogen can be transmitted in pepper seed. Pepper and tomato volunteers should be destroyed well before the next cropping season. Transplants should be certified as disease-free. Workers and farm equipment should be kept out of fields when fields are wet because this disease will be spread more readily wet conditions. This organism is readily spread through fields when contact is made with wet foliage.

While a tank mix of copper and maneb or mancozeb has more bactericidal activity than copper alone, it is important to note that this tank mix is less effective than mancozeb alone against several fungal pathogens. This fact poses some particular problems when other diseases such as late blight or target spot is a threat at the same time as a bacterial. In such cases separate trips over the field with copper/mancozeb or chlorothalonil alone may have to be made. Alternatively, sprays of chlorothalonil and copper may be used, because copper apparently has no effect on the fungicidal efficacy of chlorothalonil. Early blight is one foliar fungal disease that is quite adequately controlled by applications of copper/mancozeb tank mixes.
Periodic application of fungicides is an important component of a tomato disease control program. Attention to application techniques is as important as choice of material in achieving adequate control. A "typical" tomato spray application would be done with a tractor-mounted, boom sprayer at 200 to 275 psi pressure and 100 gal/acre of finished spray on mature plants. Proper application equipment calibration is a must. A tractor speed of about 3 miles/hour is recommended. An observer should be able to walk behind the tractor at a comfortable pace. If the tractor speed is properly adjusted, most disease situations can be adequately controlled with one application of fungicide per week. In small plot tests, bacterial spot control was better with applications twice a week compared to once a week. Faster tractor speeds can lead to poor control and may cause a need for more frequent spraying.

Care must be taken to ensure that nozzles work properly, strainers are clear and nozzle arrangement allows for adequate coverage. The air in the tomato canopy should be completely displaced by a fine mist of fungicide to prevent disease outbreaks that can begin deep inside the plant canopy.

Remember that most fungicides are primarily preventative. They must be applied before the pathogen arrives on the foliage to provide effective disease control. Timing of sprays is very important. If fungicide sprays are started after the disease is discovered, it may be impossible to curb an epidemic.

Chlorothalonil, mancozeb, or maneb offer the most broad-spectrum activity against the common foliar fungal diseases of tomato: late blight, early blight and target spot. The strobilurin fungicides (Flint and Quadris) are relatively new materials with a broad spectrum of activity.

Growers should be aware that research suggests that the use of organosilicate adjuvants has increased the incidence and severity of bacterial spot infections, possibly by enhancing the penetration of inoculum into the plant. Avoid unnecessary use of magnesium as foliar or soil applications as this may also increase the incidence of bacterial spot.

Although copper fungicides tank-mixed with Maneb or mancozeb are presently the main treatment for control of bacterial spot, recent labels for two new SAR elicitors should increase the options available to growers. Eden BioScience has recently received federal and state labels for Messenger. Novartis received a federal label for Actigard in August and expects a state label in the near future.

**Messenger™ from Eden BioScience received EPA approval in April 2000 and is now labeled for use in Florida.** Utilizing harpin proteins and harpin-related technology, Messenger is said to activate the plant’s natural defense and growth systems, providing broad protection against disease, reduced damage caused by pests and improved plant growth, crop yield and quality. Messenger is a water-soluble, granular powder that is topically applied either independently or in conjunction with traditional chemical pesticides. Once applied, Messenger degrades rapidly and leaves no detectable residue. Unlike traditional chemical pesticides, Messenger has no direct effect on pests and pathogens, reducing the likelihood of pest resistance.

The active ingredient in Messenger, harpin, is a naturally occurring protein discovered by Dr. Zhongmin Wei and his colleagues at Cornell University. Those findings were first published in the July 3, 1992, issue of *Science* (Volume 257). EDEN Bioscience has further studied the harpin protein and developed the commercial application of Messenger at its research and production facility in Bothell, Wash.

**When Messenger is applied to plants, its active ingredient, the harpin protein, initiates a complex set of metabolic responses, causing natural gene expression and activating a plant’s natural defense and growth systems.** Messenger activates a plant’s natural growth and defense mechanisms. When Messenger is applied to a plant, harpin proteins bind to plant receptors. Upon binding, the Messenger-treated plant initiates and amplifies a
set of complex signaling pathways: activating a well-defined series of systemic acquired resistance (SAR) genes, inducing the jasmonic acid/ethylene dependent pathway and eliciting plant growth-related systems.

While this natural process occurs nearly every day in almost all plants, Messenger stimulates the expression of a set of natural plant genes that is said to result in resistance against a broad spectrum of viral, fungal and bacterial diseases, including several for which no effective treatments are available. Messenger is also said to activate plants to suppress or repel certain insects, mites and nematodes. Full response generally occurs within 3 to 5 days after application. Resulting effects may last for several weeks, or throughout the growing season, depending on the crop.

**Messenger is classified by the EPA as a biochemical pesticide** that protects plants against a wide variety of pests on multiple crops. Eden claims additional benefits including improved plant growth, crop yield and quality.

**Messenger is virtually non-toxic to humans and the environment.** Messenger poses no unique or additional risk to field workers. Based on test results, EPA classifies Messenger as practically non-toxic to mammals, birds, honeybees, plants and aquatic species. EPA designates Messenger as a Toxicity Category IV product, a designation reserved for materials with the lowest hazard potential.

**Because of low use rates, no harpin residues are detectable after application.** Harpin protein is rapidly degraded in the environment by natural sunlight and by microbes on plant surfaces and in the soil. As a result, there is virtually no human dietary exposure to Messenger resulting from application of the product.

**Actigard (TM) 50WG PLANT ACTIVATOR.** For protection against certain diseases of leafy vegetables, tomatoes, and tobacco. (VegNet Vol. 7, No. 27, September 13, 2000 – from the label)

**Actigard 50WG is a selective, systemic compound used for the control of downy mildew of cole crops and leafy vegetables, bacterial leaf spots of tomatoes, and blue mold of tobacco.** Actigard 50WG is an inducer of host plant resistance. Actigard 50WG exhibits an unique mode of action, which mimics the natural systemic activated resistance (SAR) response, found in most plant species. Actigard 50WG has no direct activity against target pathogens. For best performance, always follow these directions: Actigard 50WG should be applied to plant foliage preventively, before disease is observed in the field. Actigard 50WG moves systemically within the plant; however uniform spray coverage is essential for best performance. Apply Actigard 50WG in sufficient water to ensure uniform coverage (see specific water volumes for each crop in directions for use tables). An Actigard application mimics the SAR response in plants. Maximum disease control is normally obtained 4 days after an Actigard application. Actigard 50WG provides protection against certain diseases in the crops listed on this label.

**Actigard provides sufficient protection to reduce disease levels** but should be tank mixed with other registered products with curative activity if disease is present at the time of application, to ensure adequate disease control or to broaden the spectrum of disease control.

**Actigard 50WG exhibits a mode of action unique from currently available fungicides and bactericides.** Since Actigard 50WG has no direct activity on plant pathogens, the likelihood of pathogen development of insensitivity is low.

**However, since plant pathogens are known to develop tolerance to host plant resistance and to products used repeatedly for control and because insensitivity development cannot be fully predicted,** the use of this product should conform to sensitivity management strategies established for the crop and use area. Such strategies may include rotating and/or tank mixing with products with different modes of action as well as the use of good cultural practices. If insensitivity to this product develops in your area, this product or other products with a similar mode of action may not provide adequate control. If you experience difficulty with control, and
insensitivity is a likely cause, consult your local Novartis Crop Protection representative, local agricultural extension office, or pest control advisor for the best alternative method of control. Novartis encourages responsible product stewardship to ensure effective long-term disease control.

Some restrictions:

(1) Do not apply Actigard to plants that are stressed due to drought, excessive moisture, cold weather, or herbicide injury, etc.
(2) Do not apply Actigard to tobacco in plant beds or in greenhouses/plant houses.
(3) Do not apply Actigard with foliar fertilizers and crop oils.
(4) Avoid spray overlap because injury may result.
(5) Do not apply by air.
(6) Do not apply more than 1 oz. of Actigard per acre per season. Allow 21 days between the last application and harvest.

Rotational (plantback) Restriction: Do not plant any crop within 30 days after the last application of Actigard 50WG, except for the crops listed below: Tobacco, leafy vegetables including cole (brassica) crops, and fruiting vegetables.

Note: Actigard is not yet labeled for use in Florida.

Herbicide Update from IR 4 – excerpted from VegNet Vol. 7, No. 28, September 21, 2000

The annual IR4/ USDA Food Workshop was held in Orlando, FL during the week of September 11. The big issue that arose is that Goal, Prowl, and Dual are all under review at EPA, and all projects for those products will be held up for at least 2 years and maybe longer. It appears to be political with no scientific reason for the delay. A particular irony is that just a few years Dual Magnum was given the status of a 'reduced risk pesticide'. Apparently that has all changed with no apparent explanation. Three people from IR-4 addressed the Herbicides for Minor Use committee, and they are as frustrated as other projects on these herbicides are delayed as well.

Good news for tomato growers, Griffin LLC has labeled a paraquat dichloride contact herbicide for use in Florida, which they are calling Boa. The label will allow the post harvest desiccation of vegetables following harvest. This is will provide tomato growers an alternative to Diquat which was their only legal desiccant after a decision made by the EPA regarding Gramaxone last spring. The labeled rate is 1.5 – 2 pt. per acre broadcast applied in a minimum of 10 gallons of water per acre.

Up Coming Meetings:

September 26-27, 2000  
7th Annual Florida Agricultural Conference and Trade Show
Lakeland Center
Lakeland, Florida

For more information, contact Kathy Murphy at 407-678-5357

October 10, 2000  
WPS Train-the-Trainer
Dallas B Townsend Agricultural Center
1085 Pratt Blvd
LaBelle, Florida
For more information, contact Sheila at 863-674-4092

October 10, 2000

AQUATIC WEED CONTROL IN CITRUS CANALS, DITCHES AND RESERVOIRS
Southwest Florida Research & Education Center
2686 State Road 29 N
Immokalee, Florida

Earn 5 CEU’s toward your aquatic license, reservations and fee required: see attached agenda and application below.

For more information, contact Dr Mongi Zekri at 863-674-4092.

Web Sites:

Agricultural Market News – the USDA AMS provides current, unbiased price and sales information to assist in the orderly marketing and distribution of farm commodities. Reports include information on prices, volume, quality, condition, and other market data on farm products in specific markets and marketing areas. Reports cover both domestic and international markets. – Go to http://www.ams.usda.gov/marketnews.htm

Mississippi State University Organic Fruit and Vegetable Web Page – provides a comprehensive resource guide to organic information resources as well as an organic IPM Guide. Visit this helpful site at http://www.msstate.edu/dept/cmrec/organic/

Noxious Weeds in the US and Canada – A USDA/ARS site which provides a searchable database of the noxious weed lists for forty-eight U.S. states and six southern provinces of Canada. The database can be searched by plant name, state name, or by clicking on a map. http://invader.db.s.umt.edu/Noxious_Weeds/

Nature - Alien Empire – No, this is not a cool new game site, but it is cool. This is a special PBS multimedia Web companion to the three-week NATURE miniseries that takes you into the bizarre, fascinating world of insects, with amazing graphics, sound and animation, enhanced video, and activities. Check it out at http://www.pbs.org/wnet/nature/alienempire/

Quotable Quotes

"Under capitalism, man exploits man. Under communism, it's just the opposite." -- John Kenneth Galbraith

"No problem is so formidable that you can't walk away from it." -- Charles Schulz

"Hell hath no fury like a bureaucrat scorned." -- Milton Friedman

AQUATIC WEED CONTROL IN CITRUS CANALS, DITCHES AND RESERVOIRS

October 10, 2000
Southwest Florida Research & Education Center
2686 State Road 29 N
Immokalee, FL
Registration of $10.00 per person is required by October 1, 2000.
5 CEU and 4 CCA credits are available toward license renewal.
For more information about this program, contact Dr. Mongi Zekri, 863-674-4092 in LaBelle
Additional program locations:
October 12, 2000 Fellsmere, FL - contact Mr. Jack Hebb, 561-462-1660
October 17, 2000 Arcadia, FL - contact Dr. Steve Futch, 863-956-1151

Update on the Southwest Florida Vegetable Research Investment Fund

The "SW Florida Vegetable Research Investment Fund." advisory committee meet on Wednesday, September 6th to review a 26 page “Methyl bromide Alternatives in Vegetable Production” position paper that was prepared by Glades Crop Care at the request of the committee. The draft document was unanimously accepted by the
committee after thorough review and will be made available to members in the next few weeks as soon as the final product is received.

The fund is envisioned as a strategic partnership of growers and others in the vegetable industry that pool their resources to address research needs of common concern.

By participating in the SW Florida Vegetable Research Investment Fund, you will be helping to ensure the future of practical research that addresses the needs of the local vegetable grower. The strength and ultimately the future survival of not only the vegetable industry in southwest Florida, but also every vegetable grower will depend on cooperation and unity within the industry.

For more information on becoming a member of the SW Florida Vegetable Research Investment Fund, please contact any of the advisory committee members listed above or Gene McAvoy at the Hendry County Extension Office.

Don't hesitate - join the fund today – every grower and industry partner is needed to make this a success!

**Contributors** include: Karen Armbrester/SWFREC, Jim Connor/SWFREC, Bruce Corbitt/West Coast Tomato Growers, Marty Gross/SWFREC, Ed English/Pacific Tomato Growers, Fred Heald/Farmers Supply, Sarah Hornsby/AgCropCon, Cecil Howell/H&R Farm, Leon Lucas/Glades Crop Care, Gene McAvoy/Hendry County Extension, Alice McGhee/Thomas Produce, Tim Nychk/Nychk Bros. Farm, Chuck 0bern/C+B Farm, Dr. Pam Roberts/SWFREC, Wes Roan/6 L's, Kevin Seitzinger/Gargiulo, Jay Shivler/ F & F Farm, Ben Stanaland/Pacific Tomato Growers, John Stanford/LNA Farm, Mike Stanford/MED Farms, Dr. Phil Stansly/SWFREC, Eugene Tolar/Red Star Farms, and Dr. Charlie Vavrina/SWFREC, Donna Verbeck/GulfCoast Ag.

The **SW 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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