



UNIVERSITY OF
FLORIDA

E X T E N S I O N

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SOUTH FLORIDA VEGETABLE PEST AND DISEASE HOTLINE

April 2, 2006

A frontal system, which crossed the state during the week of March 20th, brought a few days of unseasonably cool temperatures and unsettled weather. The system was accompanied by strong winds which tossed plants causing some plant burn and bloom drop along with wind borne sand that bruised some fruit when storms passed over southern Peninsula growing areas near the end of the week.

Otherwise temperatures continue to moderate seasonally with daytime temperatures in the mid 70's to low eighties. Nighttime temperatures have been in the 40's, 50's, and 60's fluctuating as fronts have traversed the peninsula. Mainly sunny days, cool nights and longer days have accelerated crop growth with most crops now showing little or no sign of freezing temperatures in February.

Most South Florida growing areas reported minimal precipitation for the period with the exception of Southwest Florida and Western Palm Beach where a number of locations recorded over 2 inches of rain bringing much needed precipitation. Favorable weather conditions have allowed growers to proceed on schedule with planting, harvest and cultural operations in most places.

FAWN Weather Summary*

Date	Air Temp °F		Rainfall (Inches)	Hours Below Certain Temperature (hours)							
	Min	Max		40°F	45°F	50°F	55°F	60°F	65°F	70°F	75°F
Balm											
3/11-4/1/06	36.2	85.4	0.10	0.5	2.9	8.2	2.5	6.9	8.3	23.8	21.1
Ft Lauderdale											
3/11-4/1/06	50.1	90.4	0.15	0.0	0.0	0.0	30.0	1.0	3.1	16.1	15.3
Fort Pierce											
3/11-4/1/06	43.3	87.8	0.23	0.0	2.3	6.8	13.1	10.5	38.3	61.3	42.9
Homestead											
3/11-4/1/06	45.0	88.3	0.61	0.0	0.0	28.3	10.9	5.9	32.4	79.8	8.3
Immokalee											
3/11-4/1/06	39.6	87.3	2.08	1.6	24.4	8.0	4.4	12.0	51.9	76.0	11.0

Go Gators!

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Crops coming to market included cabbage, celery, cucumbers, eggplant, endive, escarole, lettuce, peppers, radishes, snap beans, sweet corn, squash, strawberries, tomatoes and variety of specialty items. Quality is mostly good but prices have been weak for some items.

The short-term forecast from the National Weather Service in Miami indicates a surface ridge and a relatively dry airmass will keep the local area free of precipitation for most of the forecast period. The only exception may come on Wednesday and Thursday when a weak "back door front" may approach South Florida and move slowly south giving us a slight chance for rain. For additional information, visit the National Weather Service in Miami website at <http://www.srh.noaa.gov/mfl/newpage/index.html>

Insects

Thrips

Reports from around Southwest Florida indicate that thrips are going crazy in number of locations. Thrips pressure is very high in many locations with some pepper, tomato and eggplant fields having counts of 10-20 plus per bloom. Growers and scouts report that have begun to observe flights of thrips in the field. In most cases these appear to be flower thrips (*Frankliniella bispinosa*).

Low levels of *Thrips palmi* damage are also being observed in pepper and tomato.

Respondents on the East Coast report that flower thrips are widely and can be found in moderate to high levels in eggplant, pepper and tomato blooms. Reports also indicate that *Thrips palmi* are present in few locations and are building in pepper and eggplant.

Reports from the Plant City area indicate that thrips are present at low to moderate levels in a range of crops.

Thrips inflict damage on vegetable crops when feeding and laying eggs. Damage from egg-laying is most common in species that infest blooms such as Florida flower thrips *Frankliniella bispinnosa*. When the eggs are inserted into the pistil walls, scars develop when the fruit expands. In some fruiting vegetables dimple scars develop when the fruit are fully matured. In tomatoes, such scars may result in uneven color development at maturity.

Feeding injuries occur on both fruit and foliage. Thrips infesting blooms typically lay their eggs in the pistil or other flower parts. By the time the larvae hatch, the petals and anther have often dried and fallen. Larvae in such circumstances seek shelter under the fruit's calyx. Several generations of thrips can feed and develop under the calyx of pepper fruit, damaging immature tissues that develop corky or leathery blemishes with maturity.

Melon thrips *Thrips palmi* tend to utilize more of the host plant than other species that occur primarily in the blooms. In peppers and eggplants, affects both fruit and foliage. The greatest damage occurs when thrips become established in the blooms, and lay eggs around the calyx. Thrips feeding under the calyx of the expanding fruit cause the characteristic scars, which may affect a sizable part of the fruit wall.

In crops, such as snap beans and most of the vine crops, feeding on the foliage causes damage. Foliar feeding often begins inside the tightly rolled leaves at the growing points of the plant. Larvae and adults soon appear on the undersides of the expanding leaves. The combined effect of feeding damage in the growing point and on young leaves can severely stunt and distort sensitive crops, such as peppers.

For more information and photos of thrips, check out the Glades Crop Care Thrips KnowledgeBase at <http://www.gladescropcare.com/pg1.html>.

Whiteflies

Reports from the Manatee area indicate that moderate to high whitefly numbers pressure are still being noted in many areas and have growers wondering where they are all coming from. Growers are now beginning to see immatures in the field so IGRs use is recommended as threshold levels are reached. Reports also note that whitefly numbers have also been very high in some potato and bean fields with growers having to treat due to neighboring tomato fields.

Respondents in Palm Beach indicate that whiteflies are building in some locations. Silverleaf has been reported in some squash plantings.

Around Southwest Florida, growers and scouts indicate that whitefly numbers are beginning to build in several locations across a variety of crops.

There are several old fields around and many people have starting some crop destruction. Growers are reminded to maintain vigilance and keep up whitefly control measures to avoid a buildup of whiteflies and prevent the movement of infected whiteflies carrying TYLCV into younger plantings.

In older plantings growers should strive to maintain control of adults with oils, soaps and materials OTHER THAN nicotinoids. **A strong emphasis should be placed on PROMPT destruction, block by block, as harvest is completed, including oil with herbicide for quick burndown and control of existing whiteflies in those blocks, thus minimizing movement out to other blocks.**

Aphids

Growers and scouts around Plant City report significant flights of winged aphids over the last week or so coming in on tomatoes, peppers and cucurbits. Pressure is low to moderate depending on the location.

Around Immokalee reports indicate aphids are around at moderate levels in tomato and peppers and growers are spraying to keep them in check. Some reports indicate that aphids are also beginning to show up in watermelons.

The author witnessed an awesome example of bio control by avian predators over potatoes and squash outside of Immokalee on a field visit this past week. Both were older plantings and a heavy flight of winged aphids were present, overhead literally thousands of tree swallows were swooping and diving working the aphids for nearly two hours until few were left and the birds moved off.

Respondents from Palm Beach and surrounding counties indicate moderate aphid pressure in pepper as well as tomato and eggplant as well as leafy vegetables in a number of places.

Pepper Weevils

Around Southwest Florida, a number of respondents report that pepper weevil numbers have increased significantly causing some problems in older fields.

Reports from the East Coast indicate that pepper weevils are present in a few scattered locations.

Pepper weevil is a small (1/6 inch) black or grey beetle with a long snout (proboscis) and elbowed antennae. Adults use the mandibles at the end of the proboscis to feed on leaf or flower buds. Females also use

the mandibles to bore a small hole in developing fruit or flower buds. The hole is plugged with fecal matter (frass) after an egg is deposited. A tiny legless grub hatches from the egg and eats its way toward the seed core of the fruit where it feeds on seeds and pulp, passing through larval growth stages or instars. Damaged fruit become contaminated by insect parts, frass and rotted tissue, and will eventually fall from the plant. Pupation takes place inside the fruit within a small cell created by larval feeding. The emerging adult may feed within the fruit for a while before escaping through a circular hole chewed in the wall of the fruit.

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 often be recognized before they fall by the yellow calyx 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. Until recently Vydate has been the standard control and has given pretty good results even at 2 pts/acre when sprayed weekly in Dr. Phil Stansly's trials at the Southwest Florida Research and Education Center. A total of 24 pts can be applied for the season.

Many growers have indicated disappointing results in obtaining satisfactory control with Vydate in the field. Some growers have terminated older plantings where weevils had become unmanageable. A number of growers have indicated obtaining good results in controlling weevils with either Capture - bifenthrin or cryolite. Actara – thiomethoxam, which was labeled this year, has demonstrated superior efficacy in trials conducted by Phil Stansly. Unfortunately applications are limited to two per season and growers are still trying to work out the timing of applications to achieve the best results.

Other materials that have been used with some success by growers include Neemix and fish oil both of which seem to be most effective when used preventatively before weevils become established. Some growers who have applied Admire – imidicloprid on pepper indicate that there may be some activity on weevils and report that Admire has delayed infestations and possibly reduced the overall level of pepper weevil infestation. Many of the currently labeled materials are difficult to work into an IPM program once plantings begin to be harvested due to the 7 day PHI in force for all of them. This is particularly true for hot peppers, which are often harvested multiple times during the course of a week.

In addition to chemical controls, a complete IPM approach is recommended for pepper weevil management. Adjacent or nearby sequential plantings should be avoided. Sanitation is important. Crops should be deep-plowed immediately following harvest and after treating with insecticide to reduce adult movement into nearby fields and to reduce survival over the summer. Nightshade in and around fields should be controlled to reduce population survival between crops.

Spider mites

Around Immokalee, respondents indicate that spider mites remain low on eggplant, tomato and melons.

Growers and scouts in Palm Beach report problems with a few spider mites in eggplant and cucurbits.

Pinworms

Reports from the Palmetto/Ruskin area indicate that pinworms have started to show up in a few places on tomatoes.

Growers and scouts on the East Coast report that pinworms are present in several locations.

Reports from Southwest Florida indicate that low levels of pinworm activity in several tomato fields with some low-moderate levels being observed around field edges.

Early detection is important. Pheromone traps help provide an early warning. At planting, place a minimum of one trap per 10 acres at least 25 paces inside of field. When 3 to 5 moths are caught per trap per night, then mating disruption should be initiated. If pinworms are present, increase trap numbers to ensure an accurate estimate of the population. Pinworms can be controlled with mating disruption techniques and pesticides. Mating disruption is most successful where fields are isolated or whole areas are treated.

If using insecticides, treatment must begin when populations reach economic thresholds. The UF/IFAS Florida Tomato Scouting Guide Tomato recommends season-long action thresholds of 5 adults/trap/night to initiate the application of mating disruptants and an action threshold of 0.7 larva per plant for the initiation of control measures.

Once begun, treatments may be required until harvest. If nearby infested tomato fields are abandoned, adults can immigrate into later planted fields in large numbers. If scouting detects a significant movement, consider border treatments.

Pheromone-based mating disruptants, such as No Mate TPW spirals or Checkmate TPW dispensers provide a very effective means of combating pinworm. These should be applied according to label instructions with good distribution throughout field.

Chemical controls such as Agri-Mek and Spintor have the advantage of being effective against pinworms and leafminers as well as the additional benefit of being soft on beneficials. Lannate (Methomyl) and a variety of synthetic pyrethroids are also effective materials for the control of pinworm. Development of resistance to Lannate has been documented in pinworms in some parts of the country and excessive use of these broad-spectrum insecticides may result in outbreaks of leafminers and mites if they are present.

Organically acceptable biological and cultural control methods include the use of mating disruptants, field sanitation, and pyrethrin. Parasites can also be important in aiding in pinworm control.

Worms

Reports from the Glades indicate that fall armyworm pressure is picking up significantly, but note that this is to be expected this time of the year. Fall armyworm trap data from UF/IFAS EREC indicates that trap counts for 3/30/06 had increased to 768 up from 217 a week before. Respondent also indicate that silk fly pressure is much higher than normal.

Around Immokalee, growers and scouts report mostly low worm pressure. These are mostly southern armyworms with a few beet armyworms mixed in.

Leafminer

Reports from the Manatee County area indicates that leafminers are widely present at low levels.

Growers and scouts around Immokalee indicate that leafminer pressure remains low.

On the East Coast reports indicate that leafminers are low to moderate mostly on tomatoes.

Aphids

Respondents from Palm Beach and surrounding counties indicate heavy aphids pressure in pepper as well as tomato and eggplant as well as leafy vegetables in a number of places. Reports indicate that growers knock them back but they keep on coming.

Broad mites

Around Southwest Florida, reports indicate that broad mite populations have flared up in pepper and eggplants in several locations.

Growers in Palm Beach report that broad mites are around in low numbers and can be found on peppers and that specialty producers are also battling broadmites in herbs.

Diseases

Late Blight

Phyllis Gilreath reports that some new late blight was reported last week in tomatoes around Manatee and surrounding counties but only in isolated spots and it did not seem to spread. This outbreak resembles outbreaks in previous years with primarily foliage symptoms as compared to the stem lesions being seen earlier in the season.

Phyllis reports that in a grower meeting last month in Ellenton, Dr. Pam Roberts provided an update on late blight work she has been doing. She indicated the isolates from 2005 had different banding patterns than isolates from 2006. There is more variation in the pattern in 2006 with 4 fairly distinct patterns. In 2005, the closest fit was US13 but it wasn't a perfect fit. It was aggressive on tomato. The 2006 isolate has more variability but looks like US8 on potato. On tomato it resembles 17 and 14, but is not really a good match with any current strain. Preliminary data indicate it is mefenoxam sensitive and the A2 mating type and seems to be controllable.

Late blight is still present on both tomato and potato around Immokalee with new outbreaks being reported in several locations.

The disease can spread quickly and devastate a tomato or potato field within a few weeks if not properly controlled. Since the disease can spread so rapidly, growers should scout their fields thoroughly each day, especially when cool and wet conditions conducive to disease development prevails. No other disease will find an unprotected field as rapidly as late blight.

Bacterial Leaf Spot

Growers and scouts on the East Coast indicate that bacterial spot is present in a number of places on peppers and tomatoes. Incidence and occurrence is moderate in some pepper fields.

Growers and scouts in the Immokalee area indicate that bacterial spot won't seem to stop in some pepper plantings. Dr Ken Pernezny reports that all the bacteria strains collected recently from a trial outside Immokalee proved to be race 4.

Respondents around Manatee County indicate that bacteria remain mostly low.

Around Homestead reports indicate that bacterial spot is present at low to moderate levels depending on the location.

Bacterial Speck

Bacterial speck has been diagnosed at locations around Palm Beach and Immokalee. Dr Ken Pernezny notes that bacterial speck leaf lesions (*Pseudomonas* sp) are virtually impossible to tell apart in the field from bacterial spot lesions (*Xanthomonas* sp) without a lab diagnosis. Treatment however is similar.

Tomato Yellow Leaf Curl Virus

Growers and scouts around Manatee County indicate that they are battling very high levels of tomato yellow leaf curl virus in some locations where crops were held over longer than usual to take advantage of market conditions. Incidence as high as 60% has been reported in places.

Reports from the East Coast indicate that TYLCV incidence remains mostly low.

Dr Aaron Palmateer, Plant Pathologist at UF/IFAS TREC reports that TYLCV has reached moderate levels in some tomato plantings around Homestead.

Around Southwest Florida of tomato yellow leaf curl virus continues to increase slowly with some places reaching 6 –8 % infection. A few hotspots with even higher disease incidence have been noted.

Target Spot

Growers and scouts around Southwest Florida report that target spot continues to attack the inner foliage in some older tomato fields and is present on fruit in some places as well.

Early Blight

Reports from growers In Southwest Florida indicate that early blight is widely present at low levels in potato and tomato number of locations.

Reports from Homestead indicate that early blight is present on tomato. Incidence is high in some fields.

Common rust

Reports indicate that common rust, caused by *Puccinia sorghi*, is starting to increase on corn in the Glades. Common rust typically likes to infect young, expanding tissues and plants For this reason, during the spring corn season in Florida, rust is usually the disease of primary concern during the early part of the season, and NCLB is the disease of primary concern later in the season. Both can be controlled with timely applications of strobilurin or sterol inhibitor fungicides. These should be tank-mixed with an EBDC fungicide and also alternated as a strategy for slowing the development of fungicide resistant strains of the pathogens. Scouts indicate incidence remains lower than normal for this time of year.

Northern corn leaf blight

Northern corn leaf blight, caused by *Exserohilum turcicum*, is also starting to heat up in the Glades. While common rust typically likes to infect young, expanding tissues and plants, northern corn leaf blight

usually starts with older, fully expanded foliage. For this reason, during the spring corn season in Florida, rust is usually the disease of primary concern during the early part of the season, and NCLB is the disease of primary concern later in the season. Both can be controlled with timely applications of strobilurin or sterol inhibitor fungicides. These should be tank-mixed with an EBDC fungicide and also alternated as a strategy for slowing the development of fungicide resistant strains of the pathogens. Scouts indicate incidence remains lower than normal for this time of year.

Downy Mildew

Downy mildew is widely present on cucumber and squash in a number of locations around Palm Beach. Incidence and severity is moderate to high in some locations especially on cucumbers.

Respondents around Immokalee indicate that downy mildew is present on cucumbers, cantaloupe and squash on a number of farms around Immokalee.

Reports from Homestead indicate low incidence of downy mildew on cucumber/pickles in the area.

Growers and scouts should look at the underside of the leaves to help make the right diagnosis. Angular leaf spot will have some water-soaking at the edge of the lesions. The downy mildew lesions look uniformly dry. In addition, downy mildew infections typically start away from leaf margins toward the center of the leaf where as some diseases such as gummy stem blight normally begin from the leaf margin.

Dr Rick Raid reports that downy mildew (*Bremia lactucae*) continues to be present on lettuce in the Glades, and advises growers to stay on a strict management program. He notes some growers suspect some burn due to interactions of the recent rains and tank mixtures of maneb and phosphonic fungicides. If this seems to be a concern, growers may want to substitute Forum, Previcur, or Reason for the phosphonic for a rotation or two. Read labels for plant-back restrictions, although these may be less of a burden at this time due to summer being right around the corner.

Powdery mildew

Dr Rick Raid reports due to the dry conditions in the Glades (with the exception of the March 23 deluge), powdery mildew has been the disease of primary concern on snap beans. Sulfur is a good candidate for control unless temperatures get too warm and then phytotoxicity may occur. In that case, use a different fungicide. Experience has shown the strobilurins and sterol inhibitors are more effective against powdery than the broad-spectrum protectants.

Powdery mildew has also been reported on parsley for the second year in a row. Sulfur or strobilurin fungicides are the best bets for controlling this disease. If a grower also problems with Alternaria leafspot, the strobilurins are the compounds of choice, since sulfur will not provide sufficient control of the leafspot.

Growers and scouts around Southwest Florida report that powdery mildew is high in some squash.

Powdery mildew is also being reported on pepper in a few locations around Southwest Florida.

Respondents on the East Coast are reporting some problems with powdery mildew on cucumbers and squash and indicate that incidence and occurrence is high in few places.

Around Homestead, Dr Aaron Palmateer reports moderate to high incidence of powdery mildew on cucumbers. Incidence is high in squash.

Fusarium Crown Rot

Growers and scouts in Palm Beach report problems with fusarium crown rot in both pepper and tomato. Growers producing specialty heirloom types have been particularly hard hit.

Around Southwest Florida fusarium crown rot continues to wilt down plants in some locations.

Fusarium

Fusarium has been diagnosed on watermelon in several locations around southwest Florida.

Fusarium wilt of watermelon usually occurs without plant yellowing; usually the entire plant wilts quickly becomes brown and dies. Occasionally, wilting of vines on one side of the plant occurs, particularly on older plants. Slicing the tap root lengthwise into two equal halves will reveal two streaks of vascular tissue that are dark yellow-brown, orange brown or reddish brown. In Florida, Fusarium wilt is likely to occur prior to fruit set.

Botrytis

Gray mold has been diagnosed on tomato from scattered locations around SW Florida.

Phytophthora

Growers and scouts on the East Coast report that phytophthora remains a problem on pepper and cucurbits in a number of scattered locations.

Around Immokalee, reports indicate that phytophthora is still causing problems in some eggplant and pepper fields.

Rust

Respondents indicate that rust is present on beans around Homestead. Incidence is very low.

In the Glades, bean rust is just beginning to rear its ugly head, so growers are advised to be on the lookout.

Gummy stem blight

Gummy stem blight is present on watermelon and cantaloupe in a number of locations around SW Florida. Some early infections are now causing wilting and death of scattered plants in some fields.

Anthraxnose

Reports from Southwest Florida indicate that anthracnose is beginning to show up on older pepper in scattered locations.

Resistance is available in some varieties of chili peppers but not in bell peppers. For bell pepper production, choose cultivars that bear fruit with a shorter ripening period, which may allow the fruit to escape infection by the fungus. Wounds in fruit from insects or other means should be reduced to the extent possible because wounds provide entry points for *Colletotrichum* spp. and other pathogens like bacteria that cause soft rot. The disease 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 plow to completely cover crop diseases.

News You Can Use

Monitor Label Changes

Dr Phyllis Gilreath reports that the notes given for Monitor on page 371 of the 2005-06 Vegetable Production Guide are now in error. The production guide says "Do not apply more than 10 pts per acre, or 18 pts per acre in North Florida per season." This information was taken from was an old Valent supplemental label which is no longer valid.

In South Florida the per season limit is 10 pts. The 18 pts was for thrips in the Panhandle and the supplemental label specified the counties. Older labeling from Bayer has a 10-pint/Acre/season limit. If that is the label you are working from, you are still legal to use 10 pts.

As of February 7, 2006, this supplemental label was revised and once you buy new product with this label, you are limited to 4 applications at a maximum rate of 2 pts/Acre/application, or a maximum of 8 pts per season.

Pesticide Registrations and Actions

The FDACS has requested the use of the fungicide Topsin M® (thiophanate) for control of white mold on fruiting vegetables (tomato, pepper, eggplant) under section 18 of FIFRA. (FDACS letter to EPA dated 2/14/06).

Based on a request by BASF Corporation and IR-4, tolerances are approved for use of the fungicide boscalid (Endura®/Pristine®). Tolerances of importance to Florida include celery, spinach, and leafy vegetables (group 4) except lettuce. (Federal Register, 2/8/06).

In mid-February, OmniLytics, Inc., announced final EPA registration for its AgriPhage bacteria control product line. The material can be used in the greenhouse or field, and can be used as a preventative as well as curative treatment. At a current price of \$12/pint, a recommended treatment (two pints) equates to a treatment cost of \$24/acre. It is approved for use in tomato and pepper. (OmniLytics Press Release, 2/15/06).

Arvesta LifeSciences recently received EPA registration for Evito® (fluoxyastrobin), a strobilurin fungicide. It is labeled for potatoes and tuber vegetables, leafy vegetables (petiole subgroup only), and fruiting vegetables. It should be managed similarly to other Group 11 fungicides such as azoxystrobin, trifloxystrobin, and pyraclostrobin. (The Grower, March 2006).

Immigration Reform

It has been splashed all over the news, and things are moving fast on Capitol Hill regarding this controversial topic.

Here's a brief overview of what is currently taking place. The Senate is responding to the immigration-reform-only House Bill, debating two options. One option is a border security bill similar to the House legislation. The other, submitted by the Senate Judiciary Committee on Monday, includes provisions, such as the AgJOBS amendment, that address agriculture's need for a realistic guest worker program.

Senate debate on the two options is expected to continue for the next couple of weeks.

Now it is time for you, to do your part. Contact your Senators at <http://www.senate.gov> and let them know that you'd like them to support comprehensive immigration reform and include the agriculture-specific language.

Alternative Water Supply Funding for 2007

The Florida Legislature has authorized annually recurring funds for the development of alternative water supplies through Senate Bill 444. This funding is for capital construction of alternative water supply facilities or phases of such facilities that can be completed by August 1, 2007

To apply for this funding or learn more about this funding program please go to the SFWMD District's website <http://www.sfwmd.gov> and click on the "Alternative Water Supply" icon. You may request a written copy by contacting Karen Hargray at 561-682-6300 or khargray@sfwmd.com Deadline for submittals is June 1, 2006.

All Copper Fungicides Are Not Created Equal

Copper, an organic fungicide, is the 18th most used pesticide in the United States. Over 13 million pounds of copper were applied to 54 crops in 1997. Copper is a contact fungicide that is a multi-site inhibitor, which inactivates numerous enzyme systems in target pathogens. Because of its multi-site activity it poses low risk of resistance development. Copper inhibits spore germination but has no effect on sporulation.

Products containing fixed copper as the active ingredient are a staple for many vegetable crops and are used primarily for control of certain bacterial and fungal diseases. The pesticidal properties of copper have been known for hundreds of years. The first product formulated specifically for control of plant diseases was Bordeaux mixture, a preparation of copper sulfate and hydrated lime developed by P.M.A. Millardet around 1885. Around this time, grape growers in Bordeaux, France, were treating their crops with a crude mixture of copper and lime to discourage pilferage by locals. Millardet observed that where this mixture had been applied, less downy mildew (a disease that was ravaging grapes at that time) was present. By combining the right proportions of copper sulfate and hydrated lime, Millardet was able to maximize disease control and minimize phytotoxicity. Bordeaux mixture remains an important fungicide/bactericide to this day, along with a number of other copper-based materials.

Soluble coppers, such as copper sulfate pentahydrate and copper TEA, are extremely toxic to most plants and are used as herbicides and algacides. This is why we use "fixed" coppers as fungicides/bactericides. It is necessary to add a safening ingredient such as hydrated lime to enable the use of copper as a pesticide without risking serious phytotoxicity. All commercially available copper fungicides are essentially formulations that allow for gradual release of biologically active copper ion (Cu^{++}) on treated surfaces to provide sufficient active ingredient to suppress bacteria and fungi while limiting plant damage.

Copper fungicides offer a number of advantages to vegetable growers: low expense, good residual activity, and broad-spectrum activity against a number of plant-pathogenic bacteria and fungi. In fact, until recently our only practical chemical option against bacterial diseases were copper products. While not as effective as broad-spectrum materials such as EBDC fungicides or chlorothalonil, coppers make a good tank-mix or rotation partner for products such as azoxystrobin to help slow the development of resistance in pathogen populations. It is common to see "use a fixed copper" in our recommendations to growers, and it is often assumed that one copper material is as good as another. Thus, most growers purchase the cheapest product.

Copper fungicides are not equal however. Each varies in the efficiency in which Cu^{++} is released, and this relates to the chemical form of copper used in the product along with its formulation, which affects its ultimate efficacy. There are a number of copper products materials on the market today, most based upon five copper compounds:

Basic copper sulfate - Basicop, Bordeaux mixture (PBI Gordon, Cuprofix Disperss)

Copper oxychloride - COC

Copper tallate - TennCop

Copper ammonium complex - Copper Count N

Copper hydroxide - NuCop, Champ, Kocide

The decision on which product to use should be based upon the amount of biologically active copper that is released by a product, the formulation, and (ultimately) the price.

The latter point is critical as the amount of "metallic copper" in a product is often used as a selling point. However, what matters is how much of the product is converted in the form of Cu⁺⁺. In terms of the efficiency of release of biologically active Cu⁺⁺, the following offers a comparison between copper compounds:
basic copper sulfate < copper oxychloride / copper ammonium complex / copper tallate < copper hydroxide

This means that, in general, products containing copper hydroxide as the active ingredient release more Cu⁺⁺ than products containing copper oxychloride or basic copper sulfate.

Formulation is an important factor to consider as well - many copper products are hard to keep in suspension and can be hard on pumps and nozzles. In general, Bordeaux mixture and certain dry-flowables are the easiest to mix, allowing for good, uniform coverage of plant surfaces. These can be more expensive up front, but can actually save a grower money over time because of better efficacy (meaning less product used) and reduced wear and tear on equipment and nozzles compared to some of the less-expensive copper fungicides.

It is interesting to note that copper was applied to U.S. crops at an average rate of 4.08 lbs. per acre in 1997, or over 2.5 times higher than the average synthetic fungicide use rate.

If growers were to universally adopt organic production techniques and copper was the organic replacement for synthetic fungicides, U.S. farmers would replace 40 million pounds of synthetic fungicides with 102.8 million pounds of copper, increasing total fungicide use by 63 million pounds. This would be a 47 percent increase in overall fungicide use. At this level, copper would total 116.5 million pounds; making it the single most used pesticide in the United States.

Excerpted from All Copper Fungicides Are Not Created Equal, Dr Kenny Seebold, University of Kentucky and amended by Gene McAvoy UF/IFAS Hendry County Extension.

The Society of Saint Andrew – Gleaning America’s Fields

Want to help your community? Could you use a tax deduction? Would you like some great publicity at no cost? If you answered yes to any of these questions, the Society of St Andrew can help.

The Society of Saint Andrew is a non-profit organization actively gleaning and working on fresh produce reclamation and redistribution in 21 states across the nation. We would like to speak with you about the possibility of receiving donations of your edible--but nonmarketable produce.

Our organization will make arrangements to pick up the produce--or glean it from your fields--for distribution to those in our community facing hunger or low-nutrition. We are able to provide you with a tax deduction voucher based on Miami Terminal Price for the poundage on the day of donation.

Thank you for taking the time to consider participating in this win-win proposition. To find out more about us and why we need your help please visit our website at: www.endhunger.org For more information, call Ann Maier, at 239-275-7815

Job Opportunity

Help Wanted - Progressive grower, packer, and shipper of specialty vegetables in Southwest Florida is seeking grower(s) and office personnel to assist in the management of a growing operation. Must be motivated, self

directed and willing to learn and grow with the operation. Education and experience is a plus but the right individual will be considered for all positions.

Contact Chuck Obern, C&B Farms at 239-250-0551 for more information.

Up Coming Meetings

Manatee County

April 4, 2006

Soil Moisture Management Meeting 1:30 PM.

Gulf Coast Research and Education Center
Wimauma, Florida.

Dr. Larry Parsons, CREC-Lake Alfred, will discuss different types of soil moisture measurement equipment with pros, cons and costs for each. 1.5 CCA credits offered. For more information, please contact Phyllis Gilreath at 941-722-4524 or prgilreath@ifas.ufl.edu.

April 6, 2006

Extension Water School 5:30 – 9:00 PM

Manatee County Extension Service
Palmetto, Florida

Classes will be held on April 6, April 20 and May 4 with an all day water tour on Friday, May 12. Registration is \$25 and includes a light meal each evening.

For more information, please contact Phyllis Gilreath at 941-722-4524 or prgilreath@ifas.ufl.edu.

April 12, 2006

WPS Train the Trainer Workshop. 10:30 am – 12 Noon

Manatee County Extension Service
Palmetto, Florida

For more information, please contact Phyllis Gilreath at 941-722-4524 or prgilreath@ifas.ufl.edu.

June 14, 2006

General Standards/Private Applicator Ag License Training and Testing

Manatee County Extension Service
Palmetto, Florida

For more information, please contact Phyllis Gilreath at 941-722-4524 or prgilreath@ifas.ufl.edu. 2 CORE CEUs offered.

Palm Beach County

April 3, 2006

General Standards/CORE Test Review 8 AM – 10 AM
Private Applicator Test Review 10 AM – 12 PM

Clayton E. Hutchinson Agricultural Center
559 N Military Trail
West Palm Beach

Contact 561-233-1700

April 5, 2006

General Standards/CORE Test Review 8 AM – 12 PAM
Private Applicator Test Review 1 PM – 3 PM

Belle Glade Extension Office
2976 State Road 15
Belle Glade

Contact 561-996-1655

Southwest Florida

April 18, 2006

WPS Train the Trainer 8:30 AM

Hendry County Extension Office
1085 Pratt Boulevard
LaBelle, Florida

Contact Gene McAvoy at 863-674-4092 for details

May 3, 2006

UF/IFAS SWFREC Vegetable Spring Field day 10:00 AM

UF/IFAS SWFREC
Hwy 29 N
Immokalee, Florida

Contact Gene McAvoy at 863-674-4092 for details

Other Meetings

May 21 - 23, 2006

18th International Pepper Conference
Palm Springs, California

Go to <http://www.internationalpepper.com/> for details

June 4 – 6, 2006

Florida State Horticultural Society Annual Meeting

Marriot Tampa Westshore
Tampa, Florida

For more information, go to <http://www.lal.ufl.edu/fshs/>

September 17- 21 2006

Cucurbitaceae 2006

Asheville, North Carolina

For more information visit <http://www.ncsu.edu/cucurbit2006>

Websites

Barn Owl Cams - For those interested in watching the development of some of the owlets in a couple of the University of Florida's nesting sites around Belle Glade, check out the Live Owl Cams at <http://erec.ifas.ufl.edu>

Click on the "Barn Owl Project" listed in the left side menu and then page down to the bottom of the opening page. Click on Cam#1 or Cam#2 and then type in the userid (guest) and password (barnowl). This should let you view our cams in real time streaming video. In Cam#1, the mother owl is tending to recently hatched chicks, and in Cam#2, four owlets getting close to fledging are frequently observed swallowing prey (mice and rats) delivered by their parents...whole! Check them out and Dr Rick Raid project coordinator (rmraid@ufl.edu) know what you think.

UF/IFAS Vegetable Publications – to access all The University of Florida online publications related to vegetables, use this link - http://edis.ifas.ufl.edu/TOPIC_Vegetables

The USDA *Soil Biology Primer* is an introduction to the living component of soil and how it contributes to agricultural productivity, and air and water quality. Check it out at http://soils.usda.gov/sqi/concepts/soil_biology/index.html

Quotable Quotes

Character is like a tree and reputation like its shadow. The shadow is what we think of it; the tree is the real thing. - Abraham Lincoln

Personality can open doors, but only character can keep them open. - Elmer G. Letterman

An education isn't how much you have committed to memory, or even how much you know. It's being able to differentiate between what you do know and what you don't. - Anatole France

Use what talents you possess: the woods would be very silent if no birds sang there except those that sang best. - Henry Van Dyke

Training is everything. The peach was once a bitter almond; cauliflower is nothing but cabbage with a college education. - Mark Twain

On the Lighter Side

I Am Thankful

I am thankful for my shadow that watches me work because it means I am out in the sunshine.

...for a lawn that needs mowing, windows that need cleaning, and gutters that need fixing because it means I have a home.

...for all the complaining I hear about the government because it means we have freedom of speech..

...for the parking spot I find at the far end of the parking lot because it means I am capable of walking and I have been blessed with transportation.

...for my huge heating bill because it means I am warm enough

...for the lady behind me in church who sings off key because it means I can hear.

...for the pile of laundry and ironing because it means I have clothes to wear.

...for weariness and aching muscles at the end of the day because it means I have been capable of working hard.

...for the alarm that goes off in the early morning hours because it means I am alive.

...and finally, for too much e-mail because it means I have friends who are thinking of me.

Send this to someone you care about. I just did.

Contributors include: Joel Allingham/AgriCare, Inc, Karen Armbruster/SWFREC, Kathy Smith/Agricultural Pest Management, Bruce Corbitt/West Coast Tomato Growers, Dr. Kent Cushman/SWFREC, Dr. Phyllis Gilreath/Manatee County Extension, Michael Hare/Drip Tape Solutions, Fred Heald/Farmers Supply, Sarah Hornsby/AgCropCon, Cecil Howell/Taylor &Fulton, Loren Horsman/Glades Crop Care, Keith Jackson/SWFREC, Bruce Johnson/General Crop Management, Dr. Mary Lamberts/Miami-Dade County Extension, Leon Lucas/Glades Crop Care, Bob Mathews, Glades Crop Care, Mark Mossler/UF/IFAS Pesticide Information Office, Gene McAvoy/Hendry County Extension, Alice McGhee/Thomas Produce, Jimmy Morales/Pro Source One, Tim Nychk/Nychk Bros. Farm, Chuck Obern/C&B Farm, Teresa Olczyk/ Miami-Dade County Extension, Dr. Aaron Palmateer/TREC, Darrin Parmenter/Palm Beach County Extension, Dr. Ken Pernezny/EREC, Dr. Pam Roberts/SWFREC, Dr. Nancy Roe/Farming Systems Research, Wes Roan/6 L's, Kevin Seitzinger/Gargiulo, Jay Shivler/ C&B Farm, Ken Shuler/Stephen's Produce, Ed Skvarch/St Lucie County Extension, John Stanford/Thomas Produce, Mike Stanford/MED Farms, Dr. Phil Stansly/SWFREC, Eugene Tolar/Red Star Farms, Mark Verbeck/GulfCoast Ag, and Alicia Whidden/Hillsborough County Extension.

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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