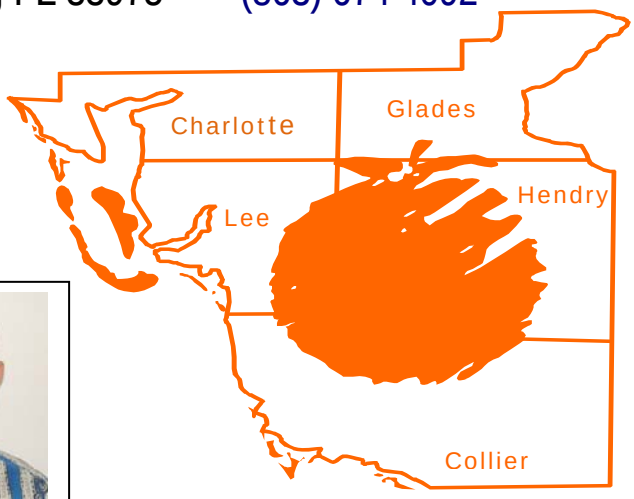
UF UNIVERSITY of FLORIDA
IFAS Extension

EXTENSION

Institute of Food and Agricultural Sciences

Hendry County Extension, P.O. Box 68, LaBelle, FL 33975 (863) 674 4092

Flatwoods Citrus



Vol. 15, No. 8 **August 2012**

Dr. Mongi Zekri
Multi-County Citrus Agent, SW Florida

Table of Contents

Previous issues of the Flatwoods Citrus newsletter can be found at:
http://citrusagents.ifas.ufl.edu/agents/zekri/index.htm
http://irrec.ifas.ufl.edu/flcitrus/

I M P O R T A N T E V E N T S

DuPont Crop Protection Seminar

Overview of Cyazypyr™ in Citrus
Date: Tuesday, August 14, 2012, 10:30 AM – 12:00 Noon
Location: Immokalee IFAS Center

Agenda

10:00 – 10:30	Arrivals/Sign-in
10:30-10:35	Introduction, Dr. Mongi Zekri – Southwest Florida Citrus Extension Agent; University of Florida IFAS
10:35-11:10	Cyazypyr™: New Chemistry Update and Overview in Citrus Alex Truszkowski – SE Cyazypyr™ Project Manager; DuPont Crop Protection Memphis, TN
11:10-11:30	DuPont™ Verimark™ Field Development Update on Young Trees Dr. Phil Stansly – Entomologist; University of Florida IFAS SWFREC
11:30- 11:45	DuPont™ Verimark™ Field Development Update on Young Trees Shine Taylor – Field Development Representative; DuPont Crop Protection SE FL
11:45- 12:00	DuPont™ Exirel™ Field Development Update on Mature Trees Barry Kostyk – Sr. Biological Scientist; University of Florida IFAS SWFREC

1.5 CEUs for Certified Crop Advisors (CCAs)
1.5 CEUs for pesticide license renewal
Pre-registration is required. Please reply by August 12th to maz@ufl.edu or call 863 674 4092 to reserve a seat.

Packinghouse Day

When: Thursday, August 23rd, 2012
Where: Citrus Research and Education Center, 700 Experiment Station Road, Lake Alfred, FL 33850
Time: Registration opens at 8:30 A.M., Program starts at 9:30 A.M.
Lunch Sponsor: DECCO

Indian River Postharvest Workshop

When: Friday, August 24th, 2012
Where: Indian River Research and Education Center, 2199 S. Rock Rd., Ft. Pierce, FL 34945
Time: Registration opens at 8:30 A.M., Program starts at 9:30 A.M.
Lunch Sponsor: JBT FoodTech

This year's program for each location will be identical, and packed full of the latest information about issues currently impacting Florida's fresh citrus industry. Topics will include:

- Promising fresh citrus selections for Florida's growers and shippers
- Taste test performance of new Florida tangerine cultivars
- Using sensory evaluation to drive how we handle fresh citrus fruit
- Potential impacts of health care reform on Florida's fresh citrus industry
- Update on fungicides and decay control for fresh citrus
- Update on the FSMA proposed rule, food safety, and indicators in the grove

No pre-registration required.
For questions and the latest details, contact Mark Ritenour at 772-468-3922, ext. 167 (ritenour@ufl.edu).

IFAS CEU Day, Tuesday, August 21, 2012

Hendry County Extension Office, LaBelle, FL
Registration opens at 8:30 AM; Class begins at 9:00 *AM*
Pre-registration is required, call 863 674 4092

Agenda

8:30-9:00 Registration
9:00-9:50 Vegetation management in forests and transmission lines (Patrick Minogue)
10:00-10:50 Integrating biological controls and herbicides (Jim Cuda)
11:00-11:50 Identification and integrated management of pasture weeds and forage tolerance – will focus on dogfennel, tropical soda apple, blackberry and other briars (Brent Sellers)
11:50-1:00 Lunch
1:00-1:50 Managing herbicide applications against development of resistance (William Haller)
2:00-2:25 Seedbank dynamics and long term integrated weed management (Ramon Leon)
2:25-2:50 Herbicide injury to vegetables from off target sprays (Peter Dittmar)
3:00-3:25 Integrated management of cogongrass (Greg MacDonald)
3:25-3:50 New and/or difficult to control upland, wetland, and aquatic invasive plants (Ken Langeland)
3:50-4:00 Evaluations and issue CEU attendance forms (Fred Fishel)

Summary of Available CEUs

Private 6
Aerial 2
Ag Row 5
Ag Tree 3.5
Aquatic 5
Demo/Res 6
Forest 6
NAWM 6
Ornamental & Turf 3.5
ROW 6
PCO (L&O) 3.5
Limited L&O 3.5
LCLM 3.5
Total Up to 6

--September Seminar

Date: Thursday, September 20, 2012, Time: 10:00 AM – 12:00 Noon
Location: Southwest Florida REC (Immokalee)

1. Spray program calendar for all citrus pests – **Dr. Phil Stansly,** Immokalee IFAS Center
2. Growing young citrus trees in the greening era – **Dr. Tim Spann,** Lake Alfred CREC, UF-IFAS
3. Breeding disease tolerant citrus rootstocks – **Dr. Kim Bowman,** USDA, Fort Pierce
4. Ridomil Gold Best Use Guidelines – **Mr. Cody Hoffman,** Syngenta, Fort Myers

2 CEUs for Certified Crop Advisors (CCAs)
2 CEUs for pesticide license renewal
Pre-registration is required. No registration fee and lunch is free Thanks to Cody Hoffman with Syngenta**. To reserve a seat, call 863 674 4092, or send an e-mail to: maz@ufl.edu**

Special Thanks to sponsors of the "Flatwoods Citrus" newsletter for their generous contribution and support. If you would like to be among them, please contact me at 863 674 4092 or maz@ufl.edu

Steve Fletcher
Fletcher Flying Service, Inc.
Phone: 239 860 2028
Fax: 863 675 3725

Heath Prescott
KeyPlex®
Toll Free: 800 433 7117
Mobile: 863 781 9096
Nextel: 159*499803*6

Scott Houk
Dow AgroSciences
13543 Troia Drive
Estero, FL 33928
Phone: 239-243-6927
SEHouk@dow.com

FIRST BANK
P.O. Box 697
LaBelle, FL 33975
LaBelle Phone: 863 675 4242
Fax: 863 675 1099
Moore Haven: 863 946 1515

Ed Early
DuPont Ag. Products
5100 S. Cleveland Ave.,
Suite 318-368
Fort Myers, FL 33907
Phone: 239 994 8594
Edward.L.Early@USA.dupont.com

Cody Hoffman
SYNGENTA
1505 Paloma Dr., Fort Myers, FL 33901
Mobile: 321 436 2591
Fax: 239 479 6279
cody.hoffman@syngenta.com

Natural Industries, Inc.

Jack Kilgore, II
Regional Representative
Florida and South Georgia

Cell 239-707-7677
Nextel 158*17*24422
Fax 239-481-3498
g8trmanjek@comcast.net

Office Address:
7150 E. Brentwood Road
Ft. Meyers, FL 33919

www.naturalindustries.com
Natural Industries, Inc.
6223 Theall Rd
Houston TX 77066
Tel 888-261-4731
Fax 281-580-4163

citriBLEN®

ward.gunter@iclsfa.com

Cell: (772) 473-3987

WELLS FARGO

Lester Clark
Vice President
Tel 239-896-1821
Fax 239-896-1819
lester.clark@wellsfargo.com

Donald Allen
AGLIME SALES, INC.
1375 Thornburg Road
Babson Park, FL 33827-9549
Mobile: 863 287 2925
Agnet # 52925
donald.allen@aglimesales.com

Nufarm Agriculture USA
Craig Noll
Office-239 549 2494
Mobile-239 691 8060
craig.noll@us.nufarm.com
Gary Simmons
Phone: 772 260 1058

MONSANTO
Jack Conroy
Phone: 863 318 1486
Fax: 886 318 8617
Mobile: 863 559 4468
Andrew.j.conroy@monsanto.com

FMC
FMC Corporation APG
Ronald Palumbo
Cell: 305 304-7491
Nextel Agnet: 14772
ronald.palumbo@fmc.com
fmccrop.com

Chemtura AgroSolutions
Jay Hallaron
Phone: 407 256 4667
Fax: 407 523 1097
Cell: 321 231 2277
jay.hallaron@chemtura.com

Special Thanks to sponsors of the "Flatwoods Citrus" newsletter for their generous contribution and support. If you would like to be among them, please contact me at 863 674 4092 or maz@ufl.edu

Special Thanks to sponsors of the "Flatwoods Citrus" newsletter for their generous contribution and support. If you would like to be among them, please contact me at 863 674 4092 or maz@ufl.edu

UF/IFAS: A Brief Overview

The University of Florida Institute of Food and Agricultural Sciences (IFAS) is a federal, state, and local government partnership dedicated to education, research, and extension.

Education - UF/IFAS can trace its roots to the Morrill Act of 1862, which established the Land Grant university system. On July 2, 1862, President Abraham Lincoln signed into law what is generally referred to as the Land Grant Act. The new piece of legislation introduced by U.S. Representative Justin Smith Morrill of Vermont granted to each state 30,000 acres of public land for each Senator and Representative under apportionment based on the 1860 census. Proceeds from the sale of these lands were to be invested in a perpetual endowment fund, which would provide support for colleges of agriculture and mechanical arts in each of the states. The establishment of Florida Agricultural College at Lake City in 1884 under the Morrill Act marked the beginning of what became the College of Agriculture of the University of Florida in 1906.

Research - Through approval of the Hatch Act of 1887, congress provided for the establishment of an agricultural experiment station at each of the land grant colleges. The Florida Agricultural Experiment Station was established in 1888 as a part of the Florida Agricultural College at Lake City. In 1906, the East Florida Seminary combined with the Florida Agricultural College and was moved to Gainesville. The renamed University of Florida was now the land grant college in Florida and the Agricultural Experiment Station became a unit of the College of Agriculture at UF. Today the Florida Agricultural Experiment Station operates research and education programs at 12 locations throughout Florida.

Extension - The third arm of the land grant system was provided by the Smith-Lever Act in 1914. This Act established the Cooperative Extension Service and specified that the service would be associated with a land grant college. The Act also stipulated that Federal funds be matched with local funds. Florida Cooperative Extension is a partnership between UF/IFAS, United States Department of Agriculture, and county governments in Florida to provide scientific knowledge and expertise to the public through non-resident educational programs. Operating as part of IFAS, Extension serves each of the state's 67 counties by providing information and conducting educational programs on issues such as sustainable agriculture, competitiveness in world markets, natural resource conservation, energy conservation, food safety, child and family development, consumer credit counseling, and youth development.

Florida Agricultural Experiment Station (UF/IFAS)

Citrus Research and Education Center (Lake Alfred)
Everglades Research and Education Center (Belle Glade)
Fort Lauderdale Research and Education Center
Gulf Coast Research and Education Center
Indian River Research and Education Center, Ft. Pierce
Range Cattle Research and Education Center (Ona)
Tropical Research and Education Center (Homestead)
West Florida Research and Education Center (Milton)
Mid-Florida Research and Education Center (Apopka)
North Florida Research and Education Center (Quincy)
Southwest Florida Research and Education Center (Immokalee)
Florida Medical Entomology Laboratory (Vero Beach)

South Florida Farmers Set Standard For Water Quality

Implementation of BMPs leads to historic achievement in runoff reduction goals.

For the 17th consecutive year, water flowing from farmlands in the Everglades Agricultural Area (EAA) achieved phosphorus reductions that exceeded those required by law. Implementation of best management practices (BMPs) produced a 71% phosphorus reduction in the 470,000-acre EAA farming region south of Lake Okeechobee for the 2012 monitoring period. An approved model is used to compute the reductions and makes adjustments to account for the influences of rainfall.

Just west of the EAA, the C-139 Basin also met its goal of reducing phosphorus discharges to historic levels. The 170,000-acre C-139 farming region consists primarily of pasture land, row crops, citrus and sugarcane. Results show 15 metric tons flowed from the basin during the 2012 monitoring period, less than half the target load of 32 metric tons.

“Year after year, science-based best management practices deliver reductions in nutrients that are greater than required by state law, helping to significantly improve Everglades water quality,” said Joe Collins, chairman of the South Florida Water Management District Governing Board. “Together with treatment wetlands, BMPs provide a solid foundation for our collective efforts to achieve the ultra-low water quality standards in the River of Grass.”

In the EAA, the most commonly used BMPs are more precise fertilizer application methods, refined stormwater pumping practices, and erosion controls to reduce the amount of phosphorus transported in stormwater runoff to the Everglades and connected water bodies. In the C-139 Basin, the District recently worked with landowners to develop more comprehensive and stringent BMP plans for each farm that better address the unique nutrient challenges in this basin. These plans are anticipated to result in greater phosphorus reduction results.

Source: South Florida Water Management District

District-Wide Conditions for July 26, 2012

The South Florida Water Management District (SFWMD) is issuing the following briefing:

In the midst of the wet season, rainfall continues to boost groundwater and surface water supplies throughout the 16-county region. While some areas saw replenished water sources with an early start to the wet season in early May, others have been gradually recovering.

Lake Okeechobee levels have slowly increased over the last few weeks, although levels remain below normal for this time of year. On the west coast, rainfall and local basin runoff in the last few weeks improved water conditions and lowered salinity in the Caloosahatchee River. The District continues to recommend that the U.S. Army Corps of Engineers follow established guidelines, which call for no lake releases to the Caloosahatchee at this time. The District continues to monitor water levels and operate the system to capture as much water as possible while maintaining flood control. For more information on the rainy season and other water updates, visit:

- Flood and Rainy Season Readiness
- SFWMD Weather/Rainfall Data
- Climate Prediction Center Precipitation Forecast

Lake Okeechobee Levels

Today	**12.13** feet
Historical Average for Today	**13.72** feet
This Date One Year Ago	**10.24** feet
One Month Ago	**11.93** feet
One Week Ago	**12.06** feet

Water Levels in Key Locations

LOCATION	WATER LEVEL	ONE WEEK AGO	HISTORICAL AVERAGE FOR TODAY
Lake Istokpoga	**38.31** feet	**38.34** feet	**38.22** feet
WCA-1	**15.91** feet	**15.96** feet	**15.43** feet
WCA-2	**12.04** feet	**12.13** feet	**12.51** feet
WCA-3	**10.32** feet	**10.34** feet	**9.86** feet
Lake Kissimmee	**50.34** feet	**50.33** feet	**50.07** feet

For a map of wet season rainfall totals in all District basins, click here.

Water Conservation Measures

• South Florida is under the District's Year-Round Landscape Irrigation Rule that limits residential and business landscape irrigation to two or three days per week based on location. Some city and county governments have adopted local ordinances that differ from the District rule and may further limit landscape irrigation. To determine watering days and times in your area, contact your local government or visit www.sfwmd.gov/2days

The City of West Palm Beach is no longer under an emergency order limiting landscape irrigation. Customers of the city's utility are to follow the District's Year-Round Landscape Irrigation Rule, which allows watering up to three days per week.

• Permitted water users such as nurseries, agriculture, golf courses and utilities are required to continue following the water use conditions in their permits. Copies of water use permits can be found in the Application/Permit records search online at www.sfwmd.gov/ePermitting

• For information about water conservation, visit www.savewaterfl.com.

• Information about current weather and water conditions can be found at www.sfwmd.gov/waterwatch

Other Actions

Lake Okeechobee releases

• Since May, there have been multiple beneficial releases of water from Lake Okeechobee to the Caloosahatchee River, and estuary salinity levels have significantly improved. Wet season rainfall and local basin runoff are providing sufficient inflow to the Caloosahatchee to maintain favorable salinity levels in the upper estuary. Based on current ecological conditions and established guidelines in Adaptive Protocols, District staff on July 25 recommended no further releases at this time. The operational position statement is available here.

Navigation

• The following locks on the north shore of Lake Okeechobee remain closed until lake levels rise to allow for safe navigation:

- S-135 at J&S Fish Camp in Martin County
- G-36 at Henry Creek in Okeechobee County
- S-127 at Buckhead Ridge in Glades County
- S-131 at Lakeport in Glades County

• The S-193 Lock, located on Taylor Creek on the north shore of Lake Okeechobee, is closed due to ongoing renovation work to refurbish the lock and ensure decades of reliable service.

# # #

Media inquiries can be directed to:
Randy Smith
South Florida Water Management District
Office: (561) 682-2800 or Cellular: (561) 389-3386

Danger of Heat Stress

Be alert to early warnings of heat stress, both in yourself and in your co-workers.

Heat stress needs to be taken seriously.

Working in a hot environment puts stress on the body's cooling system. When heat is combined with other stresses like hard physical work, loss of fluids, or fatigue it may lead to heat-related illness.
Individuals over 40 years of age need to take extra care when the weather is hot because their ability to sweat declines as they age. However, heat stress can also affect individuals who are young and fit.
POINTS TO EMPHASIZE:

●Drink plenty of water to keep body fluid levels up

●Get out of the heat occasionally

Water is crucial to help the body adjust to high temperatures. The rate of water intake must be equal to the rate of water loss by perspiration to keep body temperature normal. **When it's hot, drink plenty of water!**
Your body must work even harder to get rid of excess heat when conditions are both hot and humid. Unfortunately, water can't evaporate as readily under muggy conditions. The process is easier if the surrounding air is moving. That's why we welcome a cool breeze, or turn on a fan when the air is "sticky".
Sickness and accident rates increase when heavy work is done at temperatures above 86 F.

Don't push yourself beyond your limits. It could be harmful to your health, and could put you at increased risk of having an accident.

Heat stress hazards

1. **Heat cramps:** Heavy sweating drains the body of salt, which cannot be replaced by simply drinking water. Painful cramps occur in the arms, legs, or stomach while on the job, or later at home. Move to a cool area at once if cramping is experienced. Loosen clothing and drink cool, commercial fluid replacement beverage. Seek medical aid if the cramps are severe, or don't go away.

2. Heat exhaustion: Inadequate water and salt intake causes the body's cooling system to break down. Symptoms include heavy sweating, cool, moist skin, body temperature over 100 F, weak pulse, and normal or low blood pressure. The victim is likely to be tired, weak, clumsy, upset, or confused. He will be very thirsty, and will breathe rapidly. His vision may be blurred. **Get medical help immediately!** Heat exhaustion can lead to heat stroke, which can kill. Move the person to a cool, shaded area. Loosen or remove excess clothing. Provide cool, lightly-salted water. Fan and spray the victim with cool water.

3. **Heat stroke can kill a person quickly!** Once the body uses up all its water and salt, sweating ceases. Temperature can rise quickly. You can assume a person is suffering from heat stroke if their body temperature is over 105 F, and any of the following symptoms are present:

- ●weakness, confusion, distress, strange behavior
- ●hot, dry, red skin
- ●rapid pulse
- ●headache or dizziness
- ●In later stages of a heat stroke, a victim may pass out and have convulsions

Call an ambulance immediately if heat stroke is suspected. The victim's life may be on the line! Until help arrives, move the victim to a cool area and remove excess clothing. Fan and spray them with cool water. Offer sips of water if the victim is conscious.

Heatwave guidelines

The following measures should help prevent the development of heat-related illnesses.

●Slow down in hot weather. Your body's temperature regulating system faces a much greater workload when temperature and humidity are high.

●Heed early warnings of heat stress, such as headache, heavy perspiration, high pulse rate, and shallow breathing. Take a break immediately and get to a cooler location. **Watch for heat stress signs among your co-workers.**

●Dress for hot weather. Lightweight, light-colored clothing reflects heat.

●**Drink plenty of water.** Don't let yourself "dry out".

●Try to get used to warm weather gradually. Take it easy for those first three hot days. Your body will have a better chance to adjust if you take it slow.

●Get out of the heat occasionally. Physical stress increases with time in hot weather. Take breaks in a cool, shady location.

●Wear a hat and long-sleeved shirt to prevent burning (which can increase the risk of skin cancer.)

"Do's" and "Don'ts" of preventing heat-related illnesses

DO:	**DON'T:**
Drink plenty of water Take breaks in a cool, shady area Watch for symptoms of a heat stress, both in yourself and co-workers	Ignore symptoms of heat stress Try to "keep up" with the rest of the crew, even though you feel ill

MANAGING HEAT STRESS

By Dr. Norman Nesheim, UF-IFAS

Heat stress is caused by working in hot conditions and when the body builds up more heat than it can cope with. Several factors work together to cause heat stress. Before beginning a task, think about whether any of these factors are likely to be a problem. Consider making adjustments in the task itself or in the workplace conditions, including: heat factors--temperature, humidity, air movement, and sunlight; workload--the amount of effort a task takes; drinking water intake; and scheduling.

High temperatures, high humidity, and sunlight increase the likelihood of heat stress. Air movement, from wind or from fans, may provide cooling. Because hard work causes the body to produce heat, a person is more likely to develop heat stress when working on foot than when driving a vehicle. Lifting or carrying heavy containers or equipment also increases the likelihood of overheating. Use fans, ventilation systems (indoors), and shade whenever possible. A work area or vehicle sometime can be shaded by a tarp or canopy or provided with fans or air conditioners. Consider wearing cooling clothes that help keep the body cool.

People who have become used to working in the heat are less likely to be affected by heat stress. To become adjusted to hot work environments, do about two hours of light work per day in the heat for several days in a row; then gradually increase the work period and the workload for the next several days. An adjustment period of at least seven days is recommended. If the warm weather occurs gradually, workers may adjust naturally to working in hot conditions.

Whenever it is practical, choose coveralls that allow air to pass through. Woven fabrics (cotton, or cotton-polyester blends) allow air to pass through fairly easily. Rubberized or plastic fabrics and fabrics coated with chemical-resistant barrier layers allow almost no air to pass through.

Perspiration or evaporation of sweat cools the body. Under the conditions that lead to heat stress, the body produces a large amount of sweat. Unless the water lost in sweat is replaced, body temperature will rise. Drink plenty of water before, during, and after work during heat stress conditions. Do not rely on thirst alone to guide you. A person can lose a dangerous amount of water before feeling thirsty, and the feeling of thirst may stop long before fluids are replaced. Be sure to keep body weight fairly constant. All weight lost because of sweating should be regained every day.

When the combination of temperature, sunlight, humidity, and workload is likely to lead to overheating, use scheduling to avoid heat stress. Schedule tasks requiring the heaviest workload during the coolest part of the day. When heat stress risk is high, schedule frequent breaks to allow the body to cool. Anyone who gets dangerously hot should stop work immediately and cool down. If necessary, shorten the time between breaks.

The above steps will prevent most heat stress problems. But under extremely hot conditions when cooling devices cannot be used, it may be necessary to stop work until conditions improve.

Signs and Symptoms of Heat Stress

Heat stress, even mild heat stress, makes people feel ill and impairs their ability to do a good job. They may get tired quickly, feel weak, be less alert, and less able to use good judgment.

Severe heat stress (heat stroke) is a serious illness. Unless victims are cooled quickly, they can die. Severe heat stress is fatal to more than 10 percent of its victims--even young, healthy adults. Victims may remain sensitive to heat for months and be unable to return to the same work.

Learn the signs and symptoms of heat stress and take immediate action to cool down if you observe:

- fatigue (exhaustion, muscle weakness),
- headache, nausea, and chills,
- dizziness and fainting,
- loss of coordination,
- severe thirst and dry mouth,
- altered behavior (confusion, slurred speech, quarrelsome or irrational attitude).

Heat cramps can be painful. These are muscle spasms in the legs, arms, or stomach caused by loss of body salts through heavy sweating. To relieve cramps, drink cool water or "sports drinks." Stretching or kneading the muscles may temporarily relieve the cramps.

First Aid for Heat Stress

It is not always easy to tell the difference between heat stress illness and pesticide poisoning. The signs and symptoms are similar. **Don't waste time trying to decide what is causing the illness. Get medical help right away.**

- Get the victim into a shaded or cool area.
- Cool victim as rapidly as possible by sponging or splashing skin, especially face, neck, hands, and forearms, with cool water or, when possible, immersing in cool water.
- Carefully remove clothing that may be making the victim hot,
- Have the victim, if conscious, drink as much cool water as possible.
- Keep the victim quiet until help arrives.
- **Severe heat stress (heat stroke) is a medical emergency! Cool victim immediately. Brain damage and death may result if treatment is delayed**.

SPRAY DRIFT OF PESTICIDES

What Is Pesticide Spray Drift?

EPA defines pesticide spray drift as the physical movement of a pesticide through air at the time of application or soon thereafter, to any site other than that intended for application (often referred to as off target).

How Does Spray Drift Occur?

When pesticide solutions are sprayed by ground spray equipment or aircraft, droplets are produced by the nozzles of the equipment. Many of these droplets can be so small that they stay suspended in air and are carried by air currents until they contact a surface or drop to the ground. A number of factors influence drift, including weather conditions, topography, the crop or area being sprayed, application equipment and methods, and decisions by the supervisor or applicator.

What Are the Impacts of Spray Drift?

Off-target spray can damage other crops and affect human health and the environment. Drift results in a waste of product and reduces the effectiveness of pesticide application.

How Pesticides Drift?

There are two basic ways in which pesticides move downwind:

Vapor drift. When pesticide molecules volatilize (evaporate into the air), they can move downwind as a vapor. This form of drift is related to the product, not to the type of application method used.

Particle drift. This is the movement of spray particles, or droplets, formed during application. Several key factors determine if a spray droplet will hit its target or drift downwind: (1) the droplet size; (2) the equipment and method of application; (3) the wind speed and (4) other climatic conditions.

1. Droplet Size. "Atomizing" the spray solution into very small droplets will increase coverage, but will also increase the potential for evaporation and drift. The smaller the droplet, the greater is the risk of drift. Droplets over 150 microns in size resist evaporation much more than smaller droplets because of their large surface area. Therefore, the potential for drift rapidly decreases when the diameter of droplets is increased to about 150 microns.

2. Equipment and Application Methods.

a) ***Lower spray height.*** You can reduce drift by mounting the spray boom closer to the ground (without sacrificing the uniformity of the spray pattern). That is because wind speed increases with height. The

correct spray height for each nozzle is determined by the nozzle spacing and the spray angle. Wide-angle nozzles can be placed closer to the ground than narrow-angle nozzles. However, wide-angle nozzles also produce smaller droplets, offsetting the advantage of a lower boom height to some extent.

b) ***Use the lower end of the pressure range.*** Higher pressures generate many more small droplets (less than 100 microns). For this reason, refrain from using pressures that exceed 40 to 45 psi.

c) ***Spray volume and pressure for foliar herbicides.*** Many applicators are reducing the spray volume of foliar herbicides from the commonly used 10-20 GPA to 5-10 GPA. When you reduce spray volume, the herbicide concentration will increase to maintain the same dose of active ingredient. But as spray volume is reduced, the droplet size will decrease, and this means greater drift potential. Research has also shown that control of some broadleaf weeds with contact herbicides is reduced when you cut back on spray volume. However, reduced volumes have little effect on weed control with most translocated herbicides, as long as the chemical is applied properly. To compensate for the reduced spray volume, some applicators will increase spray pressure from a normal 30-40 psi to 60-120 psi. Increasing pressure should not be used as a substitute for spray volume. It is recommended to maintain pressure below 45 psi.

3. Wind speed. Wind speed and direction, temperature, relative humidity, and atmospheric stability all affect spray drift. Wind speed, however, is usually the most critical meteorological condition. The greater the wind speed, the farther off-target small droplets will be carried. Although there is no maximum wind speed to serve as a guideline in all situations, try to spray when the wind speed is less than 10 miles per hour. To minimize the damage done by drift, it is also important to determine the wind direction relative to sensitive crops (something that is often overlooked). To greatly reduce damage to sensitive plants, leave a buffer zone at the downwind edge of the spray area. After the wind has died down or changed direction, you can then safely spray the buffer zone.

4. Temperature and inversions. Temperature and humidity affect the amount of drift that occurs through evaporation of spray particles. Although some spray is lost through evaporation under all atmospheric conditions, the losses are less likely in cool, damp conditions. Temperature also influences atmospheric stability, as well as the presence of air turbulence and “inversions.” An inversion can occur when the air is very calm with very little air mixing. This condition makes it easier for spray to move slowly downwind. In other words, extremely calm conditions can also pose the risk of drift. Inversions generally occur in early morning or near bodies of water. You can recognize an inversion by observing a column of smoke. If the smoke does not dissipate, or if it moves downwind without mixing vertically, conditions are not good for spraying.

How to reduce drift?

- Avoid high spray pressure, which create finer droplets. Use as coarse a spray as possible and still obtain good coverage and control. Droplet size is one of the most important factors affecting drift, however, addressing droplet size alone is not sufficient to reduce the probability of drift and potential damage.
- Don't apply pesticides under windy or gusty conditions; don't apply at wind speeds over 10 mph. Read the label for specific instructions.
- Maintain adequate buffer zones to insure that drift does not occur off the target area.
- Be careful with all pesticides. Insecticides and fungicides usually require smaller droplet sizes for good coverage and control than herbicides; however, herbicides have a greater potential for non-target crop damage.
- Choose an application method and a formulation that is less likely to cause drift. After considering the drift potential of a product/formulation/application method, it may become necessary to use a different product to reduce the chance of drift.
- Use drift reduction nozzles.
- Use wide-angle nozzles, lower spray boom heights, and keep spray boom stable.
- Use drift control/drift reduction agents. These materials are designed to minimize the formation of droplets smaller than 150 microns. They help produce a more consistent spray pattern and aid in deposition. Drift control additives do not eliminate drift. Therefore, common sense is still required.
- Apply pesticides early in the morning or late in the evening; the air is often more still than during the rest of the day.
- Don't spray during thermal inversions, when air closest to the ground is warmer than the air above it. When possible, avoid spraying at temperatures above 90°-95° F.
- Know your surroundings! You must determine the location of sensitive areas near the application site. Some crops are particularly sensitive to herbicides, which move off-site.
- Be sure you are getting the spray deposition pattern you think you are; service and calibrate your equipment regularly.
- Whenever possible, cut off the spray for missing trees in the row. Spray that does not enter the tree canopy is wasted and contributes significantly to drift problems.
- Keep good records and evaluate pesticide spray results.

Remember, ALWAYS read and follow label directions.

Certifying and Training Applicators

EPA works with the USDA and the Florida Department of Agriculture and Consumer services (FDACS) to carry out certification and training programs for pesticide applicators. States have primary responsibility for ensuring that pesticide applicators are licensed and certified, as required by Federal and state laws, to apply pesticides in an appropriate manner. Part of the program for certification includes training about how to protect people and the environment from off-target spray drift. In Florida, the certification exams for restricted use pesticide applicator licenses are administered by the **University of Florida/IFAS Cooperative Extension Service** in local county offices statewide. Individuals who need to take the exams should check with local extension office(s) for training and exam schedules **http://sfyl.ifas.ufl.edu/map/**

SPRAY TANK MIXING

Tank mixing allows the grower to reduce the number of times spray machinery is used. The benefits include fewer trips, which reduces cost, soil compaction, and crop damage. Tank mixing is a complex issue. Some tank mixes are beneficial, but others cause problems. The types of chemicals that are used in a sprayer include water, pesticides, adjuvants, and fertilizers. As the number of ingredients increases in a tank mix, chances for incompatibility and phytotoxicity increase, particularly at lower spray volumes. Well water is better than ditch and pond water because it is cleaner. Ditch and pond water can plug up screens, pumps, and nozzles and be a source of inoculum for plant diseases. However, well water is alkaline, and it is believed that as the pH of the final spray mix increases, the effectiveness of some chemicals is significantly reduced. Loading the spray materials into the spray tank should be done after the tank is at least half full with water. The agitation system should be operating to attain thorough mixing. This minimizes the risk for physical and chemical incompatibilities. Loading should be away from surface water. The handler should wear the required protection as indicated on the label. Remember that the more chemicals are used in the same mix, the more likely that an adverse effect on the crop will occur. Unless the pesticide labeling states, add pesticides to the water using the W-A-L-E plan: Dry formulations should be added to the tank first followed by the liquid formulations. To the water, first add **W**ettable powders, prills [(DF's, DG's, water-dispersible granules (WDG's)] and soluble powders. Second, **A**gitate thoroughly and add the remaining quantity of water. Third, add the **L**iquid products such as solutions, flowables, and adjuvants. Finally, add **E**mulsifiable concentrates (EC's) and oils last. Tank mixing is a necessity. However, success with tank mixing is based upon slowly acquired experience. It is not possible to test the thousands of combinations that exist with tank mixing. Do the testing on a small scale and get information from reliable sources on tank mixing.

THE USE OF ADJUVANTS

Adjuvants are non-pesticidal chemicals, that when added to a spray mix, are supposed to enhance and improve its effect. Surfactants, spreaders, stickers, buffers, drift retardants, penetrants, and foam busters are examples of adjuvants. All surfactants are adjuvants, but not all adjuvants are surfactants. The importance on inclusion of an adjuvant in herbicide formulations has become an almost universal practice. The key to success with adjuvants is to use them at the recommended rate and as little as possible. At higher rates, adjuvants can cause damage to crops. Let the label be your guide in selecting adjuvants. The use of surfactants, oils, emulsifiers and fertilizer salts can enhance the activity of foliar-applied herbicides. The addition of ammonium sulfate to spray mixtures of certain foliar-applied herbicides enhances herbicide efficacy, including glyphosate. Surfactants enhance spray retention and penetration due to a number of surface properties, including reduction in surface tension and contact angle of spray droplet. Therefore, they may enhance cuticle retention, wetting and spreading on the leaf surface.

NITROGEN MANAGEMENT AND WATER QUALITY

Whatever its source, nitrogen (N) is essential for achieving optimum crop yields. The same is true of phosphorus (P) and other nutrients. However, applying too much nitrogen or phosphorus to cropland can have adverse effects on the environment. Achieving optimum yields without applying excessive nutrients should therefore be a goal of all growers. Excess nitrogen and phosphorus in surface waters, and nitrogen in groundwater cause eutrophication (excess algae growth) in surface waters and health problems in humans and livestock as a result of high intake of nitrogen in its nitrate form.

Effect of Nitrogen on Water Quality

Eutrophication is the slow, natural nutrient enrichment of streams and lakes and is responsible for the "aging" of ponds, lakes, and reservoirs. Excessive amounts of nutrients, especially nitrogen and phosphorus, speed up the eutrophication process. As algae grow and then decompose they deplete the dissolved oxygen in the water. This condition usually results in fish kills, offensive odors, unsightliness, and reduced attractiveness of the water for recreation and other public uses.

Excessive nitrate (NO_3) in drinking water can cause human and animal health problems, particularly for small babies. The United States Public Health Service has established a specific standard of 10 (ppm) milligrams of nitrate nitrogen per liter as the maximum concentration safe for human consumption.

Fate of Nitrogen in the Environment

The long-term fate of land-applied nitrogen is the same whether it comes from field-applied fertilizer, plant residues, animal, industrial, or municipal wastes, or other sources.

Nitrogen Remaining in the Soil

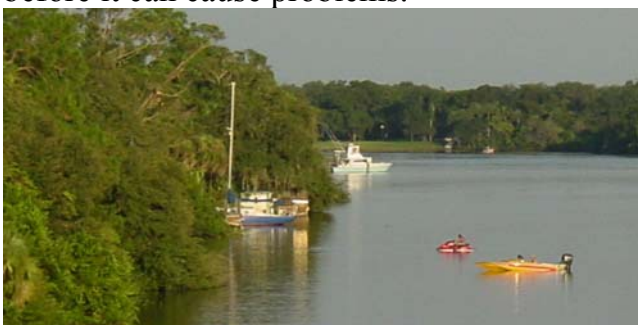
Regardless of how much nitrogen from fertilizers, manure, compost or other sources is used on a particular soil, nitrogen does not normally accumulate in the soil. Most of the nitrogen is lost from the soil in one way or another. Regardless of whether nitrogen is in the organic or inorganic form when applied to crops, it undergoes transformation to yield nitrate as an end product.

Recovery of Nitrogen in Harvested Crop

The amount of nitrogen harvested by crops is less than most people assume. Recovery of 50 percent of the applied nitrogen is a good average. However, the recovery rate varies for different crops and soils. The recovery of nitrogen applied to citrus largely depends on the amount applied, application frequency and method, fertilizer source, timing, and the yield obtained. In most seasons, the crop may not use 30 to 60 percent of applied nitrogen. This nitrogen may be lost through volatilization, leaching or runoff and may represent a potential source of pollution. Volatilization is the loss of ammonia gas (NH_3) to the atmosphere from urea and ammonium nitrogen sources. Nitrogen fertilizer sources prone to nitrogen volatilization should be incorporated into the soil or applied prior to a rainfall. Nitrogen losses are minimized through best management practices (BMPs).

Fertilizer Nitrogen Lost to the Air as Gas

It is well documented that some of the nitrogen that moves below the plant root zone is lost to the atmosphere through a process called *denitrification*. This process is the breakdown of nitrate to simple nitrogen (N_2) and oxygen (O_2) gases that return to the atmosphere. Loss of nitrogen as a gas by this process is not extensive in well-aerated, cultivated soils. Nitrogen applications to high-water-table soils that are poorly drained and high in organic matter are the least likely to contribute to contamination of groundwater by nitrate. The organic matter in the shallow groundwater provides energy for microorganisms that promote denitrification and thus much of the nitrogen is lost in the gaseous form rather than as nitrate. In many places throughout Florida, much of the nitrate flowing laterally to an outlet is either used by plants in these wet natural areas or is lost through denitrification. Thus, nature has a very effective way of removing much of the nitrate before it can cause problems.



Fertilizer Nitrogen Removed from the Soil in Surface and Subsurface Drainage

Nitrogen from fertilizers may enter streams through surface or subsurface drainage (leaching). Considerable loss of nitrogen may occur if heavy rains immediately follow a surface application of fertilizer on a moist soil surface, particularly if there is considerable slope. The loss of organic nitrogen (contained in crop residues, animal waste, or soil material) could be significant if intense rainfall results in substantial soil and debris movement. Because it has a high solubility, nitrate nitrogen normally moves readily into the soil with the initial rainfall. Thus, if fertilizer nitrogen is a source of pollution, it is usually from leaching or subsurface drainage. Because nitrogen does not accumulate in the soil and 30 to 60 percent of the applied fertilizer is not harvested with the crop, this nitrogen must be escaping into the air or water.

Management of Nitrogen to Uphold Water Quality

Because nitrate in groundwater and surface water is a potential health hazard and contributes to eutrophication problems, fertilizer nitrogen must be used prudently on crops. Listed below are some techniques for guarding against the possibility of unused nitrate contaminating surface water and groundwater supplies.

- Apply your fertilizer just before a major flush and/or bloom and during leaf and fruit expansion and growth. Avoid applying nitrogen during the rainy season. Proper timing ensures maximum nitrogen uptake and minimizes the likelihood of nitrogen leaching below the plant roots.
- Apply a reasonable amount of nitrogen to your crop. Do not apply nitrogen above recommended rates. When crop load is low, less nitrogen will be needed and removed with the crop.
- Consider collecting leaf samples for mineral analysis to check the nitrogen status and adjust the fertilizer program.
- Be sure to analyze animal, municipal, and industrial wastes for nitrogen content when applied to cropland.
- Develop and use a comprehensive record keeping system for fertilizer rates and yield.
- Calibrate applicators, apply fertilizer products and manure accurately, and use the correct application method. When possible, inject or incorporate urea-containing materials into the soil to minimize loss to the atmosphere (volatilization).

ALGAE

Algae are in the plant kingdom, but maybe they're not really plants!

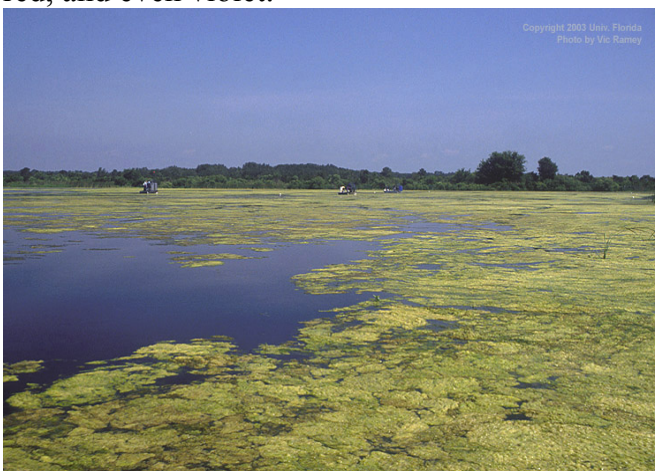
In Florida's freshwaters, algae are what make the water green, or even "slimy". However, green water is not necessarily undesirable, and neither are algae. In fact, algae are essential to the ecosystem and to life as we know it, and must be treated with respect.

Algae are a diverse group of organisms, which survive in all different types of habitats. They range in size from microscopic to meters in length and in complexity from single-celled to complex organisms that would rival even large plants. Though these organisms may look like the true, "higher", plants, they are anything but, since they do not have roots or true stems and leaves.

Algae are one of the first steps of the food web. There are microscopic algae, like phytoplankton, and there are macroalgae, algae that can be seen by the naked eye. Algae occur naturally in all types of systems and may be considered indicators of ecosystem condition. Even the mere presence of a species can give an indication of the amount and type of nutrients that run through the system. Algae provide food for all types of animals, including fish, insects, mollusks, zooplankton (microscopic animals), and humans.

What causes an algae bloom?

At times algae can grow so quickly and densely that they form a "bloom". Many people don't like the "look" of a bloom, though blooms can be a natural occurrence. Blooms are not necessarily green, though that is the most common color. They can be blue-green, brown, red, and even violet.



Some blooms turn the water a certain color; this is usually a bloom associated with phytoplankton (microscopic algae). Other blooms form clumps or mats that float on top of the water, or that grow attached to the bottom or to plants. Still others can form dense mats that cover the water surface.

Algae need nutrients, such as nitrogen and phosphorous, and light to grow. The level of growth or productivity is often dependent on the amount of nutrients in a system. There is a classification for productivity of a system; it ranges from oligotrophic (low productivity and nutrients) to hypereutrophic (very high nutrients). Also, since algae need light to photosynthesize, how far light penetrates the water is also another limiting factor.

Blooms can have far reaching effects on the environment. Some can become so dense they

can ultimately cause a problem with low oxygen levels. A decrease in oxygen causes hypoxia (low oxygen) or anoxia (no oxygen) and the other organisms in the water that need oxygen to survive, such as fish, become stressed and may die. Other blooms may release toxins that can be harmful to animals.

There is a general consensus that rapidly growing human development, and increased human use and disposal of nutrients over the past few centuries, has increased the frequency and intensity of algal blooms in many regions of the world. This has created a global effort to control harmful blooms.

Controlling blooms

The most direct way to control blooms is to reduce the availability of nutrients. Most water management organizations throughout the world are actively pursuing a variety of nutrient control strategies. However, for some aquatic ecosystems nutrient control is impractical, ineffective or simply too costly. For some cases chemical or biological treatments can be helpful alternatives.

Chemical Treatments

Copper sulfate (bluestone) and **chelated copper compounds** such as Cutrine-Plus, Algae Pro, and K-TEA, as well as Endothall are common chemical treatments used to kill algae. Chemical compounds that shade out the light for algae growth, e.g. Aquashade, are also used to control blooms. Each chemical has its own restrictions and toxicity to animals. Read the directions carefully before application.

Biological Treatments

The main biological treatment that is employed today is the use of various carp fish species to control submersed and floating algae. **Grass carp** (*Ctenopharyngodon idella*) is mainly used for aquatic weeds and attached submersed algae, such as *Nitella* sp., and *Chara* sp. Where they do not prefer filamentous algae to eat, grass carp will eat *Lyngbya*. The **silver carp** (*Hypophthalmichthys molitrix*) has been shown to be an effective treatment for controlling filamentous algae, including blue-green algae.

Both species are non-native species and there are many restrictions to employing them as a means of weed control; some states prohibit their use altogether. When they are allowed, the use is restricted to **triploid carp**. Triploid carp have an extra set of chromosomes that render the fish sterile, therefore prohibiting a population explosion if the fish escapes into an uncontrolled area.

Physical Treatments

Physical treatments for algae in ponds include aeration and airlifts. While aeration does not kill or remove algae from the water, it oxygenates and stirs the water column, and can create conditions to shift from toxic and smelly blue-green algae to preferred green algae species. The resultant algal population is usually not as dense or as toxic to other organisms in the ponds.

Mechanical Treatments

Harvesters are sometimes used to skim dense mats of blue-green lyngbya alga from the surface of lakes and rivers. Lyngbya normally grows in dense mats at the bottoms of nutrient enriched lakes. These mats produce gasses during photosynthesis that often causes the mats to rise to the surface. At the surface, winds pile the algal mats against shorelines or in navigation channels; these mats can be several acres in size. Managers have developed a process called "grubbing" whereby harvesting machines lift the mats off of submersed plants such as native eelgrass, without cutting the eelgrass. By removing the blanket of lyngbya from the eelgrass, the plants grow and expand. Eelgrass is an important food source for manatees in the Crystal and Homossassa Rivers.

Flatwoods Citrus

☐ If you did not receive the ***Flatwoods Citrus*** newsletter and would like to be on our mailing list, please check this box and complete the information requested below.

☐ If you wish to be removed from our mailing list, please check this box and complete the information requested below.

Please send: Dr. Mongi Zekri
Multi-County Citrus Agent
Hendry County Extension Office
P.O. Box 68
LaBelle, FL 33975

Subscriber's Name:_____

Company:_____

Address:_____

City:_____State:_____Zip:_____

Phone:_____

Fax:_____

E-mail:_____

Racial-Ethnic Background

__American Indian or native Alaskan
__Asian American
__Hispanic
__White, non-Hispanic
__Black, non-Hispanic

Gender

__Female
__Male