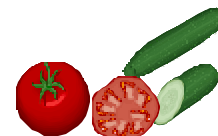
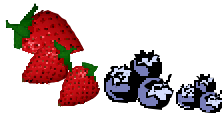




# Berry/Vegetable Times

July/August 2004



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## Calendar of Events 2004

2004 Agritech Educational Session and Trade Show, Aug.31 & Sept 1, Plant City-Arthur Boring Building. For more information, contact the Florida Strawberry Growers Association, 813-752-6822.

Florida Tomato Institute, Sept. 8, 9-3 at the Ritz Carlton in Naples. For more information, contact Diana Hester, Florida Tomato Committee, 407-894-3071

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## From Your Extension Agent... Alicia Whidden

### Valuable Source for Watermelon Information

If you are thinking about growing watermelon next spring, take a look at the watermelon section of the Gulf Coast Research and Education Center website. This section has been compiled by Dr. Don Maynard, a world authority on watermelons and other cucurbit crops. It contains all the information you need for growing watermelons, including production costs, recommended varieties, production practices, and information on pests and disorders. Dr. Maynard has also included information on a new class of watermelons called "personal sized" watermelons.

Worldwide the USA is ranked fourth in watermelon production with China producing the most. In the US, Texas is number one, with Florida second. In the 1940s Florida was the number one production state for watermelon.

Also on the GCREC website is information on other horticultural crops- both vegetable and ornamental. The GCREC website address is <http://gcrec.ifas.ufl.edu>. For the information on watermelon, click on the icon for vegetables and then go to watermelon. On the homepage you can also check out the progress of the new facility at Balm and see photos of its construction.

## Twenty-five Years of the North American Blueberry Industry

Tom Sjulín, Director of Strawberry Production and Research for Driscoll Strawberry Associates, Inc., Watsonville, California  
(This article was adapted from a presentation Dr. Sjulín made at the 2004 North American Berry Conference, February 23-25, 2004, at the Hilton Westshore in Tampa. The full version of Dr. Sjulín's presentation, including references and figures, can be viewed on the GCREC-Dover web-site at <http://strawberry.ifas.ufl.edu>)

The following article focuses on industry developments in the past 25 years, and gives a personal view of what I expect for the next 25 years.

I will limit my remarks to the highbush blueberry industry, as I have no direct experience in the wild lowbush industry. The North American highbush blueberry industry has undergone tremendous change in the past 25 years, with rapid expansion of acreage in several regions and major shifts in types of blueberries planted. The introduction of many improved cultivars, especially low-chill southern highbush cultivars, has supported this change by opening up new opportunities for growers. Most of these new cultivars came from USDA breeding programs in New Jersey and Mississippi headed by Arlen Draper (now by Mark Ehlenfeldt) and Jim Spiers, respectively, and programs at the Univ. of Arkansas (headed formerly by Jim Moore, now by John Clark),

(Continued on page 2)

the Univ. of Florida (directed by Paul Lyrene), and North Carolina St. Univ. (headed by Jim Ballington). More recently, new cultivars developed by Jim Hancock at Michigan St. Univ. promise to greatly improve the quality of late-season offerings.

The significance of these new blueberry cultivars cannot be understated. For example, the 'Duke' cultivar released by the USDA has changed the face of the New Jersey and Pacific Northwest industries. The production acreage has not increased in New Jersey in the past 25 years, but yields are now much more stable, thanks to the 'Duke', and nearly 90% of the production was fresh marketed in 2002. The firmness of the 'Duke' cultivar also allows some Pacific Northwest growers to machine harvest for the fresh market, in turn allowing a greater percentage to be marketed fresh without placing huge demands on the limited labor supply.

Paul Lyrene in Florida has introduced 10 new southern highbush cultivars in the past 10 years. Several of these cultivars, plus the highly flavored 'O'Neal' cultivar from Jim Ballington and new releases from the USDA in Mississippi, are creating new opportunities across the southern U.S. Growers in Georgia are testing these low-chill types as alternatives to the later-ripening rabbiteye types. California has created an entirely new fresh market blueberry industry in the past 25 years, thanks to these new cultivars. Dave Brazelton, a blueberry propagator who keeps close tabs on the industry, now estimates California at 1,300 acres. Southern highbush cultivars, especially the 'O'Neal' cultivar, have also been widely planted in Argentina and northern Chile, increasing the volume of fresh product in North American markets from October through December.

Reported utilized production of highbush blueberries

in the U.S. in 2003 was 187.7 million pounds harvested from 41,000 acres, with an additional 80.2 million pounds harvested from the wild. The fresh market crop was 56% of the total highbush production, but represented 71% of the total highbush crop value of \$220.8 million.

Worldwide, the highbush blueberry industry continues to expand rapidly. Brazelton estimates there are now 86,460 acres, an increase of 51% since 1995. The U.S. acreage increased about 30% during this period (he thinks it's 53,500 acres now), with much of the remaining increase in South America (now over 6,900 acres) and Europe (now over 9,700 acres). The consumer's discovery of the combined health benefit and delight of eating blueberries has fueled this expansion. Nor does it appear that the acreage expansion will slow. A recent estimate places worldwide acreage at more than 96,000 acres by 2008.

I've made my share of predictions about the small fruit industry. Some of my predictions of 12 years ago were well off the mark (e.g., the growth rate of the California strawberry industry would slow, while others hit the mark (e.g., proprietary varieties would increase in importance in California. One thing is certain, the North American small fruit industry will face its share of challenges but will continue to grow and prosper for quite some time to come. Helping drive this expansion is an aging North American population that is more concerned about eating right, and the explosion of research underscoring the health benefits of small fruit consumption. Consumers will be looking for fresh berries all year, so I expect that shipments outside the traditional peak months will increase more rapidly.

## Strategies for Early Season Disease Control

Jim Mertely and Natalia Peres

Strawberries harvested early in the season tend to be healthier than those harvested later in the season. In Florida, relatively few fruit are rotted by *Colletotrichum acutatum* (the anthracnose fruit rot fungus) or *Botrytis cinerea* (the Botrytis fruit rot fungus) when the first crop is harvested in December and January. This suggests that disease management practices early in the season can be less rigorous than those later on. However, decisions made prior to planting, and disease control practices carried out early in the season can influence late season disease development. Some of these factors include proper destruction of the old crop, choosing the right cultivar(s), obtaining healthy transplants, and initiating a fungicide spray program. Crop destruction was discussed in the last issue of Berry/Vegetable Times. This article will touch on the other practices.

Strawberry cultivars vary in their resistance to fruit-rotting organisms. In some cases, the resistance is so effective that fungicide applications can be reduced or omitted. For example, 'Carmine' and 'Sweet Charlie' are highly resistant to anthracnose fruit rot. When these cultivars are grown, regular applications of captan or thiram are more than adequate for good anthracnose control. Such applications are highly recommended since they suppress other diseases and tend to increase yields. 'Camarosa' and 'Treasure' are highly susceptible to anthracnose. If *C. acutatum* is present, these cultivars often require regular applications of captan combined with Abound, Cabrio, Pristine, or Switch later in the season. Even a rigorous fungicide

(Continued on page 3)

spray program may fail to control anthracnose in ‘Camarosa’ and ‘Treasure’ when environmental conditions favor disease development. ‘Festival’ is neither highly resistant nor highly susceptible to anthracnose; a good fungicide spray program usually controls anthracnose in this cultivar.

Resistance to Botrytis is less clear-cut than anthracnose. ‘Carmine’ and ‘Camarosa’ have some resistance to Botrytis, which may be sufficient to skip standard bloom applications of specific botryticides. ‘Treasure’ is intermediate in reaction. ‘Festival’ and ‘Sweet Charlie’ are both susceptible to Botrytis, although ‘Festival’ has been consistently less susceptible than Sweet Charlie in our trials. Nevertheless, both cultivars require special applications of Captivate, Elevate, Pristine, or Switch during the main bloom period in January and February to maintain adequate control of pre-harvest disease in the field and post-harvest disease in the distribution chain. Although the choice of cultivar is often based on agronomic characteristics, it pays to know how each cultivar responds to these diseases. The choice of cultivar will dictate, in part, the types of fungicides that will be required, the dosages to be applied, and the overall cost of the disease management program.

Obtaining healthy transplants has been a perennial problem for Florida strawberry growers. Finding transplants free of *C. acutatum* during the 2001-02 and 2002-03 seasons was especially challenging for highly susceptible cultivars such as Aromas, Camarosa and Treasure. However, anthracnose was less prevalent last season, perhaps due to greater awareness of the disease by plant propagators and increased efforts to suppress or eliminate *C. acutatum* in the nursery. Recognizing potential disease problems in an acre’s worth of transplants, or even in a single box

plants is not an easy task. Transplants colonized by *C. acutatum* often appear healthy, although petiole lesions are occasionally found (Fig. 1). Hidden colonization of transplants by *B. cinerea* is extremely common. This fungus persists as invisible latent infections on strawberry leaves and petioles, and is widespread with many hosts. Therefore, even Botrytis-free plants would eventually be infected by spores produced on local vegetation. Fortunately, a number of fungicides provide excellent control of Botrytis fruit rot when applied during the main bloom period in January and February. Always purchase transplants from a reputable nursery (most nurseries in Canada and California probably fall into this category). Also, North Carolina nurseries which participate in the North Carolina Crop Improvement Association plant certification program should be good alternatives to our traditional Canadian suppliers.

It seems logical to use fungicides sparingly early in the season when disease pressure is low and to spray vigorously later in the season when disease pressure is higher and epidemics seem to occur. Epidemiological theory suggests that early season applications are important because they prolong the lag phase of the disease and delay the start of an epidemic. With respect to anthracnose, logic seems to win out over theory. Experiments here at GREC-Dover have shown that weekly applications of captan from November through January did little to control anthracnose in February and March. However, early season applications did produce a significant yield response compared to the untreated control in 2003-04 (one out of three seasons). Moreover, applying captan solely in February and March controlled anthracnose fruit rot as well as a whole season program during three seasons out of four. Yet marketable yields were significantly increased

by applying captan throughout the season in one experiment. Does this mean that fungicide applications are unnecessary until late in the season? No. Early applications of captan sometimes produce higher marketable yields in our trials. Based on these findings, our present recommendation is to apply a broad-spectrum protectant fungicide (e.g., captan or thiram) at the lower label rate early in the season and to increase the rate later in the season when disease pressure is more intense. Start your applications as soon as possible after the plants have been watered in. Reinforce the protectant fungicide with a good botryticide during the main bloom period and with products active against anthracnose as soon as blighted flowers and fruit are detected in the field (Fig. 2, 3). Keep in mind that supplemental fungicides may not be needed if the cultivar is sufficiently resistant to the disease.



Fig. 1. Anthracnose on petioles.



Fig. 2. Anthracnose flower blight.



Fig. 3 Anthracnose on small fruit.

## Web Based Information for Irrigation Management

John R. Duval

There is quite a lot of useful information on the internet concerning proper irrigation management. There is an **IFAS** website (<http://waterconservation.ifas.ufl.edu/>) that brings together current IFAS recommendations and research for all forms of irrigation used in Florida. It is a tremendous resource with information on everything from proper system design for vegetable crops to freeze protection for citrus and everything in between. A new website The Irrigator (<http://irrigator.ifas.ufl.edu>) is currently under construction. It contains detailed information on drip irrigation for vegetable and berry crops. This site is not meant to compete with the water conservation site, but to compliment it. The Irrigator will contain helpful calculators to determine amounts of water applied and injection rates for pesticides and line cleaners. Means of cutting farm irrigation cost and reducing amounts of water applied without sacrificing marketable yields will also be discussed in depth.

## On-line Insecticide Resistance Aid Available

James F. Price

Managing insecticide resistance in target pests has become an important component of pest control programs. Without adequate attention to the issue, excellent products can become less effective or even completely ineffective. Managing insecticide resistance can be a rather complex task, but there are two major means available to growers to delay its occurrence.

The first is to integrate additional control tools with

pesticide use. For instance, when a grower uses predator mites and miticides in the control program, the predators can kill mites that are surviving the chemical and leading to resistance. The second means is to rotate among different chemical modes of action with the intent to kill survivors (that could establish a resistant population) with a product that kills differently.

There is an on-line Web site, <http://www.irac-online.org/documents/moa/moa.doc>, that provides the mode of action of all insecticides used in agriculture. Growers using this site can develop insecticide application sequences that ensure that different types of chemicals are used before similar ones are repeated.

To learn the modes of action of pesticides of interest, growers obtain the common chemical name of the active ingredients (from container labels), advance to the table in Appendix 3 of the site, find their active ingredient in the table and the associated mode of action group. It is easy to locate active ingredients in the table by using the browser's search feature: Click "Edit", then "find", and then write the active ingredient in the space provided, then search. The cursor will relocate to the word entered.

Growers, sadly, have experienced too many times the burdensome economic losses attributable to insecticide resistance. This site provides an easy tool to cut those losses and enhance profitability.

*(Editor's note: If you have questions about developing pesticide application sequences, you can contact Dr. Price by email at [jprice@ifas.ufl.edu](mailto:jprice@ifas.ufl.edu) or by phone at (941) 751-7636 Ext. 246.)*

## Chemically Speaking

?? Included in the new highway safety bill recently passed by the Senate is language to exempt

certain farmers from new hazardous materials transportation rules (CS January 2004). Many agricultural groups voiced concern over the new homeland security requirements because of the burden they impose on local farmers who regularly transport large amounts of pesticides, fertilizers, and fuel but pose little risk and lack of the resources to implement the measures. The exemption covers only farmers who have sales of less than \$500,000. (Pesticide & Toxic Chemical News, 2/16/04.)

?? On March 17, the EPA notified the FDACS that it had granted a specific exemption under Section 18 of FIFRA for use of the fungicide thiophanate-methyl (Topsin ® M) for management of white mold (*Sclerotinia sclerotiorum*) on fruiting vegetables (tomato, pepper, eggplant). The registration numbers for the Cerexagri products are 4581-408 or 4581-377, and the exemption expires on 3/31/05. (EPA letter of 3/17/04.)

?? Users of metam are asked to contact the Pesticide Information Office at (352) 392-4721 to provide use and benefit information. This sterilant is under going review and various questions arise as to the utility of the material. Please let us know if this is an important tool for you.

?? The USDA released the results of the Pesticide Data Program (PDP) for 2002 in February. More than half (58 percent) of the nearly 13,000 samples contained no detectable residues, while 19 percent contained one residue and 23 percent contained more than one residue. Of all samples, 0.3

*(Continued on page 5)*



percent exceeded the tolerance and 2.7 percent had residues for which no tolerance had been approved. (Pesticide & Toxic Chemical News, 2/23/04.)

## Glyphosate Quickly Cleared by Humans

An exposure study of farm workers and their families showed that a substantial number of workers who applied glyphosate (Roundup®) had no detectable residues, even though the detection limit was one part per billion (ppb). The study, which was cooperatively conducted between Monsanto, Exponent Corporation, Emory University, and University of Minnesota, examined urine samples of 48 South Carolina and Minnesota farmers, their spouses, and 78 children, aged four to 18. The samples were collected before application day, on the day after the application, and three days after the application. Farmers had applied glyphosate to a minimum of ten acres to over 100 acres.

On the day of glyphosate application, 60 percent of the farmers had detectable residues, with a mean of three ppb. This yielded a theoretical dose of 0.004 mg/kg. Only four percent of spouses were found to have detectable residues on application day and none had residues in later monitoring. Twelve percent of the children had detectable residues on the day of application, and all but one of the children who had detectable residues had helped with the application or been present during mixing, loading, or application. None of the theoretical doses approached EPA's reference dose of two mg/kg/day. The results are in March's edition of Environmental Health Perspectives. (Pesticide & Toxic Chemical News, 3/29/04.)

## Interesting Occurrences

### Chemically Speaking, May 04

The great state of California cultivates a lot of fruits and nuts—as everyone knows. The good folks at the California Department of Pesticide Regulation put together a list of “interesting occurrences” at the beginning of April. None of the following cases resulted in death, although most people required medical treatment.

?? A Contra Costa homeowner discovered sewer rats were entering his home through a toilet. He bought an incendiary device intended for gophers and other burrowing pets, and dropped it down a plumbing vent on his roof. The device melted a plastic elbow in the pipe and the roof caught on fire, causing \$80,000 in damage before firefighters could extinguish the blaze.

?? A Riverside County woman set off four foggers in her 1,000-square-foot apartment (about three cans more than recommended application) and left the residence (as the label instructed), only to reenter several times to pick up things she had forgotten. She began to experience dizziness, nausea, and cramps, so she called 911. Upon arrival, a paramedic attempted to retrieve the fogger without wearing a respiratory protection device, and he too became ill.

?? In Stanislaus County, a 38-year-old woman found a home remedy for lead lice on the Web. She then applied eight ounces of dog flea-and-tick shampoo and olive oil to her scalp, and wrapped her head in cellophane for five hours. Her scalp began to itch and burn. She felt shaky and also experienced nausea and drooling.

?? In San Joaquin County, a 23-year-old man spotted a fly on his

beer can and sprayed an insecticide on the can. Later, as he drank from the can, his lips began to tingle.

?? An 18-year-old Lassen County resident sprayed half a can of outdoor-use insecticide in his bedroom, then went to sleep. He awoke with nausea, vomiting, dizziness, sweating, abdominal craps, diarrhea, and other symptoms. He denied his sister's allegation that he was sniffing the insecticide.

?? A Placer County man was spraying his year with the insecticide diazinon when he stopped for a chew of tobacco, placing the wad into his mouth with an unwashed hand. He began vomiting, salivating, and experienced shortness of breath.

?? A Sonoma County apartment resident sprayed three aerosol cans of lice treatment on his bed, then went to sleep. He awoke the next morning with a headache, nausea, and vomiting. He did not read or follow the product label directions and told investigators he assumed the more he used, the more effective it would be.

?? In Los Angeles County, a woman diluted bleach in a cup to clean it, then forgot about it and went to bed. The next morning, she warmed the cup of liquid and took a sip before remembering the cup contained bleach. In a similar incident, a Sonoma homeowner left a cup of bleach solution that she had used for cleaning on her bathroom counter. She got up at midnight and drank from the cup. Her throat began to burn and she vomited.

?? A Tuloume County homeowner tried to kill a spider in a cupboard by spraying it with insecticide. The woman then struck her head in the

*(Continued on page 6)*

cupboard to determine if the spider was dead. She began coughing and vomiting from the fumes. In a similar case, in San Joaquin County, a man stuck his head inside a cupboard to determine if the insecticide he had sprayed on ants was working. He developed a mild headache, dizziness, and respiratory symptoms.

?? A San Francisco physician over-treated his closet with mothballs. When he wore clothes from the closet, he began to feel dizzy, nauseated, and suffered loss of muscular coordination. The first time, he recovered in fresh air. The second time, he went to an emergency room and was hospitalized overnight to rule out a stroke before the problem was traced to excessive mothball fumes.

## Slow, Slimy and Deadly

Dan Culbert - Extension Horticulture Agent

We had a very interesting visitor in our office recently, Lisa Payne from the USDA's Animal and Plant Inspection Service Plant Protection and Quarantine Office. She alerted us to a recent news story out of Wisconsin. Seems that some exotic pet operations imported a snail that is capable of chewing up over 500 different kinds of plants. Additionally, this critter can be host for a human parasite that causes a form of meningitis, and can live for 9 years in captivity.



Giant African land snail, *Achatina fulica*.

Oh, and I almost forgot to tell you - one of these full-sized "slime-ers" is capable of growing to a length of eight inches (yes, 8") long. And - guess who spent a million dollars from 1966 to 1975 cleaning up a population of 3 that grew to 18,000? Today's column will introduce you to the Giant African Land Snail ("GALS"), and encourage you to turn them in to the "snail police" if you see one as your child's next science project or served up with butter as escargot.

Last November, inspectors conducted a search that led to the closure of a home-based snail farm. Last month, another news story reported that five of these fist-sized critters were donated to a Wisconsin Elementary school. After the teachers learned their classroom pets were illegal, they turned them over to the USDA. Over 100 snails have been recently confiscated from exotic pet stores and dealers in Wisconsin, Illinois, Iowa, and Ohio. Snail smugglers could receive fines of up to \$1000 per violation.

Scientists consider the giant African land snail, *Achatina fulica*, to be one of the most damaging land snails in the world. It is known to eat many tropical plants and most varieties of beans, peas, cucumbers, and melons. Believed to be originally from East Africa, GALS has established itself throughout the Indo-Pacific Basin and in Hawaii. It has also been introduced to Caribbean islands (Martinique, Guadeloupe, Saint Lucia and Barbados).

These mollusks are prolific reproducers. They bend the rules of biology because individual snails have the ability to produce both eggs and sperm. Once mated, they can lay up to 400 pea-sized eggs per clutch, and can set down three clutches per year. Even though this is a tropical creature, it can hibernate through northern winters. Want to guess what this creature could do in Florida?

In 1966, a Miami, FL, boy smuggled three giant African snails into south Florida upon returning from a trip to Hawaii. His grandmother eventually released the snails into her garden. Seven years later, more than 18,000 snails had been found along with scores of eggs. Several rounds of quarantines, picking posses, and the use of chemical snail baits finally rid the state of these pests. The state eradication program in Florida took 10 years and cost \$1 million. New eradication efforts may impact native tree snails, some of which are endangered. This is why our state is very interested in preventing their re-introduction. They also may carry a parasite that can effect people's health. These snails can carry microscopic nematode worms (*Angiostrongylus cantonensis* and potentially another species, *A. costaricensis*) which are known to cause a form of meningitis. Handling these snails with bare hands or contacting the slime they leave on vegetables is **not** advised.

Some folks have suggested that these critters could be the basis for a very profitable enterprise: escargot farming. To ensure that escargot meat is safe to eat, it needs to be completely cooked. High heat will give escargot the consistency of tire rubber - making it a bit chewy to be floating in butter.

Information suggests that one or more species of giant African snails are being sold in pet stores or traded by exotic animal dealers. It's likely that these snails were imported illegally. Officials and our office are asking the public's assistance in identifying these snails no matter where they are in the US. If the snails were to be released, it is likely that Floridians would have to come up with much more than the one million "clams" that we did in the 1960s. GALS has proven that it can cause serious damage to both the

(Continued on page 7)

landscape and nature.

We've placed photos and links to other GALS and snail references on our county Extension webpage. Consumers who own or may have seen a GALS are asked to please immediately report it to the FDACS toll-free helpline at 888-397-1517. Alternately, you may contact USDA inspector Lisa Payne in Sebring at 863-655-1720. You can visit our webpage at <http://okeechobee.ifas.ufl.edu>. Our phone number is 863-763-6469, and you can email us at [okeechobee@ifas.ufl.edu](mailto:okeechobee@ifas.ufl.edu).

## Lobate Lac Scale

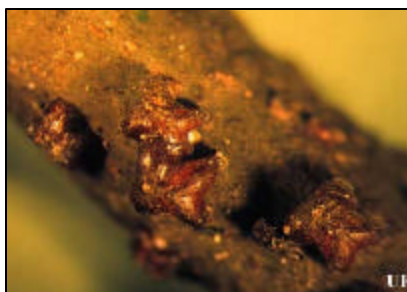
Kim Gabel, Monroe County Extension Agent (edited by Dave Palmer)

The Lobate Lac Scale (*Paratachardina lobata*) originate in India and Sri Lanka and was found for the first time in Florida in 1999 on a hibiscus plant in Broward, Collier, Hendry, Lee, Martin, Miami-Dade and Palm Beach Counties and in spreading. This species has the potential of being the most devastating pest to trees and shrubs in the state's history because it attacks so many plant species. More than 120 species in the 44 families of woody plants have been determined to be host for the Lobate Lac Scale and the plant list is growing. Plant species included are ornamental shrubs and trees, invasive plants, fruit trees, and 39 native plant species. For a listing of the plant known to be attached as of October 2002 got to <http://edis.ifas.ufl.edu/IN471>.

The Lobate Lac Scale is about one-sixteenth of an inch long. The body has two pairs of prominent lobes that look "X" shaped. The adult has a dark reddish brown color, but often appears dull and black due to a coating of sooty mold. The

immature scale stage is called a crawler. It is an elongated oval that has a deep red color. It can only be seen by the naked eye when placed next to the right background or by using a magnifying glass or microscope.

This scale infests woody portions of twigs under one-inch diameter and small branches. It attaches to the branch and sucks the plant sap causing the host plant to starve from lack of food and water. The branches start to wither and then branch dieback happens. A black colored fungus called sooty mold grows on the honeydew (waste product) produced by the scale. These secretions often cover infested and uninfested plants. Where sooty mold is thick on the leaf surface,



Mature females.  
Photograph by: F. W. Howard,  
University of Florida

little photosynthesis takes place.

Since the mature females are wingless, the crawler stage is dispersed by wind currents or by walking along the branches and falling off infested plants on to plants nearby. It can also be moved by birds or animals or by planting scale infested plants in your landscaping. Be on the lookout for the X-shaped scale on any plant you see. Inform your local Extension Office or your local Division of Plant Industries office if you find something suspicious. Because this insect attacks both native and non-native plant species and not only residential landscape plants, but can invade natural areas as well. This will make control difficult.

Currently, for a small infested landscape area, University of Florida researchers recommend using repeated applications of horticultural oil or products containing imidacloprid such as Merit or Bayer Advanced Garden Tree & Shrub Insect Control. This product is a systemic insecticide that should be applied as a drench to the root system. Read and follow all label directions.

The best hope for long term control of the scale is by using biological controls. Currently researchers at the USDA and UF are evaluating insect parasites and predators that attach the Lobate Lac Scale. If successful, biological control could keep the pest scale in check and help prevent large losses of native habitats. Hopefully these will be available late 2004. More information visit the following websites:

<http://www.doacs.state.fl.us/pi/enpp/ento/paratachardina.html>

[http://creatures.ifas.ufl.edu/orn/scales/lobate\\_lac.htm](http://creatures.ifas.ufl.edu/orn/scales/lobate_lac.htm)

(Editor's note: Several of our woody fruit trees are a known host for Lobate Lac Scale. These are carambola, grapefruit, Surinam cherry, round kumquat, mango, jaboticaba, avocado, and cattley guava. There are many ornamental plants that are hosts. Just a few are rose, hibiscus, gardenia, sand live oak, laurel oak, live oak, and crape myrtle.)

The use of trade names in this publication is solely for the purpose of providing specific information. It is not a guarantee or warranty of the products names and does not signify that they are approved to the exclusion of others of suitable composition. Use pesticides safely. Read and follow directions on the manufacturer's label.