



# Berry/Vegetable Times

November 2003



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## From your Extension Agent...

Coming up this month we have the **Strawberry School 2003** on November 18<sup>th</sup> from 9:00 till around 3:30 at GCREC-Dover. 1 CORE and 1 private applicator CEU and CCA credits of 1.5 SW, 1.5 PM, and 1.0 CM have been granted. The schedule appears on page 5 of this newsletter. We have a variety of talks from birds and freezes to water and BMP issues and a demonstration on how to calibrate your sprayer. Lunch is being provided by Kenneth Parker and Chemical Dynamics. We will be having a question and answer session on water and nutrition issues and ask you to send your questions to Dr. Duval ahead of time. He and Dr. Simonne will be answering your questions. Please e-mail questions to JRDuval@ifas.ufl.edu or mail them to him at 13138 Lewis Gallagher Rd., Dover, FL 33527. Also please RSVP to Christine Cooley at (813) 744-6630 ext. 60 or ccooley@ufl.edu by Nov. 14 so we will have a headcount for lunch. Come join us for a fun and informative time.

This is a reminder for the packinghouse folks that the deadline to register their facility with the U. S. Food and Drug Administration is December 12, 2003. This is in compliance with the new FDA bioterrorism registration regulations. This does **not** apply to farms. Facilities may register online at [www.fds.gov/furls](http://www.fds.gov/furls). For questions you can call 1-800-216-7331 or contact Courtney Hunt of the FDA in Tallahassee at (850) 942-8325.

**Happy Thanksgiving!**  
Alicia Whidden

**"Budworms" can be an Early Season Problem**  
Jim Price

As soon as crop establishing overhead irrigation is removed from strawberry transplants, growers must divert their attention for the next several weeks to the early-season lepidopterous larvae ("worm") problem. Growers often speak of the problem critters as "budworms", but the problem truly is not a single worm but a mixture of two or three. When we see worms this time of year they are usually the corn earworm, southern armyworm or the fall armyworm and none of them carries the name "budworm".

Each of these feeds on tender strawberry leaf blades as they develop from the strawberry bud and

**Calendar of Events 2003-2004**

Nov 7 WPS Train the Trainer Program, Hillsborough Cooperative Extension Office, Seffner. 10:00- 12:00. RSVP required. Call 813-744-5518, Ext. 104.

Nov 12 AgriLogic Strawberry Crop Insurance Meeting. 11:30 for growers at the Farm Bureau in Valrico.

Nov. 12 Pesticide Testing, Hillsborough County extension Office, Seffner. 9am. 744-5519.

Nov. 18 Strawberry School 2003. GCREC-Dover, 9:00- 3:30. CEU and CCA credits have been granted. RSVP required. Please see info in agent's article

Dec 3-4 3<sup>rd</sup> Agricultural Trade & Policy Conference. Naples, FL. For more information call 352-392-5930 or visit the website: [conference.ifas.ufl.edu/atpc](http://conference.ifas.ufl.edu/atpc).

Dec. 9 Pesticide Testing, Hillsborough County Extension Office, Seffner, 9am.. 744-5519.

Feb 23-25 NASGA 2004 North American Berry Conference. Hilton Tampa Airport Westshore. For info, [www.nasga.org](http://www.nasga.org).

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cause the ragged appearance of young, central leaves. This activity proceeds near the bud of the transplant yielding good cause for the “budworm” name. The name “budworm” sometimes is used in the Florida strawberry industry for the lesser cornstalk borer that produces a dirty silken tube that extends from the base of the crown to the soil. This adds to the confusion. This article is about the first three worms and not about the lesser cornstalk borer.

Scouts should include budworms in their inspection routine by searching, twice per week during the early season, for young leaves with holes and missing margins. Dark, small fecal pellets on the tops of leaves or on the plastic mulch below leaves also indicate budworm feeding. Eggs of the corn earworm are laid alone, but armyworm eggs are laid in masses. Remedial action should be taken anytime budworms are found at suspicious sites during the scouting routine.

Several products are available to control the infestation of budworms and each should be applied when the worms are small. Lannate® and the pyrethroids, Brigade® and Danitol®, can be effective, but they are broad-spectrum insecticides that can kill naturally occurring beneficial parasites and predators. Once those beneficials are removed from a field, aphids, spider mites, worms, and other pests can increase to cause more problems. None of these insecticides should be applied if *Phytoseiulus persimilis* predators have been released for spider mite control or if the predators are to be released within 3 weeks of a Lannate® application or 6 weeks of a pyrethroid application.

SpinTor® and formulations of *Bacillus thuringiensis* can also be effective and neither of these is as hazardous to beneficials as are Lannate® and the pyrethroids. These insecticides are compatible

with *P. persimilis* predators, although repeated applications of SpinTor® may reduce the predator population slightly.

It is important to recognize and address the budworm problem early in an episode. Once the initial fall budworm problem is under control, scouts can reduce inspections to once per week and growers can concentrate more on spider mites and other pests certain to come.

### Crown Rots of Strawberry Jim Mertely

Once strawberry transplants are established and begin growing rapidly, some plants may wilt suddenly and die in a matter of days. The crowns of these plants are rotted internally and show decayed areas that are brown, red, black, or marbled in appearance. Several fungi cause these symptoms, including anthracnose fungi in the genus *Colletotrichum*, and several species of *Phytophthora*. However, because the symptoms caused by these fungi are not very distinctive, the pathogen cannot be identified by symptoms alone. In order to treat crown rot diseases effectively, it is necessary to know which pathogen is responsible. Therefore, growers are encouraged to submit samples of collapsed plants to the strawberry diagnostic lab before attempting to correct the problem.



Crown rot in the field.

Crown rots caused by anthracnose fungi can be divided into two types. *C. gloeosporioides* and *C. fragariae*

cause a typical form of crown rot characterized by sudden collapse and death of plants. At one time, these pathogens were thought to come from infected transplants. This may have been true when transplants were grown in local nurseries; since both species have been isolated from native Florida plants. Molecular fingerprinting has shown that *C. gloeosporioides* isolates pathogenic to strawberry come from the same population as native local isolates. However, neither species has been found on Canadian nursery plants. Healthy transplants become infected during warm, wet periods in the fall by spores produced on plants bordering the berry field. Starting a disease management program just after watering-in may control this form of Colletotrichum crown rot by preventing early infections. Programs based on captan or Thiram should be effective for this purpose, since both fungicides reduce infections of the petioles and leaves. Plants that are already infected may benefit from one or two applications of the systemic fungicide Topsin M, according to preliminary data collected by Dr. Dan Legard.



Crown rot symptoms caused by *C. gloeosporioides* or *C. fragariae*.





Crown and root rot symptoms caused by *C. acutatum*

A second, atypical type of crown rot is caused by *C. acutatum*. Transplants are infected by this pathogen in the nursery, and may be difficult to establish in the production field due to root necrosis disease. In susceptible cultivars such as Camarosa and Treasure, the pathogen enters the crown from the rotted roots, and produces a small decayed area at the base of the crown. Plants infected in this manner often die, but may persist for some time as new structural roots develop from areas higher up on the crown. There is little that can be done for plants severely infected by *C. acutatum*, but any practice which reduces stress during establishment may aid the recovery of mildly infected plants.



Crown rot symptoms caused by *Phytophthora*

*Phytophthora* species such as *P. cactorum* and *P. citricola* cause another typical type of crown rot. Little research has been done on *Phytophthora* crown rot under Florida conditions, probably due to the sporadic nature of the disease. The origin of infections in our farming system is unclear. However, it is known that *Phytophthora* spp. persist for long periods in the soil, but are killed by soil fumigation.

Roots are infected by a swimming spore called a zoospore. There are two chemical strategies for *Phytophthora* crown rot control. One is preventative and involves the application of Ridomil Gold through the drip line. Due to the expense of this product, one application is usually made after watering in. However, a second application can be made up until fruit set if diseased plants are found in the field. The second strategy involves spraying the foliage with Aliette (Bayer) or Prophyte (Luxembourg Industries). Both products contain phosphite, a form of phosphorus fungistatic to *Phytophthora* spp that is translocated downward in the plant. While phosphite fungicides are more effective when applied preventatively, they may also be of some benefit when applied as soon as the disease is found in the field. Some foliar fertilizers contain phosphite, but are not specifically labeled for disease control. Finally, cultural practices that prevent excessive soil moisture may reduce the number of successful infections and plant mortality.

### Suppression of Twospotted Spider Mites

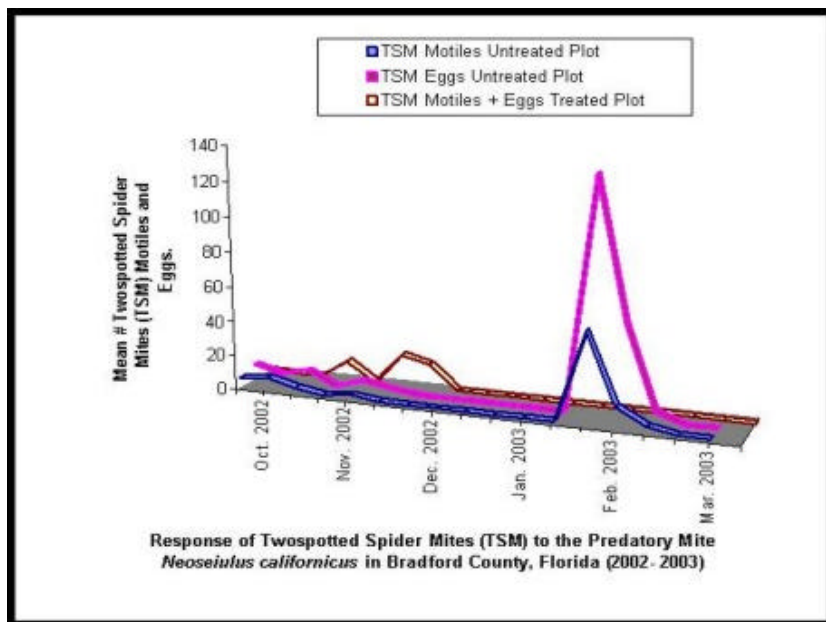
Oscar E. Liburd, Gisette G. Seferina and David A. Dinkins

The twospotted spider mite, *Tetranychus urticae* Koch, has been recognized as the most important arthropod pest in strawberries in the southeast. Twospotted spider mites attack strawberries in the nursery, greenhouse and commercial fields, feeding on leaves causing yellowing, which ultimately leads to a reduction in yield. Traditional control strategies for twospotted spider mites have required several applications of key acaricides during a typical strawberry production season. In many cases, miticides have been applied as a preventative measure or

on a calendar basis, resulting in high control costs and the development of resistance. As an alternative to chemical control, some growers have focused on inoculative releases of predatory mites.

In Florida, the predatory mite that has been released most often has been, *Phytoseiulus persimilis* Athias-Henriot. However, its establishment has only been successful in the southern regions of the state (Hillsborough County). Several theories have been suggested as to the reasons why this predatory mite, *P. persimilis*, has not been successful in northern Florida and other areas in the southeast. It is generally believed that *P. persimilis* is unable to survive the north Florida winters. As an alternative to *P. persimilis*, we studied the predatory mite, *Neoseiulus californicus* McGregor to determine its effect on twospotted spider mite reproductive rates and their overwintering capabilities in north Florida.

A 5-acre strawberry field in Bradford County (northern Florida) was selected for our test site where previous releases of *P. persimilis* had been unsuccessful. The predatory mite, *Neoseiulus californicus* McGregor, was chosen because it has provided fairly good control of twospotted spider mites in other areas of the country. This predatory mite was released during the last week of October at a rate of one predator per strawberry plant. During this time, the population of twospotted spider mite averaged 5 mites per trifoliate. Standard routine practices as far as disease management were followed. The grower was asked to reduce the use of the conventional fungicidal products; Sulphur and Captan® (Captec 4L). With regards to insect management, the grower was asked to avoid Lannate® (Methomyl) and Thiodan® (Endosulfan). These requests were made in light of previous reports which indicated that these pesticides are toxic to predatory mites.



Our results indicated that *N. californicus* provided excellent control of twospotted spider mites (Fig. 1). One week after release, there was a significant reduction in the number of twospotted spider mite motiles and eggs. This reduction continued until early December (Fig. 1). After that time, the average temperature in northern Florida remained low (~ 60- 70s<sup>0</sup> F daytime high) until late January when the temperature rebounded (>80s<sup>0</sup> F daytime high). Twospotted spider mite activity increased significantly in February. During that month, a single application of Acramite™ (Bifenazate) was made to suppress high populations of twospotted spider mites and to avoid economic damage resulting from spider mite injury. After the application of Acramite™, populations of *N. californicus* increased rapidly further suppressing the activity of twospotted spider mites until the end of the season.

*Neoseiulus californicus* has shown traits of being a generalist predator. These predators feed on twospotted spider mites, thrips and pollen but not on the strawberry plants. Therefore, *N. californicus*

can survive in fields when populations of twospotted spider mites are low. They generally take a longer time (compared with *P. persimilis*) to suppress populations of twospotted spider mites. There also are reports that *N. californicus* is more susceptible to pesticides than *P. persimilis*. In our laboratory, the activity of *N. californicus* and *P. persimilis* decreased significantly after exposure to various pesticides. However, both species recovered from pesticide exposures after 48 hours.

This study was a one-year on-farm demonstration that was conducted in Bradford County during the fall of 2002 and spring of 2003. Growers who are thinking of adopting the use of *N. californicus* should exercise caution because it is customary to repeat studies for two years before firm conclusions can be drawn. *Neoseiulus californicus* can be obtained from several sources which are available on the internet. For more information regarding this on-farm demonstration trial you can contact Dr. Oscar E. Liburd at (352) 392-1901 ext. 108 or you can log onto <http://FruitnVegIPM.ifas.ufl.edu/>.

## Ideas for Increasing Florida Strawberry Growers' Profit

Craig Chandler

This two-part article describes how research and development efforts may help Florida strawberry growers increase their profit in the future. My comments are organized around the three main factors that affect profitability: 1) production costs, 2) yield of product, and 3) price of product. Production costs are the focus of this month's article, while my thoughts on yield and price will be presented in the December newsletter.

One way to increase profit is to reduce the cost of production, which has been rising steadily in recent years. So what are the major costs of production, and how can they be reduced? According to the latest figures from the IFAS Ag Business Center the top four pre-harvest costs are transplants (\$1700/acre), fungicides (\$717/acre), soil fumigant (\$684/acre), and insecticides (\$557/acre).

Considering transplants first, what if we developed a cultivar that could be successfully propagated here in Florida? Currently, most transplants are obtained from nurseries that are over 1000 miles from the state. Transportation expenses for such a long haul must add significantly to their cost. In addition to being less costly, Florida propagated plants may be easier to establish. They could be dug from the nursery one day, and planted in the fruiting field the next. Crown rot (caused by *Colletotrichum gloeosporioides*) can be a serious problem with locally propagated plants (See Jim Mertely's article on crown rots), but diseases caused by *C. acutatum* may be less prevalent on plants propagated in Florida than on those propagated in cooler northern climates. Local transplants may also

be freer of angular leaf spot and spider mites than ones from northern nurseries. University of Florida Ph. D. graduate student Steve MacKenzie is currently conducting fundamental research on *C. gloeosporioides* -- research that could bring us a step closer to being able to propagate healthy strawberry plants in Florida. In inoculation studies at GCREC-Dover over the last two seasons, 'Treasure' has shown good resistance to several isolates of *C. gloeosporioides* and may be a logical candidate for a local nursery trial. (Note: 'Treasure' is a patented cultivar, and cannot be propagated legally without a license to do so.)

Moving on to fungicides, what if growers could apply fungicides based on cultivar, the crop's stage of growth, and environmental conditions, rather than relying on fixed calendar schedules? This sort of sophistication could reduce product and application costs without compromising disease control. Dr. Jim Mertely of GCREC-Dover has been conducting research with this idea in mind, and developed some initial recommendations for modifying the traditional spray schedule.

Opportunities to lower the cost of soil fumigant are probably going to be more limited than with foliar fungicides. But growers may be able to lower expenses by using materials and rates based on actual pre-plant pest populations. For example, if sting nematode (*Belonolaimus longicaudatus*) and weed populations are relatively low the grower may be able to use less fumigant.

To keep insecticide (and miticide) costs to a minimum, these materials should be applied only when needed -- which is sometimes difficult to determine. Accurate scouting reports and economic injury thresholds (developed through scientific research) are the tools necessary to make informed pest

management decisions.

It must be pointed out, at this point, that to reduce chemical control costs and still maintain effective disease and pest control will, in most cases, require growers to increase the amount of money spent on management and monitoring efforts.

In conclusion, I want to emphasize that some of the ideas mentioned above need to be tested and refined before they can become standard practices in commercial strawberry production here in Florida. But with industry support, research and development efforts on these topics will yield a more profitable harvest for Florida strawberry growers.

## Magnesium Applications and Bacterial Spot on Tomatoes and Peppers

Phyllis Gilreath

Manatee Vegetable Newsletter, Sept/Oct 2003

There have been questions recently regarding the interaction of Mg applications on the severity of bacterial spot on tomatoes and peppers. This is based on work conducted several years ago by Dr. Jeff Jones and others. In that study, bacterial spot on inoculated plants was more severe in leaves with high levels of Mg. Foliar application of Mg had a pronounced effect on disease development, possibly through the increase in available Mg. (Mg has been shown to be essential for the growth of bacteria.) In earlier studies, pepper plants with Mg levels at the upper end of the normal range had considerably more disease than plants with levels at the lower end of the normal range. Some growers are questioning the potential risk of increasing bacterial spot severity by applications of foliar nutritional sprays containing Mg. Perhaps a more pertinent question to be asking is why these applications are being

made in the first place, unless there is a documented Mg deficiency. Most growers lime annually, usually at least in part with dolomite, thus Mg levels should be adequate. These results would suggest that caution should be exercised in foliar feeding of peppers and tomatoes with Mg, especially during periods of high disease pressure.

## Now is the Time

John R. Duval

Now is the time to start fertilizer and water management. In research done by Albregts and Howard, it was found that delay of fertigation and drip irrigation after establishment could significantly reduce early yields. Monitoring of soil moisture and beginning a fertilizer management quickly after establishment is imperative. It must also be remembered that while a 'full grown' strawberry transplants soil moisture threshold for optimum performance is around 12-15 centibars, this is assuming a plant with a well-developed root system. Newly established transplants do not have an extensive root system so instead of 2-3 water applications a week, smaller daily applications may be necessary. This limited root system also does not inhabit a great deal of soil volume. Thus, when you fertilize, do not over water so that soluble nutrients (mainly nitrogen) move downward out of the root zones of young plants. It should also be remembered that you cannot 'catch up' on missed fertilizer applications. If the fertilizer is lacking during critical growth periods, adding additional fertilizer later will not bring the plants to where they would be if the application had been made on time. Therefore, to maximize strawberry yields and monetary returns, an active fertilizer and water management strategy needs to be implemented immediately after establishment.

## Strawberry School 2003

Tuesday Nov. 18, 2003

9:00 am-3:30 pm

GCREC-Dover

13138 Lewis Gallagher Road, Dover

- 9:00 Welcome by Dr. Jack Rechcigl, Center Director of GCREC-Bradenton & Dover
- 9:10 “Bird Dispersal at Farms” by Larry Brashears, USDA Wildlife Services, Ruskin
- 9:40 “What you need to consider when using water for frost protection” by Dr. Larry Parson, Lake Alfred REC
- 10:10 Winter Weather Program by Chris Oswalt. Citrus Extension Agent, Polk and Hillsborough
- 10:30 Break
- 10:50 “Drip System Management” by Alicia Whidden, Veg. Crops Extension Agent, Hillsborough County.
- 11:10 “Building a BMP Plan for Strawberries-Where do we start? by Dr. Eric Simonne, Horticultural Sciences, UF.
- 11:40 “Irrigation Scheduling & Monitoring” by Dr. John Duval, GCREC-Dover.
- 12:10 LUNCH Provided by Kenneth Parker of Chemical Dynamics
- 1:10 “Tail Water Recovery in Strawberries” by Dr. Craig Stanley, GCREC-Bradenton.
- 1:40 Sprayer Calibration by Doug Thompson , Chemical Containers
- 2:40 Questions and Answers on Water and Nutrition

RSVP by November 14  
to Christine Cooley (813) 744-6630  
or email [ccooley@ufl.edu](mailto:ccooley@ufl.edu)

