



# Berry/Vegetable Times January 2005



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## Calendar of Events

**Feb. 8 Pesticide License Testing, Hills. Co. Extension Office. (813) 744-5519.**

**Mar. 8 Pesticide License Testing, Hills. Co. Extension Office. (813) 744-5519.**

A monthly newsletter of the University of Florida IFAS, Gulf Coast Research and Education Center, and Florida Cooperative Extension Service.  
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## From Your Extension Agent...

In this month's issue of the Florida Market Bulletin there is an article on the spring 2004 Florida agricultural produce promotion campaign called "PowerGrid". This was the third year of a campaign to promote Florida produce across the country and into Canada. The campaign was expanded in the third year due to the success of the first two campaigns. According to the Florida Department of Agriculture and Consumer Services (DACS) this campaign has increased retail sales of Florida produce. USDA statistics report that Florida's agriculture production value increased 4.7% in 2002. At the same time the eight southern states of Alabama, Arkansas, Georgia, Louisiana, Mississippi, North and South Carolina, and Texas as a group had an 11.7% decline in their ag production sector. For more information check out the January 2005 Florida Market Bulletin.

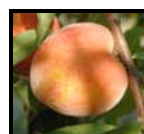
The Florida Market Bulletin is published monthly by DACS and is free to Florida residents who request it. DACS uses it to get information to consumers. Also there is a classified section where you can find or advertise for sale ag-related items that have been produced or used on the farm. There is no charge for putting an ad in the Market Bulletin. Contact information is: Florida AgLine 1-888-816-6854 or [www.florida-agriculture.com](http://www.florida-agriculture.com)

February 7<sup>th</sup> will be Food Checkout Day. It is estimated that

the average American will have earned enough disposable income in the first 37 days of the year to pay for their food supply for the whole year. It is estimated that only 10% of a person's disposable income goes toward food. We have one of the best food supplies in the world. Not only is it cheap but also one of the safest in the world and with a great diversity of products. US farmers should be very proud of the job they do!

*Alicia Whidden*

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**New UF/IFAS  
Peach  
Newsletter**  
 Alicia Whidden

In 2004 the University of Florida Horticulture Department started a new Florida Stone Fruit Extension Program. As part of the program a new on-line quarterly newsletter, the Florida Peach newsletter, has been created. It will focus on peaches but will also have the latest information on plums and nectarines for the state. The first edition of the newsletter came out in December and can be found at

<http://www.hos.ufl.edu/jffnweb/Stonefruitnl/index.htm>

## Market Outlook for Blueberries

Alicia Whidden

Blueberries have been touted as a great “health” food. With the number of health food books telling us to eat blueberries to have better health the demand for the product should only increase.

Blueberries are native to North America and are one of the few truly blue foods. North America produces 90% of the world’s production. The US and Canada are the largest producers and consumers but worldwide demand for blueberries is increasing. The harvest runs from about April 1st to early October. The nation’s 2004 highbush crop was approximately 269 million pounds and 154 million of those were consumed fresh.

Christine Morris in The Fruit Growers News, Sparta, Michigan quoted Mark Villata, executive director for the U. S, Highbush Blueberry Council as saying the demand for blueberries has convinced the West Coast to plant more. There is strong domestic demand for the fruit but the international demand continues to grow. According to Vallata, Japan is the largest off-shore market and South Korea looks to be next. Production of blueberries is also increasing in South America. Chile and Argentina are the largest exporters of blueberries to the US. According to Morris’ article, in 2003 the average consumption in the US of highbush blueberries both fresh and processed was about 17 ounces per person. This was a 9% increase from 1999.

### 2004 Highbush Crop Estimate (millions of pounds).

Region (U.S.)	2003 Fresh and Process	2004 Fresh and Process	Percent (%) Change
West	79.7	111	+39
Midwest	64	69	+8
Northeast	40.9	37.5	-8
South	46.3	51.4	+11
Total All Regions	230.9	268.9	+16

Source: North American Blueberry Council



## Information from the BMP Workshops held in Hillsborough and Manatee Counties in December

Vegetable and Agronomic Crop BMP Manual Workshop Notes

Phyllis Gilreath and Alicia Whidden

The Best Management Practices (BMP) Manual for Vegetable and Agronomic Crops was developed to address agricultural nonpoint pollution sources as originally mandated by the Federal Clean Water Act back in 1972. More recently, Total Maximum Daily Load (TMDL) guidelines have been a driving force behind ensuring that growers are following BMPs to reduce impacts to impaired water bodies.

Currently the draft BMP manual is 167 pages in length and after 3 years of development and review, is scheduled to be adopted by rule. The purpose of the recent workshops was to give growers an opportunity to provide input and feedback to FDACS, the lead agency in development of the manual. What’s in it for you?

Once adopted by rule, verified by FDEP and implemented, growers who voluntarily sign up and follow BMP guidelines will receive a “Presumption of Compliance” with regards to state water quality standards. Also, monetary assistance may be available through cost share programs such as FARMS.

BMP implementation will rely upon a three-pronged approach. There are 13 general or universal BMPs that are applicable to many farming operations (page 10 of the manual). By doing an inventory of current farm practices, growers will find that they are already following some of these baseline BMPs. You do not have to do them all, but growers will be expected to make a reasonable effort to implement as many as practical. Think of these as Tier 1 guidelines.

Following this inventory, growers should turn to the BMP Decision Tree Flowchart (pages 7 & 8) which will take you to Tier 2 guidelines. These are more specific BMPs applicable to different situations. For vegetable growers in Central Florida, the two that would be most applicable include the Plasticulture Farming and the Seasonal/Temporary Farming Operations. The Plasticulture Farming Performance Standard includes 2 pages of qualitative guidelines (beginning on page 133). The Seasonal/Temporary Farming Guidelines begin on page 137. Follow the flowchart until you reach the block(s) that best describe your farming operation. The implication here is that participating growers will implement both the general or Tier 1 BMPs and the Tier 2 BMPs applicable to their situation.

The next step is an on-farm assessment using

*(Continued on page 3)*

the checklist in appendix A-1. FDACS Ag-Teams may be able to assist growers with these on-farm assessments which are specific for vegetable growers. This is the tool that growers would use to mitigate the risks from practices such as “over-fertilization”. BMP 33 (Optimum Fertilization Management/Application) contains these guidelines. Obviously, as with most programs these days, documentation and recordkeeping will be important.

Growers are encouraged to take a look at the manual which is available online at <http://www.floridaagwaterpolicy.com/PDFs/BMPs/vegetable&agronomicCrops.pdf>, paying particular attention to the sections that would be applicable to them. **There is still time to comment.** Call your extension agent if you have comments or concerns and we will pass your comments along to FDACS. Once the manual has been adopted (anticipated date of adoption is currently March, 2005), then growers can sign-up electronically by completing a Notice of Intent form. We will pass along more information as it becomes available.

## Molybdenum in Strawberries

John Duval

Molybdenum (Mo) is an essential element for plant growth and is one of the elements regularly tested for by tissue analysis. Mo is very important for the proper physiologic use of nitrate in plants. Therefore, Mo deficiency often appears as a nitrogen deficiency. Deficiency usually occurs when soil temperatures are low (< 45 F) and plants are still growing. Recently several growers have noted very high levels of Mo in their plants, around 12-18 ppm. As there is no known level of toxicity for Mo, this does not pose a problem for our berries. When the level of Mo has been found at 1500 ppm in tomato, an intense yellow color in the leaves was found but no other symptoms. So, if you find you have high levels of Mo in your strawberry plants there is no cause for worry; your plants will be just fine.

*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.*

## Sugars, Vitamin C, and Anthocyanin levels in Strawberry Fruit Vary During the Season

Craig Chandler and Steve Talcott\*

Strawberry fruit may look the same from harvest to harvest, but the levels of important chemical compounds within the cells of these fruit can change dramatically over the course of the season. We harvested fruit from 9 cultivars and 13 breeding selections on January 23<sup>rd</sup>, 2003 and then again a month later on February 27<sup>th</sup>. The fruit was analyzed for soluble solids (which consists mostly of sugars) and chemical compounds known to be strong antioxidants. The study was repeated in 2004, with 5 cultivars and 4 selections.

In every case, both in 2003 and 2004, the fruit harvested in January had higher levels of soluble solids than the fruit harvested in February. For example, ‘Festival’ fruit harvested in January 2003 had an average TSS (total soluble solids) of 10.5 % compared to 5.2% for fruit harvested in February. A difference of this magnitude probably has a significant effect on flavor: the fruit with higher soluble solids being sweeter.

The pattern for vitamin C in 2003 was similar to that for soluble solids. Fruit harvested in January had higher levels of vitamin C than fruit harvested in February, for all but one selection. But in 2004, the vitamin C content of fruit harvested in January was higher than that of fruit harvested in February for only 5 of the 9 genotypes tested. The Vitamin C levels in February fruit of ‘Festival’ were 39% and 24% less than in January fruit in 2003 and 2004 respectively. Similar differences were obtained for ‘Treasure’, with February fruit having 37% and 38% less vitamin C than January fruit in 2003 and 2004 respectively.

The opposite pattern occurred with anthocyanins, compounds that give fruit their red color, and the most important class of antioxidants in strawberries. Anthocyanins were at higher levels in February fruit than January fruit, for all but one cultivar. The anthocyanin level of February fruit of ‘Festival’ was almost double that of January fruit in 2003, and over two-thirds higher than that of January fruit in 2004.

Vitamin C and anthocyanins are both antioxidants: the level of one appears to be decreasing as the other is increasing. One conclusion that could be drawn from our study is that later season fruit, in general, is not as sweet as earlier season fruit, but the total quantity of antioxidant compounds in fruit remains high over time.

\*Steve Talcott is an assistant professor in the Food Science and Human Nutrition Department, University of Florida, Gainesville.

## Actara® Aphid and Whitefly Insecticide Registered in Strawberries

Jim Price, Curtis Nagle and Silvia Rondon

Thiamethoxam formulated as Actara® recently has been registered by Syngenta Crop Protection, Inc. in field-grown strawberries for control of aphids and whiteflies. It cannot be used in the greenhouse or on plants grown for use as transplants. Actara® can be applied as a spray at 1.5 to 3 ounces (aphids) or 3 to 4 ounces (whiteflies) per acre up to 3 days before harvest. No more than 8 ounces can be used in each growing season and 7 days must elapse between applications. Actara® carries the signal word "Caution" and a 12 hour worker reentry interval.

Thiamethoxam is a systemic neonicotinoid as is imidacloprid Admire® registered last year by Bayer Crop Science. Actara® has the advantage that it can be applied as a spray during the cropping season.

Actara® is highly toxic to bees and precautions should be taken to protect them. Labelling information indicates that Actara® generally is safe to beneficials, but the degree of compatibility of this product with *Phytoseiulus persimilis* predatory mites in strawberries is not sufficiently understood yet.

Scientists at the Gulf Coast Research and Education Center have worked with thiamethoxam over many years of development and conclude that is an effective material to control whiteflies and aphids. The Florida strawberry industry is fortunate to have this material now available to them.

At the time Actara® was registered, another formulation of thiamethoxam also was registered as Platinum® for aphids and whiteflies in strawberries. Platinum® bears the prohibitive restriction that it must be applied to the soil bed and not within 50 days of harvest.

## Pesticide Regulations and Actions

?? On August 12, the Florida Department of Agriculture and Consumer Services issued the special local needs registration SLN FL-040006 to Syngenta Crop Protection for the use of pymetrozine (FulFill®) insecticide (EPA Reg. #100-912) on tomato to manage whitefly. Specifically, the number of applications has been increased from two to four. (*FDACS notice of 8/12/04*).

?? Based on a request by KIM-C1, time limited tolerances have been approved for the plant growth regulator forchlorfenuron. The tolerances for blueberry and will expire 5/31/06. (*Federal Register, 8/11/04*).

?? Based on a request by Bayer Crop Science and Janssen Pharmaceutica, Inc., tolerances have been approved for the pre- and post-harvest fungicide pyrimethanil. This is an anilinopyrimidine fungicide that is active against *Botrytis* spp., *Venturia* spp., *Alternaria solani*, *Alternaria mali*, *Sphaerotheca macularis*, and *Monilinia* spp. Tolerances of importance to Florida include citrus (post-harvest), strawberry, tomato, and tuberous/corm vegetables. (*Federal Register, 8/26/04*).

?? Bayer CropScience has proposed to the EPA to delete the usage on blueberry from their iprodione (Rovral®) product labels. (*Agricultural Chemical News, 8/15/04*).

?? Syngenta has added suppression of black rot in cole crops to their Actigard® (acibenzolar) label. (*Agricultural Chemical News, 8/15/04*).

## Pesticide Potpourri

?? A nematode that had until recently been referred to as race 3 of root knot has been classified as its own species, *Meloidogyne floridensis*. An international team of USDA and French scientists collaborated on the placement of this new species. It was originally isolated from root knot resistant peach rootstocks in Gainesville, FL. These rootstocks are the only known hosts as of now. (USDA ARS, 8/20/04).

## How Colorful is Your Diet?

*Consumer Reports on Health*

Eating your greens every day is not enough. According to the National Cancer Institute, people should eat at least one item from the five color group daily, the reds, white, blues/purples, yellows and greens. That advice stems from studies showing that different-colored produce contains different phytochemicals, including antioxidants and other disease-fighting substances. Below is a list of the possible benefits of the phytochemicals in fruits and vegetables of different colors. For additional information, go to [www.5aday.gov](http://www.5aday.gov).

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**Phytochemical: Lycopene and Anthocyanins**

**Red fruit or vegetable:** *Lycopene*—guava, pink grapefruit, tomatoes, and watermelon.

*Anthocyanins*—beets, cranberries, kidney beans, raspberries, red apples, red cabbage, red onions, strawberries, and cherries.

**Possible Benefits:** *Lycopene*—reduced prostate cancer risk. *Anthocyanins*—lowered blood pressure; protection against circulatory problems caused by diabetes.

**Phytochemical: Allicin**

**White fruit or vegetable:** Garlic, leeks, and white onions.

**Possible Benefits:** reduced risk of cancer spread and heart attack, lowered cholesterol and blood pressure; enhanced infection defenses.

**Phytochemical: Anthocyanins and Phenolics**

**Blue/Purple fruit or vegetable:** *Anthocyanins*—blackberries, black currants, blueberries, elderberries, purple grapes.

*Phenolics*—eggplant, plums, prunes, and raisins.

**Possible Benefits:** *Anthocyanins*—reduced risk of cancer, heart disease, and age-related memory loss.

*Phenolics*—slowing of some effects of aging.

**Phytochemical: Beta-carotene and Bioflavonoids**

**Yellow fruit or vegetable:** *Beta-carotene*—apricots, butternut squash, cantaloupe, carrots, mangos, peaches, pumpkin, and sweet potatoes. *Bioflavonoids*—apricots, clementines, grapefruit, lemons, nectarines, oranges, papaya, peaches, pears, pineapple, tangerines, yellow peppers, and yellow raisins.

**Possible Benefits:** Beta-carotene—reduced risk of cancer and heart disease; maintenance of good vision; increased infection fighting ability. Bioflavonoids—together with the Vitamin C in these fruits, reduced cancer and heart-attack risk; maintenance of healthy skin, bones, and teeth.

**Phytochemical: Lutein and Indoles**

**Green fruit or vegetables:** *Lutein*—broccoli, green peas, honeydew melon, kale, kiwifruit, leafy greens, romaine lettuce, spinach. *Indoles*—arugula, broccoli, brussel sprouts, cabbage, cauliflower, kale, rutabaga, Swiss chard, turnips, watercress.

**Possible Benefits:** *Lutein*—maintenance of good vision; reduced risk of macular degeneration and cataracts.

*Indoles*—reduced risk of breast and prostate cancer.

## The Tumid Mite: A Pest of Strawberries

Silvia Rondon and James Price

The tumid spider mite or tumid mite, *Tetranychus tumidus* Banks, is dark red to purplish and rather robust mite that can be found on the strawberry crop throughout Florida (Fig. 1). The injury inflicted to strawberry plants resembles the damage caused by the twospotted spider mite (*Tetranychus urticae* Koch) (Fig. 2). This injury appears as russetting of the lower surface of leaves and in severe cases, discoloration to the upper surface. The tumid mite and the twospotted spider mite co-exist in the strawberry crop, and particularly this year, the presence of the tumid mite has been unusually high on some local farms. In some instances, tumid mite densities have been higher than densities of the twospotted spider mite.

Control of this pest is somewhat easier to accomplish than is that of the twospotted spider mite. In general, miticides that control twospotted spider mite will control the tumid mite. Some broad-spectrum insecticides, such as methomyl, kill the tumid mite but do not control twospotted spider mite. Accordingly, applications of such broad-spectrum insecticides may render the tumid mite unnoticeable. Since the two species are competitors for the same plant resources, the twospotted spider mite may gain an advantage in the strawberry crop when insecticides remove the tumid mite. Currently, researchers at the University of Florida are conducting trials to investigate the predatory mites *Phytoseiulus persimilis* and *Neoseiulus californicus* for control of the tumid mite.

**Hosts.** The tumid mite is a polyphagous spider mite with over 70 host plants of various families such as Gramineae, Leguminosae, Compositae and Malvaceae. It is a serious pest of cotton, celery, beans, eggplant, beets, okra, peas, and sweet potato. It also lives on hyacinth, castor bean, dahlia, morning glory, palms, milkweed, mint, avocado, and other ornamental and tropical plants.

**Distribution.** The tumid mite has been reported in Georgia, Tennessee, South Carolina, Louisiana, Texas, Hawaii, Arizona, and California. Outside the continental U.S.A. it is known in Brazil, Mexico, Puerto Rico, Guam and Trinidad and Tobago [Saba. 1973. Life cycle and population dynamics of *Tetranychus tumidus* (Acarina: Tetranychidae) in Florida. Fla. Entomol. 57: 47-63].

**Development.** Female adults lay reddish or whitish eggs on lower leaf surfaces. As a result, eggs of both colors can be found on the same leaf, complicating distinctions between tumid eggs and the whitish twospotted spider mite eggs. As rule of thumb, the

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warmer it is, the more prolific the females become. Females can live for over 1 week at 75-84°F (24-29°C) and for over 2 weeks at 66°F (19°C).

**Monitoring.** Procedures similar to those used to detect twospotted spider mites should be followed to monitor the tumid mite. In each block of plants (i.e., a group of plant of the same variety from the same nursery and planted on the same day) examine weekly, with the aid of a 5x lens, the undersurface of 100 leaflets. More detail can be gained when needed by using a second 14X lens. No action threshold has been determined yet for this mite, but an informal miticide action threshold of about 5% if the leaflets possessing one or more tumid and/or twospotted spider mite is good. As usual, scouting should start as soon as transplant establishment irrigation ends.

Tumid mites can be damaging in Florida strawberries and attention must be given to them. Since control of this pest is normally reliable with available tools, losses to this pest mite should remain low.

For more information visit <http://strawberry.ifas.ufl.edu/entomology/spidermites.htm>



Fig. 1. Adult and egg stage of the tumid mite. The adult is a robust red mite (0.1 mm), with prominent hairs around the body which are visible with the aid of a 14X lens. Credit Univ. of Georgia.



Fig. 2. The twospotted spider mite (0.07 mm length). Recognized by the two characteristic spots in the upper surface. Arrow shows the feeding damage on the leaf. Credits. S.I.Rondon, IFAS, UF.

## The Flowers Are Coming: Be Ready

Jim Mertely and Natalia Peres

In west central Florida, strawberries usually start their main bloom in late January. During early to mid-February, flowering is heavy and the final crop is set. These are critical times for plant disease management. Strawberry flowers are easily infected by *Botrytis cinerea* (the cause of Botrytis fruit rot or gray mold) and *Colletotrichum acutatum* (the cause of anthracnose fruit rot). For this reason, timely applications of fungicides during the main bloom period are essential for a healthy crop.

During the early season, Captan and Thiram are used regularly for general disease control. These applications should be continue during the main bloom period, but additional fungicides may be needed. The choice of what fungicide(s) to apply depends on the cultivar grown and the diseases present. If Camarosa, Festival, Treasure, or Ventana are being grown, fungicides such as Abound, Cabrio, Pristine, or Switch may be needed to control anthracnose disease. If Carmine, Florida 39, or Sweet Charlie are being grown, Botrytis is the main target, and can be controlled by Captevate or Thiram. Pristine and Switch are also effective against Botrytis. Captan, one of the ingredients of Captevate, also suppresses anthracnose. Fields should be monitored closely this time of year so that the bloom period disease control program is started on time. Many fungicide labels advise starting at "10% bloom". At this stage, the average plant has one to two fully opened flowers. Plan ahead and start on time!

To avoid the development of fungicide resistance, products such as Abound, Cabrio, and Pristine should not be applied more than four or five times per season and no more than two sequential applications should be made. Always follow product label and do not go over the limit per season or the limit of consecutive applications.



**SPECIAL GCREC FACT SHEET****Angular Leaf Spot: A Bacterial Disease in Strawberries in Florida**

Natalia Peres, Silvia Rondon, James Price, and Daniel Cantliffe

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Angular Leaf Spot (ALS) is a bacterial disease caused by *Xanthomonas fragariae* Kennedy & King, a pathogen highly specific to wild and cultivated strawberry (Legard et al. 2003). ALS is an important disease on winter strawberry production worldwide. In the U.S., it ranks 6th in economic importance after gray mold (*Botrytis cinerea* L.), verticillium wilt (*Verticillium albo-atrum* Reinke & Berth), powdery mildew (*Sphaerotheca macularis* L.), anthracnose (*Colletotrichum* spp.), and pythium root rot (*Pythium* spp.) (Sorensen et al. 1997). The rapid spread of ALS is associated with the increasing rate of interchange of plant material.

ALS was first reported in Minnesota in 1960 and since then it has been found in almost all cultivated strawberry areas in the U.S. (Funt et al. 1997). In California, the largest U.S. producer of fresh strawberries, ALS is a minor disease that occurs especially during rainy weather or when overhead sprinkler irrigation is used (Strand 1993). ALS is the only strawberry disease in Florida caused by a bacterium (Howard et al. 1985). Little is known regarding the epidemiology of ALS (Funt et al. 1997; Mass 1998); however, development of the disease is favored by warm days (20°C/68°F) and cold nights (2-4°C/ 36-39°F) (Howard et al. 1985).

**Symptoms**

*X. fragariae*, the causal agent of ALS, is a slow-growing, Gram-negative bacterium that produces water-soaked lesions on the lower leaf surfaces (Fig. 1). Lesions begin as small and irregular spots on the undersurface of the leaflets. When moisture is high on the leaves, lesions ooze sticky droplets of bacteria (Howard et al. 1985). As the disease develops, these lesions enlarge and coalesce to form reddish-brown spots, which later become necrotic (Fig. 2). A practical way to recognize the disease is to place the leaves against a source of background light where the translucent spots can be seen (Fig. 3).

During severe epidemics, the pathogen also can cause lesions on the calyx of fruit that are identical to foliar lesions (Fig. 4) and, when severe, can make the fruit unmarketable (Legard et al. 2003). The tissue with older damage eventually dies and dries up giving leaves a ragged appearance (Strand 1993).

**Spread of the Disease.**

The primary source of inoculum in a new field is contaminated transplants (Mass 1998). Secondary inoculum comes from bacteria that exude from lesions under high moisture conditions. Bacteria can survive on dry infested leaves and tissue buried in the soil for up to 1 year (Roberts et al. 1997; Strand 1993). The pathogen can be spread easily by harvesting operations when wet and cool conditions favor the production of bacterial exudate. The pathogen also can be dispersed by rain and overhead sprinkler irrigation. If the pathogen invades the vascular system of the plant, the disease will be difficult to control and affected plants may wilt and die, although this is rarely seen in Florida

**Control Methods**

The best way to control ALS is to use pathogen-free transplants. Hydrogen peroxide and copper fungicides can provide effective control of the disease in some instances, but low rates of copper should be used since phytotoxicity has been documented with repeated sprays. Growers should avoid harvesting and moving equipment through infected fields when the plants are wet. Overuse of surfactants (wetter-stickers) should be avoided when the disease is present. Minimizing the use of overhead sprinklers during plant establishment and for freeze protection will also reduce the spread of the disease.

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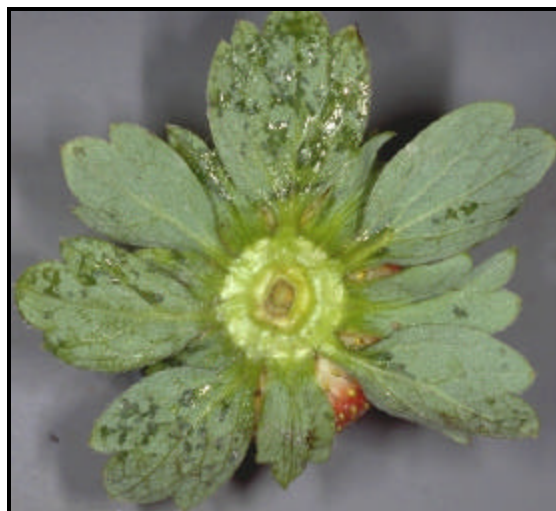
*Fig. 1. Water soaked lesions of Angular Leaf Spot.*



*Fig. 3. Translucent spots of Angular Leaf Spot.*



*Fig. 2. Reddish-brown spots of Angular Leaf Spot.*



*Fig. 4. Angular Leaf Spot lesions on the calyx.*