the Southern Region small fruit consortium

NC State University
Clemson University
The University of Arkansas
The University of Georgia
The University of Tennessee
VA Polytechnic Institute and State University

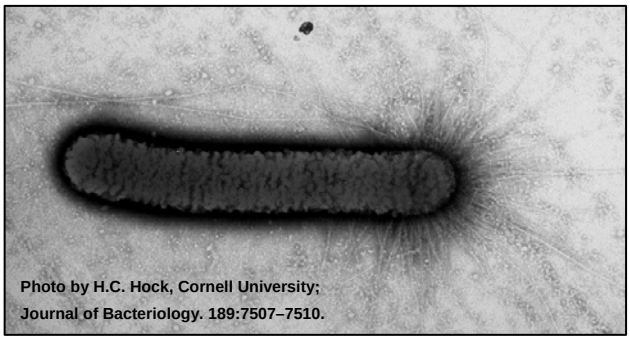
Small Fruit News

Volume 8, No. 1 January 2008

In this issue:

Special Reports:

Bacterial Leaf Scorch of Blueberry



Phillip M. Brannen, UGA Ext. Plant Pathologist
Gerard Krewer, UGA Ext. Horticulturist
Bob Boland, UGA Ext. County Agent
Dan Horton, UGA Ext. Entomologist
C. J. Chang, UGA Plant Pathologist

Relative to total sales, blueberries are the number one fruit commodity in the state of Georgia, surpassing even peaches. Recently, a new disease has been identified in the Georgia blueberry production region. This disease has been named bacterial leaf scorch, and it is caused by the bacterium *Xylella fastidiosa* (Figure 1). Koch's postulates was recently utilized to confirm this new disease; the suspected disease causing agent (bacterium) was isolated from a diseased plant, cultured, and reintroduced into a healthy plant in which subsequent disease symptoms developed that were similar to the original plant. For bacterial leaf scorch, Koch's postulates were conducted by Dr. C. J. Chang (University of Georgia) in the summer of 2006, and they were fulfilled in November 2006. Through initial field surveys conducted in the summer of 2007, it was determined that this disease has the potential to become a major threat to blueberry production in Georgia and elsewhere, especially in the southern highbush blueberry varieties. Among these varieties, 'FL86-19' (alias 'V1') has proven to be the most susceptible. However, 'Star' and other varieties are also showing substantial disease incidence and severity in several locations. At this early stage, little is known for sure about the epidemiology (means of dissemination and spread) of this disease, and the basic research to determine the means of spread and interaction within the south Georgia environment needs to be completed. In addition, research-based control methods also need to be established for this disease. Current recommendations are based on information derived from other plant systems, such as wine grapes, and information needs to be developed specifically for blueberries.

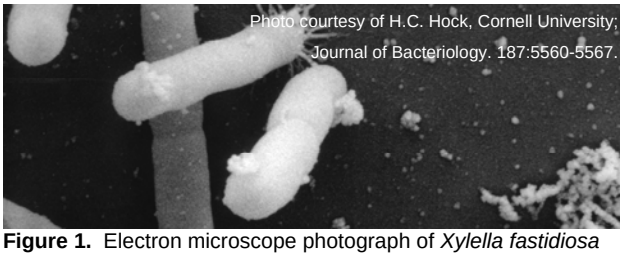


Figure 1. Electron microscope photograph of *Xylella fastidiosa* bacteria (Pierce's disease of grape isolate) attached to a membrane surface. The bacteria and associated bacterial and plant-associated products will clog the xylem elements, the conductive tissues which transport water and nutrients from the roots, causing scorch symptoms and eventual plant death.

Causal organism. The *Xylella fastidiosa* bacterium is pathogenic on numerous plant species. In addition, it is known to inhabit many host plants without causing disease symptoms; among these are various grasses and herbaceous weeds which are generally found throughout the blueberry production region of Georgia; native blueberries also likely harbor the bacterium. Therefore, there is generally a bacterial reservoir which is readily available for infection.

Little is known about the specific *Xylella fastidiosa* strain found in blueberry. This bacterium may be genetically identical to the subspecies causing Pierce's disease of grape or the one causing phony peach, major *Xyllella*-incited diseases which also occur in Georgia, or it may distinct from both. As in other *Xylella*-incited diseases, it is assumed that the

bacterium blocks xylem vessels, thereby preventing water and nutrient flow from the soil throughout the plant. This bacterium only survives in plant xylem or within the insects which vector it. In general, *Xylella* diseases are more prevalent in warmer environments; this is related in part to the fact that the insect vectors, primarily sharpshooters, survive better in warmer environments, but the bacterium also overwinters more successfully within host plants in warmer climates. Though it is speculation at this point, the increase in bacterial leaf scorch in Georgia may be at least partially related to warmer winters which may have aided survival of vectors and the bacterium. Without regard, South Georgia and Florida provide ideal environments for both the bacterium and the vectors to survive.

To date, the disease has been an obviously observed field problem of southern highbush blueberry varieties only. It is not known whether this disease is also causing problems in rabbiteye varieties. The bacterium can in fact colonize rabbiteye plants, but whether or not it results in chronic or acute disease has not been determined for rabbiteye varieties. However, there is no doubt at this point that the disease is causing chronic and acute losses in southern highbush varieties.

Disease cycle and causal conditions. The disease cycle of this bacterium in grape, peach, and plum is well known, and it is likely the same in blueberry. Infected hosts serve as reservoirs and overwintering sites of the bacterium. In the spring and early summer, insect vectors, sharpshooters and spittle bugs, transmit the bacterium through feeding on infected plant tissues and subsequent feeding on healthy plants. In other systems, the glassy-winged sharpshooter, *Homalodisca coagulata*, is the most important vector. The glassy-winged sharpshooter can be found abundantly in south Georgia and Florida, where it is known to be the major vector of *Xylella* in peach, while also preventing production of European wine grapes. Once the insect has acquired the bacterium, it is transmitted to a new plant as the insect injects the bacterium into the xylem (the conductive tissues which transmit water and nutrients from the roots to the other plant tissues) during feeding. This bacterial species is unique in that it is limited to life in the plant xylem. Movement of the bacterium occurs throughout the plant xylem system. At some point, bacteria form colonies, and through a combination of tyloses, gumming and bacterial exudate production, the xylem is clogged. In time, clogging of vessels reaches a point at which individual stems or whole plants will no longer be able to carry sufficient water and nutrients to support life. At this point symptoms develop, and eventually the plant will die. Plant death can be relatively rapid, but in general, symptom development starts in one year and continues through at least a second season before plant death.

Though it has not been proven, it is assumed that this bacterium can be transmitted through propagation from infected plants. If so, then this is particularly troubling, since massive numbers of plants can be disseminated rapidly to expand the epidemic. The combination of propagation and insect vectoring could cause rapid spread throughout the entire region. However, it is likely that infected plants would not be utilized for propagation very often, since they would show disease symptoms. In addition, propagated, infected plants may be killed rapidly in the nursery, therefore preventing additional spread. This raises many questions and much research is needed to address the specific question of propagative spread through cuttings.

Root grafting may also serve as a potential transmission mechanism. In high-density beds, this may be particularly important as a means of spread, but again, there has been no research conducted to date to support this premise.

Symptoms. The initial symptom is a marginal leaf scorch (burn), which unfortunately is similar to that observed with extreme drought, fertilizer salt burn, or root rots (Figure 2). Sometimes, the scorched leaf area is bordered by a darker band between the healthy and scorched tissue. This leaf symptom can be uniformly distributed throughout the plant, but in the early stages, scorching may be limited to individual stems or perhaps one side of the plant – indicating that only a partial xylem blockage has occurred which may be limited to one cane or one stem. Spring growth is characterized by twigs of very thin diameter. Eventually, leaves abscise (drop), and young twigs/stems may take on a yellow appearance (Figures 3-4). After leaf drop, the plant eventually dies (Figure 5). Often, where a plant has died from bacterial leaf scorch, a neighboring plant will show symptoms the following year.

The most unique symptom of bacterial leaf scorch is actually observed once leaves have dropped – the yellowed stems and twigs. The plant can drop virtually all leaves and yet remain otherwise healthy in appearance; the stems and root systems appear sound, and vascular discoloration is not generally observed. Once the leaves have dropped from the plant, the plant takes on a skeleton-like appearance. Dieback is also not generally associated with this

disease in the early stages; of course, the final result is plant death, and at that point it is not possible to diagnose the cause of death.

Figure 2. Scorch symptoms (late summer) observed on plants which are infected with *Xylella fastidiosa*. In some cases, the marginal leaf burn is very distinct, and it is surrounded by a dark line of demarcation between green and dead tissue. In other cases, the symptoms are very similar to those of anthracnose leaf spot; in fact, disease causing and saprophytic organisms do opportunistically infect the marginal dead tissue, further confusing accurate identification.

Figure 3. Scorch symptoms (late summer) observed on plants which are infected with *Xylella fastidiosa*. The symptom observed here is the best indicator that the plants are actually dying of bacterial scorch, as opposed to root rot, anthracnose, fertilizer salt or chemical injury, or simple drought stress, any of which can mimic bacterial leaf scorch. Prior to complete plant death, all leaves abscise (fall off), and the remaining stems take on a yellow, "skeletal" appearance. The root system and stems do not show any obvious lesions or dieback symptoms, and the plant will generally appear healthy, with the exception of complete defoliation.

Figure 4. Panoramic view of an individual plant with bacterial scorch symptoms. Some surrounding plants are also starting to show early symptoms as well.

Figure 5. Plants which have died from bacterial leaf scorch. At this stage, it would be very difficult to determine that bacterial leaf scorch was the cause of death, especially once plants have been hedged. Symptoms are virtually identical to those of root rot, but in this case, there is no excessive moisture or low areas which would be often associated with root rot. Also, the pattern of spread is different from root rot, in that scattered dead plants are observed; root rot mortality is often clumped, especially around low, wet areas.

The bacterium cannot be easily observed with a light microscope, so confirmation is only possible through ELISA or PCR techniques in a lab. In addition, observation of bacterial growth on specialized media is also recommended for confirmation of this disease.

Cultural controls. (1). It is essential that new plants not be propagated from *Xylella* infected plants. At this point, there is no testing program for propagation. However, propagators should never take cuttings from plants which they have not personally inspected for visual disease symptoms. Diseased plants should never be utilized for propagation, whether they have symptoms of *Xylella* or viruses or other diseases of blueberry.

(2). Identification of *Xylella*-infected plants is possible in the field, and once such plants are identified, they should be flagged and immediately destroyed. By doing this, it is hoped that the epidemic will be slowed.

(3). There may also be a tie-in between plant stress and successful infection by *Xylella*; therefore, reduction of plant stresses, such as drought stress, may at least slow symptom development, if not preventing it altogether.

(4). We have observed potential varietal field resistance in some southern highbush blueberries, but this has not been confirmed scientifically. The 'FL86-19' variety is particularly susceptible to infection and disease development by *Xylella*. When compared with other southern highbush or rabbiteye varieties, the 'FL86-19' variety quickly develops symptoms and high bacterial titers after manual inoculations, which correlates well with observed susceptibility in the field. On the other hand, 'V5' has been observed to have presumed field resistance to this bacterium (Figure 6). Though this presumed

resistance needs to be confirmed through further research, this is encouraging, since it likely indicates that breeding can be utilized to develop varieties which are highly resistant to *Xylella*.

Figure 6. Potential resistance. In this planting, a single row of 'V5' plants was alternately planted after 10 rows of 'FL86-19' plants (repeated numerous times). The surrounding 'FL86-19' plants were all infected, with significant mortality, and they have been removed at this point; the 'V5' plants consistently show no symptoms of disease or mortality after five years at this site. From this anecdotal information, it is not possible to determine conclusively that this is resistance, but it is encouraging, and it very likely indicates field resistance in the 'V5' line.

Chemical controls. At this point, there are no chemical controls which actively kill the bacterium. However, it may be possible to slow or even break the disease cycle by vector management, killing the insects which transmit the bacterium. There are in fact several insecticides which are active against leafhoppers, and several of these are registered for use on blueberries.

(1). Application of soil-applied neonicotinoid products (imidacloprid or thiamethoxam) should take place as plants begin their initial spring flush. With any of the neonicotinoid materials, their systemic qualities will be best observed when there is good moisture and active growth. In parallel fashion, neonicotinoid longevity is much better with soil application than with foliar application. Product longevity and performance, extrapolating from ornamentals, are influenced by rate, hence applying the highest labeled rate is best. For blueberries, the neonicotinoids labeled for soil application include imidacloprid products (Admire 2F, Admire Pro, Advise 2FL, Alias 2F, Courage 2F, Imida E-AG 2F, Nuprid 2F) and a thiamethoxam product (Platinum 2EC).

(2). During the late spring period, which may correlate with the period of actual vectoring by sharpshooters, foliar-applied pyrethroids and organophosphates should be utilized to augment or complement the neonicotinoid drench, especially if glassy-winged sharpshooters are observed in sticky traps.

As mentioned throughout this fact sheet, additional research will be needed to address the basic questions we have relative to this new menace to the blueberry industry. However, it is likely that this disease will mimic similar diseases in other plant systems. As such, we can extrapolate the need for a management program, to include cultural and chemical control and breeding programs. Southern highbush blueberry producers should actively incorporate suggested management practices for this disease, as they have others. Otherwise, the epidemic will likely increase throughout the region, resulting in major losses.

Contact your local county agent for additional information or specific chemical recommendations.

References.

C.J. Chang, P.M. Brannen, G. Krewer, B. Boland, and R. Donaldson. 2007. Bacterial leaf scorch of blueberry: a new disease caused by *Xylella fastidiosa* (Abstr.). Phytopathology 97(7):S20.

M.M. Meyer, B.C. Kirkpatrick. 2007. Effects of cold temperatures and variety on cold curing of *Xylella fastidiosa* infected grapevines (Abstr.). Phytopathology 97(7):S76.

L. Varela, R.J. Smith, and P.A. Phillips. 2001. Pierce's Disease. University of California Agricultural and Natural Resources Pub. 21600.

J.M. Wells. 1995. Phony Peach. Pages 53-54 in: Compendium of Stone Fruit Diseases. J.M. Ogawa, E.I. Zehr, G.W. Bird, D.F. Ritchie, K. Uriu, and J.K. Uyemoto, eds. APS Press, St. Paul, MN.

NC State Hires New Entomologist for Small Fruits

Tom Monaco, Coordinator
Southern Region Small Fruit Consortium

Hannah J. Burrack has recently joined the Department of Entomology at North Carolina State University and will have responsibilities for extension and research in small fruits, specialty crops, and tobacco. Burrack comes to North Carolina from the University of California, Davis, where she conducted research on the olive fruit fly, an invasive pest of olives in California and the most important pest of olives worldwide. A native of Wisconsin, Burrack completed her undergraduate work in entomology and rural sociology at the University of Wisconsin, Madison and her graduate work at UC Davis with Dr. Frank Zalom. Burrack's small fruit research will focus on key pests in strawberries, blueberries, grapes, and brambles. Initial projects include mite management in strawberries and thrips identification, phenology determination, and management in blackberries. "I am particularly interested in enhancing spider mite management through biological control and the use of diverse chemical options," says Burrack. Burrack will also be involved in projects on grapes and blueberries during 2008, including ongoing research on Pierces's disease and its vectors in North Carolina.

In addition to her small fruit research, Burrack will be conducting work on several important insect pests of tobacco. A multi-state project to study the tobacco splitworm will begin in 2008 and will address questions of pest phenology, behavior, and host range. Further research plans include potential work on medicinal herbs, new crops, and organic pest management.

University of Arkansas Joins the Southern Region Small Fruit Consortium

Tom Monaco, Coordinator
Southern Region Small Fruit Consortium

The University of Arkansas has joined the Southern Region Small Fruit Consortium effective December 2007. Arkansas is the sixth university to join the consortium since its inception in 1999. NC State University, Clemson University, and the University of Georgia are the original members of the consortium. The University of Tennessee joined in 2002 and Virginia Tech joined in 2005. The history, governance and activities of the consortium are summarized in the power point presentation posted at http://www.smallfruits.org/SRSFCactivities/SRSFCpresentations.htm.

The consortium was created to pool small fruit expertise in the southeast to better serve the small fruit industry. Activities include training for county extension service agents throughout the member states. Since its inception 15 in service trainings have been conducted involving over 346 county agents. The trainings have covered all facets of small fruit production and have utilized faculty and industry expertise throughout the region. A complete listing of the trainings is listed in the power point presentation referenced previously and the most recent trainings are posted at http://www.smallfruits.org/CoAgentTraining/index.htm .

Another function of the SRSFC is to promote and fund research and extension projects with small fruits. Approximately $500,000 in grants has been awarded since 2001. A complete listing of projects funded along with progress and final reports can be found at http://www.smallfruits.org/SRSFCReserchFunding/index.htm. With the addition of the University of Arkansas to the consortium $80,000 and $20,000 have been allocated to fund research and extension projects for 2008. Thirty four proposals have been submitted for 2008 and awards will be made in January of 2008.

The SRSFC maintains a web site (www.smallfruits.org) to disseminate information on small fruit production in the southeast. The web master for the site is located at the University of Georgia. Recent important postings on the web site are the IPM/Production Guides(http://www.smallfruits.org/SmallFruitsRegGuide/index.htm) for the production of strawberries, blueberries, brambles, winegrapes and muscadine grapes in the southeast. These guidelines are updated annually and are comprehensive. The Small Fruit Newsletter (http://www.smallfruits.org/Newsletter/SmallFruitNews.htm) which is published quarterly features timely information and management tips as well as feature articles.

The SRSFC also sponsors regional and state grower meetings on small fruits as well conferences. A listing of these sponsorships are contained in the previously reference power point presentation.

We invite other southern universities to consider joining the consortium. Contact Tom Monaco(tom_monaco@ncsu.edu) for additional information relevant to joining the consortium.

"Opportunities" Facing Small Fruit Producers in 2008

R. Allen Straw
Virginia Tech

As I sit to write this article the end of the year is fast approaching. Of course for children and those of us that are still children at heart, Christmas never comes fast enough. Time just seems to drag. However, most of us that are adults feel like this time of year flies by. We want to spend time with family and friends and take a few days off and rest. I usually end up having to go back to work after the first of the year to "rest" up after the Holidays. Unfortunately this situation reminds me of same issues that face many of our strawberry producers.

The 2007 growing season had its share of "opportunities" (that is the polite way of saying problems). From the "Easter Freeze" that blanketed most of the Southeast to drought that hampered land preparation and planting in the fall, it seemed like every turn of the calendar presented more "opportunities". I have visited with many fruit and vegetable growers that were literally exhausted this fall. The year had seemed so long and many of the "opportunities" faced had taken more time and effort than usual that they were just worn out. I had many of them say, "I just wish this year was over!"

Of course the problem with wishing one year is over is that the next year is upon us. And each year has its own set of "opportunities". What opportunities might small fruit producers face in 2008? Well . . . let us look at a few for which we might begin to prepare.

The first "opportunity" that comes to mind for all of us is labor. In light of pending legislation in many of our states, this is becoming a frightening word for many producers. Again, as this article is being written I just heard of the legislation passed by Oklahoma and of course many eyes are on Arizona to see what will happen to agriculture and the service industry in that state. The thought of a minimum $10,000 fine or even jail time for using illegal workers is frightening. To add to the concern of this "opportunity" is the rumor circulating in the rumor mill of another class action lawsuit to recover the "fee" that many workers have to pay to come to this country. Many users of H2A workers are still paying substantially for previous lawsuits. Speculation is that this newest "opportunity" may cost from $5,000 to $10,000 per worker. So how do we approach this "opportunity"? First, do everything in you power to make sure your workers are legal. Most importantly, contact you legislators to inform them of your situation and let them know of your concerns.

Another "opportunity" facing small fruit producers is the phase out of methyl bromide. Reductions in allocation continue to push the price of fumigants containing methyl bromide upward. Therefore, lower rates of fumigant in combination with VIF films (virtually impermeable films) is becoming a common practice. Due to the rising cost and limited availability of methyl bromide, some producers are looking at alternatives such as Telone products. Another alternative, Midas (methyl iodide), received a time limited tolerance for use in the 2008 season. Again, how should growers approach this opportunity? I believe most growers should continue to wisely use existing supplies of methyl bromide, while evaluating the adoption of alternatives. The use of Telone might be options for some producers, while Midas might have the best fit for others. Producers need to learn all they can about the alternatives and determine which might fit the best into their production situation.

Another serious "opportunity" facing small fruit producers in 2008 is the increasing cost of inputs, especially fuel and fertilizer. More and more attention will need to be paid to the efficiency of operations. At no other time has soil sampling been more critical.

Obviously growers do not want to reduce inputs that will reduce their production. However, wise use of fertilizer inputs should help increase profitability.

Wildlife damage is an ever increasing "opportunity" in small fruit production. For years many producers have battled deer. Then along came turkeys to many production areas. In 2007, we even had migratory birds like Cedar Wax Wings eating strawberry in at least two states. The dry weather of 2007 has many creatures looking for anything green to eat. One of the best deterrents to wildlife damage is keeping them from getting in a habit of feeding in your fields. Producers will need to be preemptive in controlling wildlife in the years to come. This will likely include the preventive use of fencing and repellents.

And last but not least, who knows what "opportunity" Mother Nature may present us with in 2008. No matter what does come our way, producers will need to continue to use water wisely. In many areas water will continue to be an issue for quite some time. Again, many producers experienced a costly lesson with the Easter Freeze of 2007. As agricultural experts and producers we need to learn from our mistakes and apply that knowledge to the "opportunities" we may face in 2008 and coming years.

To the growers that read this article, I wish you a restful New Year and a profitable 2008 season. To the research faculty that might take time to read this, remember the producers for whom you work. Find ways to make your research efforts applicable to the needs of those people. For the Extension personnel that might read this article, encourage your producers. Give them a kind word now and then and be ready to help them find sound answers when the "opportunities" of 2008 present themselves.

R. Allen Straw
Area Specialist
SW VA AREC
12326 VPI Farm Road
Glade Spring, VA 24340
Phone: 276.944.2202
Cell Phone: 931.261.0973
VA Cell Phone: 276.393.2187
Fax: 276.944.2206
E-mail: astraw@vt.edu

Bramble Chores
Winter 2008

Gina Fernandez, Small Fruit Specialist
North Carolina State University

WINTER

Plant growth and development

- √ Plant is "dormant"
- √ Some differentiation is occurring in the flower buds

Pruning and trellising

- √ Pruning should occur in late winter. However, in some areas winter ice storms can do tremendous damage to plants and trellis systems. If you produce blackberries in one of these areas, pruning can take place early winter to help avoid severe damage.
- √ **Make trellis repairs after plants have defoliated but before pruning and training.**

Erect types

- √ prune out the spent floricanes
- √ Tie canes to wires in a fan shape
- √ cut lateral branches back to 8-12"
- √ thin canes to 6-8 canes/ hill (4 ft spacing)

Trailing types

- √ prune out spent floricanes
- √ tie or weave canes to wire so that they do not overlap
- √ prune side laterals to 12-18"
- √ thin canes to 6-8 hill (6-8ft spacing)

Primocane fruiting raspberries

- √ Prune (mow) primocane fruiting types to ground level

Weed control

- √ Many summer weed problems can be best managed in the fall and winter using preemergent herbicides. Determine what weeds have been or could be a problem in your area. Check with local extension agent for cultural or chemical means to control these weeds.
- √ Establishing new plants into rows of black plastic or landscape cloth can reduce weed problems significantly

Insect and disease scouting

Listed are insects and diseases that are present during this season. Control of these pests may occur at this time or in another season. Check the Southern Regional Bramble integrated Management Guide for recommendations

http://www.smallfruits.org/SmallFruitsRegGuide/Guides/2006/BrambleSprayGuide61506.pdf

- √ Scout fields for insect and disease damage and remove those canes
- √ Remove wild brambles within 600 ft of your planting during the winter
- √ Apply liquid lime sulphur or Bordeaux for disease control

Planting

- √ Growers in warmer regions can plant in December.
- √ Take soil tests to determine fertility needs for spring plantings.
- √ Prepare list of cultivars for next years new plantings. Find the commercial small fruit nursery list at http://www.smallfruit.org

Nutrient management

- √ Place nitrogenous fertilizers in row before new canes emerge in spring
  - o Raspberries: Apply 500-800 lbs of 10-10-10 per acre in split applications. Apply half in Feb-March and the remainder in April-May. Spread uniformly across the row or side dress with half on each side of row in a 3 ft wide band.
  - o Blackberries: In established plantings apply 60 to 80 lb/acre N. Nitrogen can be applied in split or single applications. If using a split application, apply the first portion at bud break and the remainder just after harvest. Ammonium nitrate is the most common form of N used on blackberries.

Water management

- √ Make repairs to irrigation system (check pumps, lines, etc)
- √ Plants generally do not need supplemental water in winter

Marketing and miscellaneous

- √ Order containers for next season
- √ Make contacts for selling fruit next season
- √ Attend grower meetings:
- √ Plan on attending the North American Bramble Growers Association meeting. (www.nabga.com) For more information contact:

Debby Wechsler
NABGA
1138 Rock Rest Rd.
Pittsboro, NC 27312
NABGA@mindspring.com
Phone: 919-542-3687
Fax: 919-542-4037

Quarterly Strawberry Plasticulture Checklist

Gina Fernandez, Small Fruit Specialist
North Carolina State University

This checklist was originally developed for growers in North Carolina. You will have to adjust your work activities either earlier or later depending on your location. For more detailed information, check the Southern Region Integrated Strawberry Management Guide http://www.smallfruits.org/SmallFruitsRegGuide/Guides/2007/Strawberry%20Integrated%20Management%20GuidefinalcopyJennings%202%208%2007%20_3_.pdf and the Southeast Regional Strawberry Plasticulture Production Guide http://www.smallfruits.org/SmallFruitsRegGuide/Guides/2005culturalguidepart1bs1.pdf

Winter (Dec-Feb)

- Check all equipment (replace hoses etc)
- Get drip and overhead irrigation system hooked up, check your sprayer, replace hoses etc.
- Keep deer out of the strawberry patch. They can do serious damage to
- plants and plastic
- Examine plants for spider mite damage, they can be mistaken for winter damage
- Get ready for leaf tissue analysis in late February
- Spray ryegrass in late February/March
- Order chemicals and fertilizer for spring
- Scout crops for insects, mite and leaf diseases
- Scout for weeds, vetch in holes is not killed by winter temperatures
- Spray row middles with grass herbicide such as Poast when ryegrass is 10-12 inches tall
- Purchase digital thermometer
- Calibrate thermometers in 32F water bath
- Purchase row covers
- Monitor weather forecasts closely
- Check frost alarm to see that it is working properly
- Get pumps, hoses and pipe ready for frost protection (First date is usually early March in NC)
- Order picking containers

- Prepare signs for stands, roadside directions, and on-farm use
- For companion crops, order seeds and locate/prepare greenhouse facility for growing transplants
- If selling fruit at wholesale markets, line up buyers now.

Small Fruit News

Volume 8, No. 1 January 2008

Editor and Contributor..... Tom Monaco

Published is four times a year. Small Fruit News is available on the Southern Region Small Fruit Consortium (SRSFC) web site www.smallfruits.org. To subscribe to an electronic notification service of new Small Fruit News issues on the web, send your e-mail address to brendaw@uga.edu.