the Southern Region small fruit consortium

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Small Fruit News

Volume 7, No. 2 April 2007

In this issue

Special Reports

Letting the cork out of the bottle: the rapidly expanding wine grape industry in Georgia

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The Georgia wine grape industry is quite a bit smaller in size than the industries of our northern neighbors, North Carolina and Virginia. Nonetheless, it has grown rapidly within the last 10 years, and it produces many world-class wines. There are really three areas of wine growth in the state: vinifera/hybrids, muscadine, and nontraditional fruit, such as blueberry and blackberry, and wineries which support all three areas. The potential for additional growth is very strong throughout the state, due largely to proximity to major population and tourism centers, such as Atlanta or Savannah. For the purposes of this article, I will concentrate on the growth and issues of the North Georgia vinifera industry, but I will also make a few comments on the growth in muscadine and nontraditional wines.

Our vinifera wine grape industry is currently limited to areas where colder temperatures limit Pierce's disease (PD) epidemics: the foothills of the Appalachians. Pierce's disease (Figure 1) is caused by *Xylella fastidiosa*, a bacterium which is spread by spittlebugs and leafhoppers, of which the glassy-winged sharpshooter is primary to disease spread in Georgia. Based on recent surveys of vinifera grape vineyards throughout the state, our recommendations have been that no one should consider planting vinifera grapes at elevations which are < 1300 feet, and this recommendation has served us well. In the past, several vineyards have been decimated at lower elevations. Despite previous history, warmer winters over the last few years may have resulted in a shift of the PD "safe" zone, and we are now observing diseased plants at higher elevations than in the past. This disease shift is of some concern to our industry, and this is likely to be a chronic problem which is related to changing winter temperatures. Nonetheless, the vineyards which are nestled in the foothills are among the most beautiful vineyards in the nation at this time (Figure 2), and aggressive management will hopefully maintain these vineyards for many years to come.

Figure 1. *Pierces disease of grape, caused by Xylella fastidiosa, is the limiting factor for vinifera grape production in the Southeast. Symptoms include marginal leaf chlorosis and shoot dieback, fruit "raisin" formation, and "islands of green," caused by differential maturation of stem tissue. Plants usually die in 1-2 years after infection.*

As reported in the 2005 Georgia Farm Gate Value Report, there are >1700 acres of grapes in Georgia, of which the vast majority are muscadine (mostly located in the southern part of the state). Total value of grape production is estimated at > $7 million, but this in no way reflects the value-added production of either vinifera or muscadine wines. Though the regional benefit of wineries to local economies (agrotourism) has never been fully developed for Georgia, the value of the industry is clearly substantial and growing. Relative to vinifera specifically, a recent survey of vineyards in north Georgia indicated that there were > 20 different

vinifera/hybrid grape varieties grown on > 300 acres with a market value of ~ $1 million. There are now more than 10 wineries which are producing vinifera and hybrid wines, and of these, only two existed 10 years ago.

North Georgia soils generally consist of some combination of clay, sand, and loam, but the content varies widely even within vineyards. Most soils in the foothills areas are well drained, and they usually are somewhat rocky, which helps with drainage and adds other horticultural benefits to the production of vinifera. In general, the production areas would resemble those of both the North Carolina and Virginia foothills regions. The vast majority of vineyards are found at locations with >1700 foot elevations and range upwards to ~2100 feet. There is an obvious tradeoff in site selection between PD and cold damage, but to date, the higher elevations have had minimal cold damage and crown gall.

Though Georgia producers are developing vinifera vineyards and wineries which can often challenge the best in the nation, to include California, we have management challenges that are not observed uniformly in the other grape regions. These management challenges in Georgia's vinifera grapes have largely been the same as elsewhere in the Southeast, but there are likely some distinctions due to our even warmer environments and longer growing seasons. The environment is a contributing factor to the quality of the wines, but our warm, moist environs contribute mightily to our disease pressures.

Due to the near perfect environment for disease development, downy mildew has been our most challenging disease to date, with the possible exception of PD. With the recent revelation of downy mildew resistance to the strobilurin (QoI) fungicides in North Carolina (Turner Sutton, North Carolina State University; *personal communication*), it is likely that this will be a problem for Georgia in 2007 as well. County agents will be conducting resistance surveys this summer to determine the extent of the problem, but this is likely a regional issue at this point. Without regard, we will have to be careful in our use of strobilurins, and the old, broad-spectrum chemistries (mancozeb and captan) and phosphonates (Aliette, ProPhyt, etc.) will take on new importance to our spray programs.

Powdery mildew has been more sporadic as a disease in Georgia, and with good management, we generally do not observe it as a major problem in Georgia. If we observe resistance shifts in the activity of the demethylation inhibitor (DMI) fungicides such as myclobutanil (as observed in some other southeastern states), then it could become a more common disease.

Phomopsis has been problematic in the past, but we now recommend the use of late-dormant lime sulfur and earlier budbreak applications of EBDC fungicides, such as mancozeb; with these modifications of our spray program, we observe much better control of Phomopsis. Other diseases, such as Botrytis, black rot, bitter rot and ripe rot, have only rarely been an issue in the last few years, which indicates that our fungicide programs are pretty effective for management of these common diseases. Sour rot has also been observed, but mainly in overripe grapes with excessive insect or bird damage.

In the insect realm, grape root borer continues to be an issue with limited control options, and we have yearly outbreaks of spider mites and Japanese beetles. However, we have generally not had major insect issues other than those associated with these pests. Likewise, our herbicide programs have been very effective if utilized aggressively.

Returning to the PD issue, we have to reexamine our options for management. Insecticides, especially soil-applied insecticides, will be part of the management scheme, but we really need to find better methods of management. Don Hopkins (University of Florida), has been experimenting with the use of bacterial "cross protection," and we are now testing this in Georgia vineyards. Cross protection has traditionally referred to use of a mild or attenuated virus (non-infectious) plant inoculation which protects against the virulent form, and it was reported in 1929. In the case of PD, *Xylella* species which do not cause PD are injected in young vinifera grape seedlings, and the seedlings are then rendered more resistant to PD. We are also testing this on older plants as well (Figure 4). Even if this technology continues to show promise in the field, it is unlikely that this method will allow for a major expansion of the vinifera range, though this is a possible outcome. When warmer winters occur, this technology is more likely to be of value in reducing the epidemics which occur where vinifera are currently grown on the PD "edge." In addition to this research, C.J. Chang (University of Georgia) is working with application of soil-applied terpenes, which have also shown some promise for reducing disease spread and symptom development of PD. Though PD continues to be a vinifera menace, southern scientists are thinking through novel means of combating this old enemy.

Figure 2. *Nestled among the north Georgia foothills of the Appalachians, vinifera vineyards provide some of the most beautiful vistas in the state at any time of year. Tourism is augmented by the presence of both cultivated and natural beauty. (photo provided by Frogtown Cellars)*

Figure 3. *Blackstock Vineyards and Winery (top photo) and Frogtown Cellars (bottom photo) have recently joined the list of vineyards which have added full-scale wineries. (photos provided by Blackstock Vineyards and Winery and Frogtown Cellars).*

Figure 4. *Bacterial "cross protection" of vinifera wine grapes to Pierce's disease (PD). Bacterial cross protection, developed by the University of Florida (Don Hopkins), is being field tested in Georgia vinifera vineyards. In the case of PD, Xylella species which do not cause PD are injected in young vinifera grape seedlings, and the seedlings are then rendered more resistant to PD. We are also testing this on older plants as well (above).*

As mentioned, I will touch on the expansion of wineries into the southern part of Georgia as well. Though many of the north Georgia wineries have produced muscadine wines for many years, the movement of wineries into south Georgia is a very new development. We now have several muscadine wineries in the region, and more are slated to come online. Also, a very limited number of non-traditional wineries have now opened; these are producing wines from fruits such as blueberry and blackberry, readily found in south Georgia, and they are even producing excellent sparkling wines and ports from such fruit. There are PD-resistant grapes which mimic some of the characteristics of vinifera, and these are also being planted. Grapes such as Blanc du Bois, Black Spanish, Suwanee, and Norton have made their way into production in the PD region. Though these are not vinifera grapes, the impact on agrotourism and economic development to south and middle Georgia regions may potentially be as important as that of vineyards and wineries in the northern part of the state.

To conclude, Georgia has a dynamic and rapidly growing wine grape industry, from north to south. We are on the edge of the production range for vinifera grapes, but these are being grown very successfully in north Georgia, as they have been for ~20 years or more. More growth is expected in this region. Pierce's disease continues to be an issue for Georgia, but with good site selection and new management technologies, we are hopeful that it will

become less and less of an issue. In addition, we still have a largely untapped market in south Georgia for non-vinifera grapes and other wines. Needless to say, we are excited about the potential, and the cork is out of the Georgia bottle!

The South Carolina Strawberry Industry

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Strawberry production in South Carolina has a fairly long history. Many communities had a matted-row producer as far back as the late fifties. Some commercial production of this type in the Pee Dee region went to the markets in southeastern North Carolina during the sixties. In the mid-eighties, South Carolina benefited from the emphasis that North Carolina State University began to put on the annual hill culture production system. Many South Carolina growers and extension agents attended NCSU demonstrations and educational sessions about this new way to produce strawberries. The industry in South Carolina began to grow as extension agents and suppliers began to spread the new technology. Much of this expansion was consumer driven, because the demand for the high quality berries produced by this system was so great.

The industry expansion began primarily in the upstate (Piedmont and Foothills regions) in the late eighties and by the mid nineties all of the state had a number of growers using the annual hill culture system to produce strawberries. The industry now consists of a diverse group of about 75 farms producing berries. The last two agricultural censuses have reported the acreage to be between 300 and 400 acres, but the actual acreage is a little more than 500 acres accordingly to extension surveys. The estimated farm gate sales from this acreage are between 4.5 and 5.0 million dollars. Although there are a handful of farms in South Carolina with more than 20 acres of berries that market through a variety of both wholesale and retail channels, the vast majority of South Carolina's strawberries are marketed directly to the consumer at numerous 'strawberry sheds' on farms with less than 10 acres of production.

A number of farms have begun to take advantage of 'value added' strawberry products such as strawberry ice cream and jam made by contract processors using berries from their farms. In this way, more use is made of the total yield by using berries that would not make the grade cosmetically for direct sale as fresh berries. Some growers use their 'day old' pre-picked berries for processed products, and at least one farm delivers (donates) their unsold pre-picked berries to a food bank in the evening. Actual 'pick-your-own' sales have declined in the last decade, but the demand for pre-picked farm-stand berries has risen greatly. Significant amounts of berries are still picked by the consumers as one can see by visiting many strawberry farms on a Saturday in late April or early May. Many producers have school tours or special events to draw families to their operations.

The 'Chandler' variety was the mainstay of the industry in South Carolina and is still widely planted particularly in the upstate where the winters are longer and colder. 'Camarosa' has supplanted some of the 'Chandler' acreage in the milder winter areas of the Sandhills and coastal plain. Growers and consumers in these areas like the large berry size and greater yield of this variety. A number of growers have specialized in a particularly early crop using the 'Sweet Charlie' variety. Other varieties such as 'Festival' and 'Treasure' are beginning to be seen on some farms. Our mild climate has allowed several growers to successfully force production of fall strawberries. The average price of strawberries on farm is between $1.25 and $1.50 per pound, although most fruit is sold in 'gallons' which average between 6 and 7 pounds. Pre-picked fruit in 'gallons' is sold for as much as $10.00 near urban areas. The price for fruit in flats normally is around $14.00, although this price fluctuates relative to the national supply of strawberries.

In the lower coastal regions near Charleston and Beaufort, the strawberry season can start as early as late February some years, but it normally starts up in mid-March. The season normally starts in the coastal plain in late March and continues through late May. The upstate season starts about two weeks later and will normally continue into June. Hotspots for production are our areas of greater population such as the Myrtle Beach/Conway, Charleston/Beaufort, Augusta/N. Augusta, Columbia, Rock Hill/Charlotte, Greenville/Spartanburg, and Anderson/Clemson.

MANAGING "ANTHRACNOSE" FRUIT ROT OF STRAWBERRY WITH AN EFFECTIVE PLANT CERTIFICATION PROGRAM

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Strawberry is a high-income per-acre crop that justifies the use of several disease management strategies. These start with the use of healthy transplants, sanitation, resistant cultivars, and chemicals. Because prevention is the key to any disease control strategy, the program of maintaining Nuclear Stock to produce Foundation, Registered, and Certified strawberry planting stock is vital to the strawberry industry worldwide. The United States does not have a Federal certification program for producing healthy plants; however, North Carolina is a good example of a successful state strawberry certification program. The plant certification program has been a vital part of the North Carolina strawberry industry for over 50 years. The program was initiated in the Department of Plant Pathology at North Carolina State University (NCSU) in Raleigh, NC to eliminate virus diseases in the different strawberry cultivars. In order to obtain plants free of virus and other harmful pathogens, an agreement was made with the USDA Small Fruit Laboratory in Beltsville, MD to provide virus-indexed plants for the North Carolina certification program. During the period of 1975 to 1990 the "strawberry anthracnose complex" caused by several species of *Colletotrichum* (*C. acutatum, C. fragariae, & C. gloeosporioides*) became wide spread in both nurseries and commercial fruiting fields throughout the southeastern United States. However, certified plantings located at the Sandhills Research Station, Jackson Springs, NC remained free of these pathogens. Because the program could not supply certified nurseries with sufficient numbers of Registered stock, some of the larger nurseries obtained plants from sources outside of the N.C. certification program. Often these stocks carried latent infections of *Colletotrichum acutatum* and Colletotrichum fruit rot became established in the North Carolina certification program. Due to a lack of funding in the early 1990's, the certification program at NCSU was unfortunately discontinued.

With the establishment of the "Micropropagation Unit" (MPU) in the Department of Plant Pathology at NCSU in 1996, berry growers were provided with an effective and efficient approach to meeting the growing demand by the strawberry industry in North Carolina for obtaining healthy, true-to-type, stocks of commercially important cultivars. In late spring of 2005, some certified nurseries had a low percentage (< 0.04%) of plants infected with *C. gloeosporioides* that originated from one Registered nursery. The nursery had been inspected by N.C. Crop Improvement Association (NCCIA) several times in 2004 but the disease was never detected in any of the cultivars being grown. This species of Colletotrichum has a host range of some 250 wild and cultivated plants, including sicklepod. Spread of C. *gloeosporioides* is primarily from infected wild plants adjacent strawberry nurseries. Sicklepod plants were later found on an adjacent farm and identified as the probable source of primary infection to nearby plants in the Registered nursery. Although C. *gloeosporioides* has been isolated from infected fruit, it is not a major fruit rotting pathogen of strawberry. A study was conducted in 1988-89 where isolations were made from 184 strawberry fruit and crowns (*cv* Chandler) with fruit rot symptoms. Results showed that 100% of the fruit isolations yielded *C. acutatum* and 0% *C. gloeosporioides*. Isolations from crowns yielded 10% *C. acutatum* and 27% *C. gloeosporioides*. There have been several instances where plantings of susceptible cultivars known to be infected with *C. gloeosporioides*, were dug and planted for berry production the following year without showing any fruit rot symptoms. Results from these field tests and observations indicate that even though *C. gloeosporioides* could result in some plant loss for certified nurseries, losses due to fruit rot the following year would be minimal or non-existent for berry growers. *Colletotrichum acutatum* on the other hand, is a major fruit-rotting pathogen of strawberry and is commonly referred to as "anthracnose fruit rot." It has a narrow host range and very rarely kills the plant. The major source of inoculum comes from other strawberry infected plants carrying latent infections of the fungus. Symptoms observed on strawberry planting stock are primarily runner and petiole lesions. The long range goals for the MPU are to develop and maintain Nuclear Stocks of superior, pathogen-indexed mericlones of strawberry, sweetpotato, and brambles for the North Carolina Certified Seed Program. Operation manuals for strawberry and sweetpotato have been developed that provides guidelines and necessary information for producing and maintaining micropropagated, virus-indexed plants. The MPU also serves as a repository for *in-vitro* plantlets of selected cultivars and breeding lines of vegetatively propagated crops.

Nuclear stock plants are produced by meristem tip-culture and Foundation plants (first generation from nuclear plants) are virus-indexed (plants shown to be

free of virus by grafting onto indicator plants) and maintained in insect-proof screen cages in the greenhouse. Foundation plants are increased on methyl bromide treated soil in an area known to be free of soil-borne pathogens and *Colletotrichum* spp.

Figure 1. *Solid tarp fumigation with methyl bromide for planting Certified stock. Foundation and Registered plantings are also treated the same to avoid weeds, nematodes and other pathogens.*

Production of planting stocks from the MPU within the N.C. certification program requires strict management standards to deliver high quality plants that are true-to-type and free from designated diseases and pests. Ideally, nurseries in the program are not involved in commercial berry production. Only MPU approved plants are grown in the certified greenhouses and fields. Foundation plants grown at the Sandhills Research Station are dug and sold in March to Registered nurseries for further increase and sale to Certified nurseries.

Figure 2. *Foundation planting stock at the Sandhills Research Station, Jackson Springs, NC. Plants are taken from the greenhouse to establish the Foundation nursery in screen cages and open field. Plants are dug and sold in March and April to Registered nurseries for further increase.*

In 2006, approximately two million Registered plants were produced by three nurseries and distributed to ten Certified nurseries which in turn increased their plantings under strict guidelines. About forty million healthy certified plants are expected to be sold to berry growers throughout the southeast in 2007. All planting material sold under the certification program is inspected by an independent agency (NCCIA) and appropriate tags issued.

There are many programs that provide plants to berry growers throughout the world. However, not all programs maintain the rigid standards followed by the N.C. certification program, or the European and Mediterranean Plant Protection Organization (EPPO) established in 1994. There are effective certification programs in other countries. In Scotland, the certification program is operated by the Department of Agriculture and Fisheries for Scotland (DAFS). Within the last few decades, certain technological procedures have come into existence that can alter traditional certification protocols. These include large increases of planting stocks in-vitro, and in greenhouses, use of PCR for detection of pathogens, and biotechnology to identify genomes and for transferring genes from many species.

The increased interdependence of strawberry producing regions in the U.S. and throughout the world, has shown the need for unified certification procedures and rigid standards. This must address quality and uniformity of planting stock which must be free from specified pathogens and other pests. It is important that healthy sources of planting stock that have been certified true-to-type and indexed for viruses and the major pathogens of strawberry be available to commercial berry growers. Some of the benefits derived from plants produced by an effective certification program include: reduced risk of diseases and pests, true-to-type plants, cultivar stability, and high quality plants. The use of certified planting stock in North Carolina most effective in controlling “anthracnose fruit rot” (*C. acutatum*), and other devastating diseases caused by *Phytophthora cactorum* and *P. fragaria*. This is achieved at little or no cost to berry growers.

In summary, the production of strawberry plants for use by commercial strawberry growers must first be derived from micropropagation and then indexed for viruses and other major pathogens prior to increase. Certification standards for laboratory, greenhouse, and field increase must be administered by an independent agency that oversees the inspection of

plants during the growing season. Plants from outside sources that could be carrying latent infections of *C. acutatum* and other pests are not permitted at any stage of production (Nuclear, Foundation, Registered, or Certified) in the program. Soil fumigation procedures and chemical sprays follow recommended practices.

Figure 3. *Registered nursery being sprayed for leaf spot control, principally phomopsis leafspot, with a high pressure sprayer on a 14-day schedule.*

Tests for trueness to type are vital to the integrity of the program and probably are the most important. Strawberry plants derived by micropropagation of apical meristems from *in-vivo* plants and increased *in-vitro* may not have all the characteristics of the plant from which they originated. In addition, daughter plants derived from a single *in-vitro* plant may have variants for berry shape and other important characteristics. It is CRITICAL that each cultivar be evaluated for homogeneity of plants, trueness-to-type, and presence of diseases and mutations. The North Carolina strawberry certification program (Fig.1) has shown over the past ten years that the major pathogens of strawberry (*Colletotrichum. acutatum, Phytophthora. fragaria, P. cactorum*, viruses, and nematodes) can be managed by following the proper protocols and rigid standards by certified nurseries.

Project Focuses on Management of Pierce's Disease in North Carolina

Turner Sutton, Plant Pathology Department
NC State University

Pierce's disease is a lethal disease of grapes caused by the xylem-limited bacterium, *Xylella fastidiosa*. The bacterium is transmitted from reservoir hosts which surround the vineyard by a type of leafhopper known as sharpshooters, and spittle bugs. Once infected, vines can die within 1 to 2 years. Pierce's disease is the most important factor that limits the expansion of the vinifera grape industry in the warmer growing regions of the Southeast.

Pierce's disease is characterized by a marginal scorch or burn of affected leaves (Fig 1). Following initial infection the bacterium moves through the xylem vessels, down the shoot and into the cordon where it can migrate throughout the vine. Often one cordon will show symptoms first (Fig 2) but eventually the entire vine will become affected (Fig 3) and die either during the current growing season or over the winter.

Figure 1. *Typical symptoms of Pierce's disease on vinifera grapes showing scorched leaf margin.*

Figure 2. *Progression of symptoms of Pierce's disease along one cordon.*

Figure 3. *Advanced stages of Pierce's disease. This vine will probably die during the winter.*

Recent studies in North Carolina have shown that *Oncometopia orbona* and *Graphocephala versuta* are two of the primary vectors of the bacterium. *O. orbona* is present early in the growing season while populations of *G. versuta* peak from mid-June through mid-July. These sharpshooters are present in all vineyards in the state. It is unclear where these insects acquire the bacterium although *X. fastidiosa* has been identified in a number of potential non-crop reservoir hosts in NC.

In 2006 the NC Tobacco Trust Fund Commission funded a project in NC with an overall objective of developing a management program for Pierce's disease in NC. The project co-directors were Turner B. Sutton of the Plant Pathology Department and George G. Kennedy of the Entomology Department at NC State University. The specific objectives were (1) to develop a management program for suppressing the vector population based on timely insecticide applications, (2) identify the principle reservoir hosts, and (3) determine if summer pruning of infected shoots could limit the spread of *X. fastidiosa* in the vines. The GoldenLeaf Foundation has agreed to fund a continuation of the project in 2007.

The insecticide program focused on use of rotations of neonicotinoid insecticides (Venom, Assail) with an organotin insecticide (Danitol) from bud break until mid-June. The most effective program was one that began with a soil application of Venom, which was then followed by rotations of Danitol and Assail. Studies planned for 2007 will focus on refining the program to provide protection to the vines through mid-July.

At least 150 reservoir hosts have been identified and many of these occur in NC. Preliminary surveys were conducted in the fall of 2006 and some of the species that tested positive were post oak, white oak, blackjack oak, blackberry, prickly lettuce, goose grass, giant cane, corn spurry, wisteria and river birch. Studies in 2007 will focus on identifying annual broadleaf weeds and grasses that are potential hosts of *X. fastidiosa* as well as preferred food sources of the vectors.

In the pruning study, vines were scouted for the presence of symptoms of Pierce's disease every 2 weeks beginning in early July and any shoots with symptomatic leaves were cut off at the cordon. Results indicated that spread of the bacterium was limited in less than 10 percent of the vines in which this protocol was followed.. However, it is likely that many vines used in the study were already systemically infected and pruning out symptomatic shoots as they appeared was of minimal value. In the late summer of 2006 vines in each of the study vineyards were tested for the presence of *X. fastidiosa* using an Elisa test and maps of each of the vineyards were made so that the only vines that tested negative for *X. fastidiosa* in the fall of 2006 will be used in the pruning study in 2007.

Bramble Chores
Spring 2007

Gina Fernandez
NC State University, Raleigh, NC

Plant growth and development

- Plants deacclimate quickly
- Bud differentiation (additional flowers formed)
- Bud break
- Flowering
- Primocane emergence

Pruning and trellising

- Finish pruning and make sure all floricanes are tied to the trellis before budbreak.
- Rotate shift trellises to horizontal position before budbreak; rotate to upright position immediately after flowering.

Weeds

- Weed growth can be very vigorous at the same time as the bramble crop peaks. Don't let weeds get out of control.
- Weed control is best done earlier in the season before harvest commences.
- Hand-weed perennial weeds in and around plots.

Insect and disease scouting

- The period of time in the spring when the plant is flowering is the most important season for control of insects and diseases. Know what your pests are and how to control them.

Water management

- Bramble plants need about 1"-2" water/week. This amount will be especially critical during harvest.
- In the South onsider installing an overhead system for evaporative cooling. Turn on once or twice a day from 10 am to 3 pm for short periods of time (approx. 15 minutes) until mid afternoon.

Nutrient management

- Apply second half of nutrients if doing split application.

Marketing and miscellaneous

- Service and clean coolers.
- Make sure you have enough containers for fruit in the coming season.
- Prepare advertising and signage for your stand.
- Contact buyers to finalize orders.
- Hire pickers.
- Prepare signage for field orientation; it is easier to tell pickers where to go if rows are numbered.

Quarterly Strawberry Plasticulture Checklist

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.

Gina Fernandez

<u>Spring (March-May)</u>

- Send in leaf samples to testing lab every 14 days starting in late February/March
- Adjust fertility according to the recommendations
- Scout fields for mites, insects and diseases. Botrytis, anthracnose, powdery mildew, aphids, thrips, mites and clippers will be your primary pest problems at this time
- Remove old leaves and open plastic where any branch crowns might be growing underneath plastic
- Get pest problems under control with dormant, pre-bloom, pre-harvest and harvest sprays, customers don't like to see sprayers in the field when they are harvesting
- Make sure your irrigation systems for frost protection and drip are ready
- Monitor weather forecasts closely, frost protect as needed, start on a date that is typical for your area, any earlier may result deformed fruit and unnecessary loss of sleep
- Check your frost alarm to make sure that it is working properly
- Control weeds or ryegrass in aisles with herbicide if not done so already
- Apply straw mulch in aisles, if rye grass did not take
- Place 2 hives of honeybees/acre near your field
- Schedule picking and sales labor
- Order portable toilets and emphasize proper sanitation for farm labor and the public
- Get sales stand ready, tidy up, paint, make new signs, get new baskets…
- Check and organize supply inventory
- Clean out and fire-up refrigeration units
- Have scales checked by proper authorities in your state
- Harvest each plant 2x week (start early to mid April)

- Figure out a system to collect customer names etc for your mailing list
- Keep harvest records even when you are busy

IN THE VINEYARD SPRING CHECKLIST

Sara Spayd, Extension Viticulturist
NC State University

1. Make sure all the brush is removed from winter pruning.
2. Pest issues
   a. Download your copy of the 2007 NC Winegrape Spray Guide (http://ipm.ncsu.edu/agchem/7-6.pdf)
   b. Start weed control program
   c. Scout for cutworms and flea beetles
   d. Remove portions of vines or vines affected by Pierce's Disease
   e. Check for signs of over-wintering diseases
3. Make sure all vineyard equipment is in good working order
   a. Irrigation system
      i. Flush lines
      ii. Clean out sand filter for drip system
      iii. Check pumps
   b. Sprayer
      i. Clean nozzles and replace any that are damaged
      ii. Make sure motor is service and ready to go when needed
   c. Wind-machine and overhead irrigation systems for frost control
      i. Ensure frost control systems are in working order
      ii. Ensure that fuel/energy supply to machine is ready
      iii. Know where thermometers are and calibrate them
      iv. Consider a subscription to a weather forecast service – some options are listed in Ch. 11 http://www.cals.ncsu.edu/hort_sci/fruit/winegrapes.html
4. Trellis maintenance (last chance)
   a. Tighten trellis wires
   b. Check end posts and anchors for repairs
   c. Replace broken line posts
   d. Lower movable foliage wires
5. When planting,
   a. Make sure all soil amendments done
   b. Have a water supply available
   c. Don't let your baby plants dry out while planting
6. Vine maintenance
   a. Secure cordons/canes to wire
   b. Remove any ties that are girdling the vine
   c. Monitor your vineyard for bud swell and bud break
   d. Have your petiole sample kit from NCDA ready for bloom-time
   e. Soil sample
7. Cover crop
   a. Nutrition?
   b. First mowing?

Small Fruit News
Volume 7, No. 2 April, 2007

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