

# Small Fruit News

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**the Southern Region**  
small fruits consortium

Volume 2, No. 2

April 2002



Clemson University  
NC State University  
University of Georgia

In this Issue:

<b>Research Reports</b>	<i>Blueberry production in GA</i>
<b>Insect/Disease control</b>	<i>Strawberry insects/mites</i>
	<i>Life without Benlate</i>
<b>Bramble Chores</b>	<i>Spring schedule</i>
<b>Focus</b>	<i>SFN-favorites &amp; meetings</i>

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## Research Reports

### **Pondering Southern Highbush Blueberry Production in Georgia? Food for Thought!**

D. Scott NeSmith  
University of Georgia

The rising popularity of blueberries among consumers has many growers considering expanding production in Georgia. Also, new grower interest is being stimulated. Historically, Georgia blueberry production has been almost exclusively rabbiteye varieties, but in recent years, southern highbush blueberries have become increasingly popular. Typically, southern highbush varieties ripen early in the season, bringing potentially higher prices. However, these prices are offset by greater production costs and increased grower time as compared to rabbiteye blueberry production. The following are a few thoughts to consider for those interested in exploring southern highbush production in Georgia.

My number one piece of advice to those considering growing highbush is management, management, management! This is not to imply that rabbiteye blueberry production does not require management; however, southern highbush typi-

cally require more attention by growers. For starters, southern highbush are more difficult to establish in a wide range of soil. These blueberries are much more vigorous in soils high in organic matter, and such soils are not widespread in Georgia. If a grower can locate an area of soil on his or her farm that is considered spodic soil, then this would be desirable for highbush blueberries. Contact your local County Agent or Soil Conservation Service Office, and they can give you guidance concerning soil types located on your farm from soil maps. Typically, newly cut pine timber land is high in organic matter. However, row crop land and areas that have been cleared for a number of years are very low in organic matter content.



**Figure 1.** Pine bark to be used as mulch for southern highbush blueberries.

Especially be wary of using old row-crop land for blueberry production because soil pH is usually too high from previous liming. Both rabbiteye and southern highbush blueberries thrive best on acid soils, with soil pH values between 4.7 and 5.0 being ideal. When pH values exceed 5.2, blueberry growth and establishment is sluggish. You should always have a soil test run on sites you are considering for blueberry production. It is very difficult to correct soil pH problems after you plant!

So, what if you do not have high organic matter soil, is southern highbush blueberry production possible? The answer is yes, if you amend the soil with an organic material. The most suitable organic material for soil amendment and mulching for southern highbush blueberries is pine bark (Figure 1). This can be obtained from various sawmills across Georgia, but be aware that pine bark sources are becoming more limited, and the cost of the by-product is increasing.



**Figure 2.** Pine bark mulch applied to new blueberry planting.

You can spread and incorporate the bark, apply a veneer or layer of bark as mulch, or some combination of both. Typically, a band of bark 3-4 ft. wide by 4-6 in. deep is a nice beginning mulch layer (Figure 2).

You will need to add bark to the plants over time (perhaps every 3 to 5 years) to maintain good production. One caution when obtaining pine bark is know your source. There have been in-

stances where pine bark came from lumber yards with limestone mixed in. Like soil, this limestone can cause the pH of the bark to be too high for suitable blueberry production.

Another problem associated with southern highbush production is freeze damage during bloom. Southern highbush varieties generally are grown for their early production, and this early production is associated with earlier bloom dates, thus, subjecting plants to higher probabilities of freeze damage. Because of the early bloom dates, it is highly recommended that growers only produce southern highbush blueberries in areas that they can frost protect (likely with overhead irrigation). Using overhead irrigation for frost protection requires considerable knowledge of water delivery rates, weather, plant growth stages, and other issues (Figure 3).



**Figure 3.** Overhead irrigation being used for frost protection of southern highbush blueberries.

This is another area where a high level of management is required, and growers are urged to educate yourselves concerning overhead frost protection before you ever begin production. There are a few southern highbush varieties that can be produced without frost protection due to their late bloom dates, however, the currently popular varieties typically bloom early. One of the goals of the University of Georgia's Blueberry Breeding Program is to develop later blooming southern highbush blueberries that still have the desirable early ripening dates.

While the above two issues, soil organic matter and freeze risk, are major factors to consider in production of southern highbush blueberries, they are not the only issues. Highbush blueberries seem to be more attractive to deer, and therefore, deer feeding damage is more common. In some areas, most of the blueberry crop can be lost to deer feeding on shoots, blooms, and fruit. Another major pest can be birds. The early ripening fruit of southern highbush often coincides with certain migratory birds that love them. Also, because these fruit are some of the first to ripen, they attract many native birds as well, particularly in small production areas surrounded by woods. So, deer and bird protection measures may have to be considered for successful production of southern highbush blueberries.



**Figure 4.** High density beds for production of southern highbush blueberries.

One way to combat several of the problems of growing southern highbush blueberries is to produce the crop in a smaller, high density environment (Figure 4). This requires using pine bark to make production beds, coupled with overhead irrigation for water supply and frost protection. Plants are placed very close together (perhaps a 3 ft x 5 ft spacing as opposed to the 5 ft x 12 ft spacing typically used for rabbiteye blueberry production). These areas can also be protected from deer and birds by fencing, netting, or other means. High density blueberry production has been used for years in Florida with success. However, the concept is relatively new to Georgia growers. Like all new produc-

tion systems, “bugs” have to be worked out, and modifications have to be made to suit individual growers. It is recommended that one start with a small high density production system to determine if this means of production suits your management style. Also, the cost of high density production can be \$10,000 to \$15,000 per acre, which is another reason to start small. You need to choose your cultivars wisely in order to have the highest value crop possible when producing in this environment. Research is under way at the University of Georgia Blueberry Research Farm to screen varieties and selections of southern highbush blueberries for production in high density systems.

These are only some of the major issues associated with highbush blueberry production in Georgia. You also will need to pay attention to irrigation (don’t keep too wet or too dry), fertility, and pruning. Southern highbush blueberries will become increasingly important to Georgia’s blueberry industry; however, they may not (likely will not) be for everybody. These are just a few thoughts for your consideration. Good luck!

## Disease and Insect Control

### Strawberry Insect and Mite Update

Kenneth A. Sorensen  
North Carolina State University

*Mites and fire ants on strawberries.* Observations and reports indicate the presence of aphids, mites and fire ants associated with strawberries this spring. Aphids are the potato aphids and they usually will be controlled by natural enemies and pose little threat. Fire ants pose a serious threat to growers and pickers. Fire ant mounds should have been treated in the fall or winter. With harvest at hand now is the last window of opportunity. Knock down can occur with drenches of diazinon or lorsban. However, ants often recover due to low water volume and their behavior to have “Bin Laden” tunnels eve-



rywhere. Hence the queen survives and the mound may relocate. Baits work slow (up to 30 days) but give better control. Clinch is a bait that contains avermectin. This is the same active ingredient as Agri Mek and the formulation contains less active ingredient. Place some Clinch bait around the edges of mounds. Do not disturb mounds. Follow label directions for best results and treat individual mounds around strawberry beds. Do not contaminate plants or fruit.

For spider mites here is our current suggestions. With established mite populations use a knock down miticide like Brigade. Check for mite stages 3-5 days later. If populations remain high, repeat with Brigade. Where populations are low (only eggs and a few small mites are present) use Savey. Savey is an ovicide (egg killer) with some activity against small mites. It works slow. Since the temperatures are in the 70's and 80's with night time temperatures above 50 degree F, mite populations can explode in 5 -7 days. So monitor populations closely and use a miticide as needed. Again we have Brigade, Danitol, Agri Mek, Kelthane and Savey. Review information on these miticides and establish your mite IPM and resistance management program. Use a high pressure sprayer with hollow cone nozzles directed to the undersides of leaves. Tank mixes are not suggested and do alternate chemical classes of miticides for best results. With flowers and fruit present and with warm temperatures, NOW is the time to control mites!

### **A Bad Year for Spider Mites on Strawberries**

Tony Melton  
Clemson University

Spider mites are a major pest of strawberries. In most seasons, beneficial insects and a few well-timed insecticidal soap sprays will keep them under control. However, this season spider mites are rampant. In some situations, the source of the problem maybe the excessive use of non-selective insecticides. These chemicals kill both destructive and beneficial insects. Without bene-

ficial insects spider mite populations will soar. However, this season the technique of using no or beneficial friendly insecticides to conserve beneficials just wasn't enough to keep spider mites under control. In other situations, the source of the problem may have been that the transplants had spider mites. The early infection in combination with the warm fall temperatures increased the early population. Also, the fairly warm winter and low amount of rainfall allowed an increasing winter population.

Another problem source can be alternate spider mite hosts. Spider mite problems are worse where ornamental trees and shrubs are grown near strawberries. The ornamentals serve as a perennial host for re-infection. One grower in the Pee Dee uses red cedars as a screen and windbreak. Spider mites love red cedars. The poor application of insecticidal soaps and chemical controls maybe another problem source. A high-pressure sprayer with drop nozzles is needed to get the spray onto the underside of all leaves.

Over-head irrigation used for frost control may help in control. However, as temperatures rise and rainfall decrease spider mite population will only increase. For more information on control strategies see also the previous article 'Strawberry insect and mite update' from Kenneth A. Sorensen.

### **Life without Benlate**

(reprinted with permission of the North American Bramble Grower Association)

Guido Schnabel and R. Walker Miller  
Clemson University

Benomyl (Benlate) is frequently used for disease control in caneberries, blueberries, grapes and strawberries. Distribution or sale of existing stocks by DuPont was not lawful after August 8, 2001. Sale or distribution by any person of existing stocks will not be lawful after December 31, 2002. The Environmental Protection Agency (EPA) believes that the end use of any remaining existing stocks of Benomyl products will likely end in 2003. At this time EPA is determining

how long treated food containing residues of benomyl could remain in the channels of trade assuming that the last treatment occurred on December 31, 2003, and will set the expiration date accordingly.

*The impact on blackberry production.* The loss of Benlate could result in significant disease control problems for blackberry producers in the Southeast. It is the only product registered to control double blossom, one of the most serious fungal diseases in blackberries. Many major blackberry varieties like Shawnee, Choctaw, Triple Crown, Kiowa and Black Satin are susceptible. Disease tolerant varieties like Apache and Arapaho show increased susceptibility to freeze injury. The susceptibility of Chickasaw is unknown but some double blossom strikes have been observed.

Double blossom is caused by the fungus *Cercospora rubi*. The most striking symptom is the formation of numerous leafy sprouts (witches broom; rosettes) that develop from infected buds. To control double blossom, the South Carolina spray recommendations call for Benlate sprays in 7 to 10 day intervals starting when rosettes are blooming and ending just prior to harvest.

Benlate is not recommended during harvest because of its 3 day preharvest interval (PHI) restriction. Additional Benlate sprays have been recommended after harvest to control the disease. Applications of Bordeaux mixture and other coppers have been recommended during harvest as an alternative to avoid the PHI problem with Benlate. Unreported tests by Bob Head, a retired extension agent in Oconee County SC, and W. Miller indicated that although copper compounds are effective, they are cumulatively toxic. That is the greater the number of applications the greater the toxicity. Recently Dr. Barbara Smith, USDA-ARS, Poplarville, MS, reported the efficacy of several fungicides on double blossom control. Benomyl and Bordeaux mixture were most effective, but Bordeaux mixture was sometimes phytotoxic. She reported that Nova (myclobutanil) exhibited some efficacy against double blossom, but Rovral did not. Fungicides were most effective when applications began at bloom and continued until

fungal sporulation ceased about a month after harvest.

In summary, we still recommend a Benlate-based spray strategy for 2002 and even 2003 (if you have Benlate in stock). In 2004 at the latest, we need to have an effective fungicide to substitute Benlate. Fortunately, several reduced risk products are on the EPA fast track to be registered for disease control in brambles. Some of these products have broad spectrum activity thus may help to control double blossom. Here is a list of the products currently under investigation:

-New products expected to be available in 2002: Elevate (TomenAgro) is currently being developed for registration in brambles through the IR-4 program. It already is fully registered for Botrytis control in strawberries and grapes. The active ingredient is Fenhexamid, a compound very different from Benlate or Rovral. Elevate will be a very good rotation partner for Rovral to control Botrytis. Syngenta is planning on getting Abound registered for the 2002 season for brambles as well. Abound is expected to have activity against Anthracnose, rusts, and mildew and hopefully double blossom.

-New products expected to be available in 2003: Two products, Switch (Syngenta) and BAS 516F (BASF), with modes of action different from that of Benlate, are expected to be registered in 2003 in blackberries and raspberries. BAS 516F may also have activity against Anthracnose, rusts, and mildew and hopefully double blossom. Switch recently got full registration for Botrytis control in strawberries and is expected to do well for the same disease in brambles. First efficacy tests conducted by Barbara Smith, USDA Poplarville MS, are currently underway and data are expected in 2002.

-New products expected to be available in 2005: Currently, IR-4 and Ceraxagri ARE developing data to get a registration for Topsin-M, a product expected to be as efficacious against double blossom as Benlate. Topsin-M is a material that metabolizes into MBC, the active ingredient of Benlate, thus it should have similar activity against caneberry diseases.

Topsin-M may be the most effective fungicide against double blossom of all the new compounds simply because the active ingredient is identical with that of Benlate. However, we can expect Topsin-M to be registered for brambles in 2005, at the earliest, thus the other new products need to be tested right away for activity against double blossom.

*The impact on raspberry production.* Benlate is critical for the control of spur blight in varieties like Heritage and for cane blight in raspberries (pest is not on the label, but as long as label constraints are not exceeded it may be used). Applications are recommended in 2-wk intervals starting when canes are 6-8 inches continuing through the season. Again, during harvest Captan is substituted for Benlate because of the 3 day PHI. It is unknown if Rovral is effective for spur blight. Some grower tank-mix the two products for resistance management. In addition to controlling spur and cane blight, Benlate is an important rotation partner for Rovral and Ronilan to control Botrytis especially during bloom. The sole reliance on Rovral and Ronilan to control Botrytis could quickly result in the development of fungicide resistance because cross-resistance is likely to occur between the two compounds.

With Elevate, expected to be registered in 2002, the Botrytis problem should be under control. We would have Elevate, Copper and Captan to control Botrytis during bloom and Rovral, Elevate, Captan (all 0 day PHI) to control Botrytis during spring and fall harvest. Due to the different modes of actions between the new compounds Abound, BAS 516F, Switch and Elevate it seems likely that some of these products will be effective against spur blight, cane blight or Septoria leaf spot.

*Conclusions.* Benlate cannot be used for disease control after 2003, but is still legal for use in 2002 and 2003. Alternative products to control double blossom in blackberries and spur blight, cane blight and Septoria leaf spot in raspberries are needed. A variety of new products, including Abound, BAS 516F, Switch, Elevate, and Top-

sin-M, will be registered over the next few years for disease control in blackberries and raspberries. Although efficacy data are missing, it is likely that based on the broad spectrum activity of some of the compounds and based on the fact that three novel modes of actions are represented, all major blackberry and raspberry diseases will be covered.

## **Bramble Chores**

### **Spring/Summer 2002 Work Schedule for Bramble Growers**

Gina Fernandez  
North Carolina State University

Please review the winter/spring bramble chores to make sure that you have completed all tasks for winter. Here is a brief summary of chores for the next few months to prepare your brambles for the upcoming growing season. If you have any questions contact me (252-793-4428 x167; [Gina\\_Fernandez@ncsu.edu](mailto:Gina_Fernandez@ncsu.edu)).

Guido Schnabel (Clemson University) has put together a disease spray guide for both raspberries and blackberries. It is available at Southern Region Small Fruit Consortium website (<http://www.smallfruits.org/GrowerInfo/brgro.htm>). Please note that this schedule does not include an application of liquid lime sulphur. Lime sulphur does a good job at controlling anthracnose and should be considered as a part of your disease control program. Also, as of March 25, 2002 Elevate was still not registered in NC, however, we expect a label in April. In addition, Agricultural Chemical recommendations for weeds, insects and diseases for North and South Carolina can be found at the addresses listed below. North Carolina:

<http://ipm.ncsu.edu/agchem/agchem.html>.

South Carolina:

<http://cufan.clemson.edu/pestmgmtguide/>

*Pruning.* Should be completed by early spring.  
-Fall Bearing Raspberries: Fall bearing (actually mid to late summer for most of us in NC) rasp-

berries fruit at the top of the current season's canes ("primocanes"). The simplest way to manage these varieties is to mow them off at ground level during the dormant season. Be sure to mow them off close to the ground so that new shoots come from the roots and not from lateral buds on cane stumps.

-Blackberries and summer fruiting raspberries. These types of brambles bear fruit on second year canes. During the winter prune out the spent floricanes from the previous season. The remaining primocanes are thinned 3-4 / ft<sup>2</sup>.

*Herbicides.* Apply preemergent herbicide in spring if not applied in fall. There are several chemicals that are labeled for use in NC depending on age of planting and time of application, see your states agricultural chemical recommendations.

-Apply post-emergent herbicides as needed. Be sure that the chemical you are using is labeled for bearing plants; many herbicides cannot be used beyond the first year. Please read the article Herb Stiles and I have posted on the web. It is about the effect of glyphosate on bramble growth. If you see new stunted growth this spring you may have glyphosphate injury. This can be mistaken for double blossom injury. See the images at the web site below.

<http://www.smallfruits.org/Recent/AvoidGlyphosate.htm>

*Insect and Disease Control.* See bramble spray schedule (Diseases)

[http://128.192.110.100/GrowerInfo/Brambles\\_sprayguide2002.pdf](http://128.192.110.100/GrowerInfo/Brambles_sprayguide2002.pdf)

-Prebloom: Apply liquid lime sulphur or Bordeaux for control of anthracnose in late winter or early spring before new buds are less than 1/2" long.

-Crown borers can be a problem in the early spring, as well as aphids, thrips, Japanese beetle, fruitworm, rose chafer, stink bugs and psyllids. Catch these early w/ a prebloom spray; see your states agricultural chemical manual.

-Bloom: EPA has approved use of Savey 50DF for control of mites on caneberries (brambles), including black and red raspberries and blackberries. The preharvest restrictions are 3 days for

blackberries and raspberries. Please note that it is only effective on eggs. If you need a copy of the supplemental label, contact your Gowan distributor or from the website.

<http://www.gowanco.com/products/Savey50df.htm>

*Irrigation.* Plan for the irrigation season. Bramble plants need about 1"-2" water/week.

- Consider installing an overhead system for evaporative cooling. We had very good luck preventing sunscald last year in our research plots using this method once or twice a day from 10 am to 3 pm for short periods of time (approx. 15 minutes). Do not use evaporative cooling in the late afternoon. You need to have the canopy dry going into the night to minimize disease problems that may arise due to wet canopy during the night. Contact me for details.

*Trellises.* Make any last minute repairs to existing trellises before canes start growing

*Fertilizer.* Place nitrogenous fertilizers in row before new canes emerge in spring. *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-foot wide band.

-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. The incorporation of P and K should be based on soil test recommendations.

*Harvest and Marketing.* Make sure you have enough containers for your fruit.

-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.

# Focus

## Small Fruit News Favorites

Compiled by Guido Schnabel  
Clemson University

*High-bush blueberry basics*, by Ben Fuqua (Northland Berry News Winter 2001).

*Anticancer activity found in berry extracts*, reports Hank Becker (Northland Berry News Winter 2001).

*Approaches to control raspberry cane diseases*, from Annemiek Schilder (Northland Berry News Winter 2001).

*Berries grown in high tunnels*, by Kathy Demchak and Bill Lamont (*The Fruit Growers News* March 2002).

You may request a copy of one (or more) of the above articles sent to you free of charge by fax (call 864 656 6705) or by sending a stamped and self-addressed envelope to Guido Schnabel, Clemson University, Department of Plant Pathology & Physiology, 218 Long Hall, Clemson, SC 29634-0377. Don't forget to indicate which article you would like.

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Volume 2, No. 2

April, 2002

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Published at least four times/year. Small Fruit News is available on the Southern Region Small Fruit Consortium (SRSFC) web site <http://128.192.110.100/>. To subscribe to an electronic notification service of new Small Fruit News issues on the web, send your e-mail address to [schnabe@clemson.edu](mailto:schnabe@clemson.edu). You may also contact your local county agent office for a hardcopy of this newsletter.

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