Southeastern Regional Peach Newsletter

Volume 5, No. 2 July 2005

In this issue…

Editor's Note
Weed Science Update – Bermudagrass Control
Plant Pathology Briefs – Bacterial Spot, Phytophthora Root Rot, and Guardian Rootstock Updates
Focal Points – Clemson Web Site Update, Chlorothalonil Legal Issues, . . .
Horticulture Update – Messenger Use and Benefits

Editors Note

Needless to say, this has been a tough year for peach producers in the Southeast. The year started with many peach producers suffering from loss of young trees to Phytophthora root rot, a direct result of hurricanes, tropical storms, and wet conditions from last fall. The environmental issues continued, and bacterial spot has been observed on numerous peach varieties where excessive rain has occurred; Georgia and South Carolina have been particularly hard hit. Hail damage has also been prevalent, with severe damage in some parts of South Carolina. Added to these issues, the crop has often been "short" anyway, again possibly due to environmental effects. I guess the positive note is that we are not observing the poor market conditions from last year; if peaches are falling to the ground this year, they are likely diseased, as opposed to not being harvested. Thankfully, brown rot has been less invasive than expected, and we can only hope that this will continue to be the case as the season progresses.

Mark Twain said that "by trying, we can easily learn to endure adversity. Another man's, I mean." All humor aside, we researcher's and extension folks have the honor of watching producers overcome the adversities which come through in a season like this. When we can help, we do, but unfortunately, we sometimes do not have the answers which alleviate nature. This has certainly been one of those years to date. However, we do attempt to address some of the reasons and potential solutions in this newsletter issue.

Phillip M. Brannen
Editor

Focal Points – New Information for the Peach Industry

❈ **Bacterial spot letter for South Carolina and Georgia producers.** Bacterial spot has been severe in both Georgia and South Carolina. In some cases, many varieties have been infected, and symptoms have downgraded peach quality, if the peaches could be sold at all. As a result, Guido Schnabel (Clemson University) and Phil Brannen (University of Georgia) have written a letter which helps to explain reasons for the high infection rates observed in 2005. The full letter can be viewed at the following link: (click here). This letter can be used by producers as they attempt to recover losses through insurance or government sources.

❈ **Clemson peach website updates and additions.** Desmond Layne (Clemson University) indicates that the **Peach Website** at Clemson has several recent updates and additions that may be of interest to you. These include the 2004 variety evaluations and images, new articles under "publications", and links to the on-line versions of the **Peach Grower's Handbook** and the **Pest Management Guide**. If you have not visited the website yet, please point your internet browser to: http://www.clemson.edu/hort/Peach/index.php, Then click on "Peach Information."

❈ **Excellent brown rot online article from California.** There is an excellent brown rot article in the current (April-June 2005) issue of California Agriculture. You can reach it on the web at: http://CaliforniaAgriculture.ucop.edu It is worth your review, particularly as related to post-harvest control and use/selection of fungicides. See **Reduced-risk fungicides help manage brown rot and other fungal diseases of stone fruit**
Adaskaveg et al.

❈ **Possible issues for chlorothalonil (Bravo and other generic products).** A petition was presented by California, Massachusetts, Connecticut, and New York on 17 December, 2004, which would request the EPA to modify or revoke all tolerances for chlorothalonil and three other materials. The petitioner states requested this action in keeping with the additional 10X safety factor required for the protection of infants and children under the Food Quality Protection Act (FQPA). For a comment response from Georgia, see the following link: (click here).

❈ **Aim™ herbicide gets clearance for peaches.** Wayne Mitchem (North Carolina State University) reports that Aim™ herbicide has been cleared for postemergence broadleaf weed control in peach and other fruit crops. The use rate for Aim ranges from 0.51 to 1.98 fl oz/A and may be applied in multiple applications, as needed, so long as total use rate does not exceed 7.9 fl oz/A per year and a minimum of 14 days has passed since the previous application. The 1.98 fl oz/A rate is for sucker control. The addition of crop oil (1 gal per 100 gal of spray solution) or non-ionic surfactant (1 qt per 100 gal of spray solution) is necessary for optimum results. Aim does not control annual grass weeds. Aim could be used in orchards where postemergence control of morningglory, pigweed, velvetleaf, dayflower, and nightshades is needed close to harvest. The 3 day PHI for Aim is considerably shorter than the 14 day PHI for Gramoxone Max. Weeds need to be relatively small (4 leaves or less). Aim will not control grass weeds.

❈ **Need Pesticide Labels or MSDS Sheets?** There are times when it would be nice to have ready access to pesticide labels, especially when making pest management decisions. MSDS sheets are also needed in order to comply with worker protection standards. Wayne Mitchem (North Carolina State University) suggests that this information can accessed for multiple products and numerous manufacturers at www.cdms.net. The site contains complete labels, as well as 24(c) labels that have been obtained. It is very up-to-date, and it is an excellent source for current product label information.

Pathology Updates

Bacterial Spot Update

Phil Brannen
University of Georgia

Bacterial spot has been as severe in 2005 as many producers, researchers, or extension folks have ever observed. We expect bacterial spot in a wet year, especially on varieties such as O'Henry. The real surprise has come from the number of varieties which are showing symptoms. I visited several sites throughout Georgia as the epidemic developed. A partial listing of varieties which had substantial bacterial spot at this time (26 May) include the following:

Variety	Bacterial Spot Rating[a]	Variety	Bacterial Spot Rating
SpringCrest	???[b]	Big Red	???
Fireprince	MR (HS)	Empress	???
FlavoRich	???	June Prince	MR (S)
GaLa	S	Elberta	MS (HS)
Harvester	MR	MarQueens	???
Redskin	MR	Redglobe	???
Southern Pearl	MR	Summergold	MS (S)
Rubyprince	MR	O'Henry	HS (HS)
Summerprince	MR		

[a]The sources for this information are the Southeastern Peach Growers Handbook (page 49-50) or the Compendium of Stone Fruit Diseases (parentheses).
[b]Ratings are as follows: MR (moderately resistant), S (susceptible), MS (moderately susceptible), and HS (highly susceptible). Note that there are no R (resistant) varieties listed. A ??? indicates not listed in these resources.

Many questions have been raised by this epidemic, and I will try to address some of these.

(1). Why is the epidemic so severe this year? There are probably a number of reasons, but admittedly, this is at best an educated guess. We know that we had high amounts and extended rainfall due to tropical storms and hurricanes in the fall; this could have contributed to bacteria survival/multiplication, though we never observed symptoms to any large degree in GA or SC last year. An abnormally warm winter, especially in January, likely resulted in elevated inoculum levels. Increased rainfall during the critical infection periods of early leaf and fruit development were excessive and of long duration, and we would have expected bacterial spot as a result, but we have had this before, and only the highly susceptible varieties were severely impacted. Flowering and fruit development were delayed, placing early fruit development in a timeframe which corresponded to prolonged high winds and blowing sand damage (providing entry points for bacterial infection), and I suspect that this is critical; delay in development (due to cloudy, overcast, and cool conditions in the spring) maintained peaches in a susceptible, tender stage for longer than normal, and again, we speculate that this may have been critical to the increased levels of disease.

(2). Has the bacterium changed, or did the hurricanes bring a new strain of the bacterium? Unlikely. Ron Gitaitis (University of Georgia) has been working on this question to some degree. He isolated 45 isolates of the bacterium from Middle Georgia. All physiological properties of the bacterium have been consistent with the expected normal strains. All strains were killed by copper and oxytetracycline (Mycoshield), so antibiotic or copper resistance is not a likely issue – yet. However, it is

still at least possible that there is something different in the works. Ron will continue to explore this possibility with additional work, but again, it is not likely. Environmental conditions were certainly ideal for bacterial spot development in the field, and a "super strain" was not needed for disease to have occurred in 2005.

(3). Is there a breakdown in resistance among varieties? Again, not likely. Based on observation, though bacterial spot was prevalent on more varieties, it was often only "skin deep" – enough to cause problems in the market place, but truly limited to the skin. On varieties such as O'Henry, early symptoms were horrible, while on moderately susceptible varieties, late symptoms were ugly, but they were often expressed as surface lesions (Figure 1); of course, there were always the exceptions to the rule, and we did observe pretty severe symptoms on unexpected varieties as well. The suppressive nature of the moderately susceptible or moderately resistant varieties was still present in many cases, but it simply was not sufficient to stop infection and symptom development, though these peaches were often edible.

(4). What do we do for next year? Bottom line – not much has changed. Frank Funderburk (University of Georgia) addresses this in the article below, so I will not make comment on this at this point. However, the bottom line is that most varieties are in the moderately susceptible or susceptible range, and if environmental conditions come together to create the "perfect storm," then this can happen again. We do not often experience this level of disease, and we can be thankful for that. Producers will have to do their own risk/benefit analysis, based on the history of their orchards and their opinion of how often they think expanded copper applications to additional varieties will pay off. I wish we had better long-term predictors for this disease, but we simply do not have the "crystal ball" on this one – not yet anyway.

Figure 1. Early bacterial spot symptoms on O'Henry (left) and late symptoms on a moderately resistant variety (right). O'Henry develops deep-pitted lesions, whereas many moderately resistant varieties did not, even at maturity.

Bacterial Spot/Bacteriosis – What Next?

Frank Funderburk,
University of Georgia (County Agent; Peach County)

No one will dispute that we have had enough of this disease. Indeed we have had too much. The question now is what can we do to prevent this disease from causing the same devastation again. There have been suggestions of letters warning of the potential. Unfortunately we don't have a crystal ball that tells us when or if bacterial spot will be a problem. And, before 2005, if you had been told to spray all your varieties with copper, would you have done it?

Another suggestion has been to "burn off" the last few leaves with copper as the trees are going dormant. The thinking here is that the copper would clean up any inoculum on the tree. Dr. Phil Brannen and Dr. Dave Ritchie have conferred on this and don't feel this is worthwhile. They have two reasons they feel this way.

First, spraying in the early fall will not affect any bacteria that have already entered overwintering sites and are protected. Yes, you may get some control of inoculum, but there is potential for much more to have escaped.

Second, and more important in my mind, is that inoculum alone does not create a problem. Look at 2004. How much bacterial spot did you have? I didn't hear of much. Even O'Henry had less than normal. The lack of the problem in 2004 would indicate less inoculum in this year's crop. Yet we have a severe, putting it lightly, infestation this year.

So, where does that leave us? It leaves us needing to remember our weather this spring. When ideal environmental conditions, for the bacterium, exist at the same time as a susceptible host we will have a bacterial spot nightmare.

Short of a crystal ball, all we have to work with is weather history and forecasts. What should you do to prepare for next season? I suggest studying the weather that created this monster, prioritizing your varieties by susceptibility to the bacterium and getting a plan in place for late winter/early spring sprays should they be needed.

Phil Brannen has provided the following as guidelines for a bacterial spot program for 2006.

+**Susceptible varieties such as O'Henry.** Full copper program (as per the spray guide). Followed by Mycoshield and/or low copper rates as per the guide and labels. Highly susceptible varieties should always have a program.

+**Moderately susceptible varieties.** Late dormant application of copper and at least one or two post-bloom applications to coincide with the time around petal fall and shuck split and shortly thereafter. If these are applied, Mycoshield applications may not be necessary, but one can never guarantee this. In most years, even these copper applications would not be necessary, as evidenced by the lack of bacterial spot on these varieties over time. However, you can not go back and undo bacterial spot. If you do not have the late dormant copper on site prior to bloom (reducing emerging bacterial populations as much as possible), then rainy, overcast, windy weather during and after bloom will cause an explosion of inoculum and subsequent disease, as observed this year. It is difficult to predict weather patterns 2-4 weeks out, so the only sure bet is some type of a program. I wish we had adequate long-term predictors for this disease, but we simply do not. We can only make predictions as the weather occurs or with short-term forecasting, therefore we are doing retrospective analysis, as opposed to a good prediction.

Hopefully Phil's suggestions can help you make some plans for 2006 season. I'm sure there will be much discussion at our meeting in Savannah and our production meeting.

Hurricanes and Phytophthora Damage

Phil Brannen
University of Georgia

This spring, Phytophthora crown/root rot was prevalent in many young peach orchards throughout the Southeast. I am aware of the disease in both south and north Georgia counties and Tennessee as well, though it is likely to have been present wherever new trees were planted in 2003 or 2004. Phytophthora can be a problem on newly-planted trees if the plants are inundated with water, and especially if the plants are planted with the graft union below ground. However, death of older trees, especially if they have been healthy and are planted on relatively well-drained soil, is not that common. However, this spring, as trees started to leaf out and develop young fruit, many producers started noticing a high percentage of trees were showing decline and death (Figure 2).

Figure 2. Dead and dying peach trees. Peach trees were whipped around by high winds following hurricanes and tropical storms in the fall of 2004. Roots were torn, allowing for infection by Phytophthora species (possibly other root rot species as well). Decline symptoms were observed in the spring and summer of 2005.

Tree decline and death was a direct result of hurricanes and tropical storms which came through in the fall of 2004. High winds whipped young trees from side-to-side like large pom-poms, since leaves were still present, and trunks/root systems were relative weak by comparison to larger, established trees. Trees were often laid on their sides (Figure 3), but even erect trees did not escape damage. On closer examination of below-ground symptoms, roots and trunks were found to exhibit classic Phytophthora rot symptoms (Figure 4). Microscopic examination also confirmed the presence of Phytophthora species (Figure 5).

Figure 4. Young trees blown by heavy winds. This tree is representative of many young trees which were planted in either 2003 or 2004. Since leaves were still on the trees when hurricanes came through in the fall of 2004, they were often blown over. Roots were ripped as the trees were blown about, and this allowed for infection by Phytophthora species, resulting in root and crown rot. In some cases, losses were greater than 50%.

Figure 5. Belowground symptoms of Phytophthora root and crown rot. Roots rot as a result of fungal infection, resulting in brown, dead tissue (left). The crown symptoms are exemplified by a canker which generally has a dark red to orange-brown border where it meets healthy green tissue (right). Cankers generally do not extend above the crown, but they can sometimes extend up the trunk.

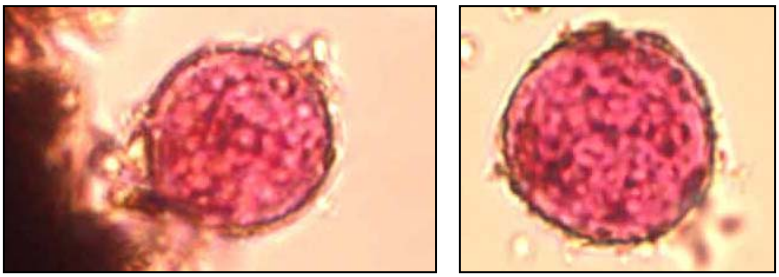

Figure 6. Round oospores (survival structures) of Phytophthora species can be seen attached to fine root hairs of peach (left). Under microscopic examination, these structures often break off (right) and float around in any free water.

Unfortunately, there is little that one can do for this type of disease once symptoms are observed. Ridomil Gold™ and Aliette™ (non-bearing trees) are registered for control of these pathogens. If one incurs hurricane damage, then the time to treat would be immediately after it occurs, not when symptoms are observed. However, the chances of success under these conditions are not generally considered good. Multiple repeat treatments would also be required, so treatment would be relatively expensive as well. Let's hope that the hurricanes stay away this year, but in fact, we are already seeing hurricane and tropical storm damage again this year. If you are observing high winds in young orchards, expect more dead and dying trees in 2006!

Field Reaction of Guardian™ Peach Rootstock to Two Different Root-Knot Nematode Isolates

Andrew P. Nyczepir
USDA-ARS

Root-knot nematodes (*Meloidogyne* sp.) are an important pest of peach in the United States. World-wide reports indicate the four major *Meloidogyne* sp. [*M. arenaria*, *M. hapla*, *M. incognita*, and *M. javanica* can cause damage to stone fruits, but *M. incognita* and *M. javanica* are the predominant species reported on peach and plum. In South Carolina peach orchards, *M. incognita* and *M. javanica* were found in 95% and 5% of orchards sampled, respectively. Above-ground symptoms caused by root-knot nematode infection include stunted growth, loss of vigor, and early defoliation of one to two-year-old peach trees when recommended management practices are not followed. Typically, root-knot nematodes do more damage to peach trees grown in sandy soils than in fine-textured soils. The current preplant nematicide recommendation for managing *Meloidogyne* sp. in the Southeast includes the soil fumigant, Telone II (1,3-D). However, with continued scrutiny of recommended nematicides, alternatives to conventional nematicide application are being investigated.

It was in a 1983 trial that Guardian™ Brand 'BY520-9', was identified as providing greater tree survival than Lovell on two peach tree short life (PTSL) sites through eight years of evaluation. Furthermore, in one greenhouse experiment Guardian™ rootstock was resistant to both *M. incognita* (GA-peach isolate) and *M. javanica* (NC-tobacco isolate), based on the number of egg masses recovered from the roots. However, in another greenhouse experiment using two different root-knot nematode populations [i.e., *M. javanica* (CA-peach isolate; known to parasitize S-37 peach rootstock) and *M. floridensis* (FL-peach isolate; known to reproduce on Nemaguard peach rootstock)] Guardian™ was susceptible to both of these nematode isolates. The latter two nematode populations were of particular interest because both S-37 and Nemaguard are in the pedigree of Guardian™. Results from these two greenhouse studies indicate that the parasitic nature of the root-knot nematode isolate must be known when evaluating *Prunus* rootstocks for resistance. Additionally, the short duration of these earlier experiments made it difficult to assess the effect these particular nematode isolates had on growth of Guardian™ rootstock over time.

Guardian™ was first made commercially available in 1993. Since Guardian™'s release researchers have been evaluating the individual lines that make up this "bulked seed lot" looking for those with superior horticultural characteristics that would result in a superior seed lot. Two such Guardian™ lines that were initially identified as having superior horticulture characteristics included SC 3-17-7 and SL2891; however, information on root-knot nematode susceptibility of these advanced lines is unknown. The objective of this research was to evaluate the effect of *M. incognita* (GA-peach isolate) and *M. javanica* (NC-tobacco isolate) on growth and susceptibility of SC 3-17-7 and (or) SL2891.

Twenty-three months after nematode inoculation in field microplots, results indicate that growth suppression, as measured by trunk diameter, of SC 3-17-7 was greater ($P \leq 0.05$) in the presence of *M. javanica* as compared to the presence of *M. incognita* or to the uninoculated plots (Table 1). Guardian™ line SL2891 growth was not affected by either nematode when compared to the uninoculated plots. Tree growth of Lovell was suppressed by both *M. incognita* and *M. javanica* when compared to the

uninoculated plots. Root galling was more abundant on Lovell, intermediate on SL2891 and least abundant on SC 3-17-7 (Table 2). Similar results were also detected for number of eggs per gram dry root weight regardless of nematode species.

Our results also indicate that *M. javanica* is more pathogenic to SC 3-17-7 than SL2891, and that both Guardian™ lines are resistant/tolerant to *M. incognita* infection even though root galls were detected. Susceptibility of SC 3-17-7 to *M. javanica* should not be of too much concern to growers, since SC 3-17-7 is resistant/tolerant to *M. incognita*; which is the predominant root-knot nematode on peach in South Carolina. Resistance/tolerance to *M. incognita* infection is the result of Guardian™ roots preventing the majority of the second stage juveniles from completing their life cycle following root penetration. Since the initiation of this experiment, SL2891 is no longer included in the Guardian™ bulk seed lots currently being distributed to commercial nurseries. The decision to omit this line from future bulk seed lots was based on its inferior PTSL resistance compared to SC 3-17-7 (T.G. Beckman, pers. commun., 2004). Additional research on evaluating Guardian™ rootstock to different root-knot species and isolates from neighboring peach producing states is currently underway.

Table 1. Effect of *Meloidogyne incognita* (GA-peach isolate) *and M. javanica* (NC-tobacco isolate) on growth of three peach rootstocks in microplots 23 months after planting in Byron, Georgia[1]

	Trunk diameter (mm)		
Treatment	Lovell	SL2891	SC 3-17-7
Check	14.0 a[2]	13.1 a	14.6 a
M. incognita	11.4 b	12.2 a	14.6 a
M. javanica	10.6 b	13.0 a	12.2 b

[1]Data are means of 10 replicates.
[2]Means within a column followed by the same letter are not different ($P \leq 0.05$) according to Fisher's least significant difference.

Table 2. Susceptibility of three peach rootstocks to *Meloidogyne incognita* (GA-peach isolate) *and M. javanica* (NC- tobacco isolate) in field microplots 23 months after planting in Byron, Georgia[1]

Rootstock	Eggs per g dry root	Galls per plant[2]
Lovell	76 a[3]	3.4 a[3]
SL2891	27 ab	3.2 ab
SC 3-17-7	16 b	2.1 b

[1]Data are means of 10 replicates.
[2]The gall index consisted of a 1 to 6 scale, with 1 = 0%, 2 = 10%, 3 = 20%, 4 = 50%, 5 = 80% and 6 = 100% of the total root system galled.
[3]Means within a main effect and column followed by the same letter are not different (P = 0.10) according to Fisher's least significant difference.

Horticulture Update

Preharvest Messenger STS® Application Impacts Peach Yield, Size and Retention

Kathy Taylor,
University of Georgia

Increasing sustainability of peach production primarily requires approaches that increase yield and improve fruit quality. Yield is composed of fruit size and number, which are impacted by tree architecture and pruning, tree density, flower and fruit thinning, or tree girdling. Developing tree architecture and higher density orchards requires effort years in advance of the crop. Obviously such input is quite expensive and can require orchard thinning or tree renovation once all available orchard space is occupied, about the time the orchard reaches peak production. Additional measures are used depending on the variety and its location: the flowers may be thinned or the tree may be girdled to improve size and thereby increase the number of fruit that can be carried on the tree. These measures also require some advanced planning and hand labor that is very costly. Methods that accomplish increased fruit size and number without the level of expense encountered using the above techniques are desirable. Horticultural chemicals that can be applied during the season add a dimension of flexibility for producers without the requirement for very early decision-making and possibly at a lower expense.

A three year trial was undertaken in 2002 to assess the usefulness of the Harpin protein formulation, Messenger STS®, as a horticultural material to increase fruit yield, principally through increasing fruit size. Trees in the study received spray treatment with Messenger STS® at several timings with an airblast sprayer at 100 gallons per acre. Messenger STS® was added to the appropriate volume of (well) water in a clean tank and applied immediately, without the addition of a surfactant. Applications were made on days with moderate temperatures when rain was not expected for at least 12 hours. Each year fruit were harvested by a commercial. Harvested fruit were weighed and counted in the field and fruit samples were returned to the lab for immediate determination of average fruit weight, fruit diameter, background color, % red overblush, and firmness. The gross income for each treatment was estimated using the following gross returns for fruit sales in 25 pound cartons: $4.00 for eighty 1⅞” fruit per carton, $5.50 for seventy-six 2” fruit per carton, $7.00 for seventy-three 2 ⅛” fruit per carton, $9.00 for seventy 2 ¼” fruit per carton, $10.50 for sixty-five 2 ½” fruit per carton, $12.00 for sixty 2 ¾” fruit per carton and $13.60 for fifty-two 3” fruit per carton.

YEAR 1. During the first year of the trial, a pilot study was undertaken to assess which application times were more effective in improving yields of peach. Combinations of three application times were made to 12-year-old ‘Harvester’ peach trees at bud break (March 8, 2002), petal fall (March 22, 2002), pit hardening (April 17, 2002). Messenger STS® treatments were applied at a rate of 4.5 ounces/acre. The harvest dates for were June 16, June 19, and June 21, 2002.

In the first year of the trial no differences in fruit quality were apparent however, ‘Harvester’ trees receiving treatment at pit hardening (PH), petal fall (PF) and bud break (BB) all produced larger fruit, with the greatest yield being produced by bud break application followed by pit hardening application (BB fb PH) and petal fall application followed by pit hardening (PF fb PH) application (Table 1). Only treatments that included application at PH produced numbers of fruit significantly greater than the control. While BB fb PH and PF fb PH yielded large numbers of fruit, the fruit were small, resulting in lower estimated gross income. The production of fruit in 2 ¾” size category was lower than other treatments producing similar numbers of fruit in the upper size range (≥2 ½”). It appeared that the making of two applications increased fruit number, without increasing fruit size, but that making PH treatment alone had increased both fruit number (probably improving fruit retention) and size. Since the BB treatment appeared to reduce fruit number and size when applied with PH, it was removed from the trial in subsequent years.

Table 1. Summary of yield and market size data for 'Harvester' fruit, in 2002.

Treatment	Total #/tree	Total Wt/ tree	Number of each Market Size/Treatment							# Frt 2 ½"/ trt	Gross Income/ trt	% of Control Gross Income
			1 ⅞"	2"	2 ⅛"	2 ¼"	2 ½"	2 ¾"	3"			
Control	409ab	58.29ab	1	4a	7a	18b	131ab	164bc	42ab	297b	632.16bc	100.00b
BB/PF	399b	53.81b	0	1b	6a	14a	142ab	153c	44ab	341ab	686.66ab	108.62ab
BB	396b	58.06ab	0	0b	1b	1b	105c	204a	49a	358a	700.99ab	110.89a
BB/PH	464a	64.72a	0	0b	0b	3b	158a	180b	19c	388a	675.54b	106.86ab
PF	379b	55.56b	0	0b	4ab	5b	128b	164c	59a	356a	717.87a	113.56a
PF/PH	491a	67.32a	0	0b	0b	3b	140ab	192ab	25c	357a	598.7c	94.71b
PH	425ab	63.33a	0	0b	0b	1b	123b	195a	41ab	361a	703.63a	111.31a

Means followed by the same letter in a single row are not significantly different from each other at P≥0.5.

YEAR 2. In spring 2003, Messenger STS® was applied to 10-year-old 'Springcrest' peach trees. Based on results of the pilot study, the application times were changed, excluding the bud break applications. Combinations of three application times were used in the study: petal fall (March 19, 2003), pit hardening (April 15, 2003), and pit hardening + 21 days (May 6, 2003. Messenger STS® treatments were applied at a rate of 9 ounces/acre. Commercially ripe fruit were harvested May 13, May 16, May 18, and May 21, 2003.

In year two, because of the need to assess an earlier season cultivar, we conducted the trial in a 'Springcrest' orchard. Generally, trees sprayed with Messenger STS® at PH, 21 days after PH (PH + 21d) or at PH with another application made after 21 days (PH fb PH + 21d) produced higher yields of fruit relative to the untreated control (Table 2). Peaches harvested from the 'Springcrest' orchard tended to be larger than untreated controls when treated with Messenger STS® at PH or PH fb PH + 21d. Treatments that included application at PH gave significantly more fruit in the 2 ¾" and 3" size categories. An exception was the PF fb PH treatment. While it had a number of fruit in the 3" size category, it had significantly fewer fruit than PH treatments that did not include and PF application. This suggests that very early application of Messenger STS® may have a negative impact on size, similar to the BB treatment in 2002. The impact on fruit size may be most apparent in the estimate of gross income. PH and PH + 21d treatments were associated with the greatest gross incomes. The ripening date and fruit quality was unchanged by treatment with Messenger STS®.

Table 2. Summary of yield and market size data for 'Springcrest' fruit, in 2003.

Treatment	Total Sized #/tree	Total Wt/ tree	Number of each Market Size/Treatment							# Frt 2 ¾"/ trt	Gross Income/ trt	% of Control Gross Income
			1 ⅞"	2"	2 ⅛"	2 ¼"	2 ½"	2 ¾"	3"			
Control	25	25.26ab	2	5a	8a	18ab	342ab	219b	3b	561ab	1151.71b	100.00b
PF/PH/PH+21	27	23.89b	0	0b	1b	24a	389a	233ab	2b	624a	1151.47b	99.70b
PF/PH	20	24.32b	0	0b	0b	6b	227c	211b	24a	462b	1210.80ab	107.61ab
PH+21	28	26.81a	0	0b	0b	9b	371a	295a	1b	667a	1277.80a	115.76ab
PH/PH+21	26	25.69ab	0	0b	0b	7b	345ab	262a	15a	622a	1000.25b	92.78b
PH	23	25.59ab	0	0b	0b	9b	348ab	279ab	18a	598ab	1324.14a	123.54a
PF/PH+21	25	27.31a	0	0b	0b	17a	311b	247ab	3b	559ab	1118.94b	97.34b

Means followed by the same letter in a single row are not significantly different from each other at P≥0.5.

YEAR 3. In spring 2004, Messenger STS® was applied to the same 'Springcrest' orchard used in 2003. The same combinations of application targets were used as in 2003: petal fall (March 24, 2004), pit hardening (April 16, 2004), and pit hardening + 21 days (May 7, 2004). Messenger STS® treatments were applied at a rate of 9 ounces/acre. The harvest dates for were May 17, May 19, and May 22, 2004.

During the latest season of the trial, results with Messenger STS® on 'Springcrest' were somewhat similar to the previous year without any difference in fruit quality of harvest (Table 3). Trees receiving PH, PF fb PH fb PH+21d had higher yields per tree. Increased yield in PH treatments appeared to be due to increases in fruit market sizes with increased numbers of fruit in the 2 ¾" and 3" size categories, but PF fb PH also had increased numbers of fruit in the 2 ¾" size category. In addition, fruit numbers in the 3" size category were greater in the PH fb PH+21d and PF fb PH treatments. In all cases, treatment was made at PH. This appears to be a critical time for application to increase fruit size. Some of the overall increase in yield may also be due to small increases in fruit retention (PH, PH fb PH+21d, PF fb PH+21d, PF, PH, PH+21d). Again, a very effective indicator of Messenger STS® impact on peach yield and fruit size is the estimated gross income. Trees had significantly greater gross incomes when treated at PH, PH fb PH+21d, or PF fb PH fb PH+21d. Again the PH treatment appears to be the most critical application time for achieving yield increase through increasing fruit size.

Table 3. Summary of yield and market size data for 'Springcrest' fruit, in 2004.

Treatment	Total #/tree	Total Wt/ tree	Number of each Market Size/Treatment							# Frt 2 ½"/ trt	Gross Income/ trt	% of Control Gross Income
			1 ⅞"	2"	2 ⅛"	2 ¼"	2 ½"	2 ¾"	3"			
Control	211ab	21.09b	4	5	11b	60ab	912ab	1475ab	48c	2440b	1022.78b	100.00b
PF/PH/PH+21	242a	25.51a	0	1	35a	84a	915ab	1496ab	79b	2490ab	1245.63a	121.79a
PF/PH	235ab	24.96ab	2	5	28a	55ab	852b	1487ab	120a	2459ab	1091.73ab	106.74ab
PH+21	229ab	23.59ab	1	9	13ab	42b	937a	1403b	95ab	2435ab	1038.49b	101.54b
PH/PH+21	243a	22.07b	5	7	4b	62a	939a	1514ab	130a	2583a	1082.68ab	105.86ab
PH	242a	25.55a	0	0	16ab	17c	884b	1576a	134a	2594a	1252.86a	122.50a
PF/PH+21	254a	26.31a	2	2	6b	42b	913ab	1621a	81b	2615a	1238.17a	121.06a

Means followed by the same letter in a single row are not significantly different from each other at P≥0.5.

Application of Messenger STS® at pit hardening seemed critical to improving fruit size. But merely making an application appeared to improve fruit retention. Certainly, peach fruit are prone to dropping or cullage due to a number of causes. Potentially fruit may be lost to diseases or failure to achieve marketable size. The shift of fruit size and apparent retention of fruit that might otherwise be prematurely abscised would result in an increased economic return. These trials suggest that the economic return may be increased between 10 and 23% for fruit from trees receiving harpin treatment at pit hardening, depending on the year of the trial and cultivar. Yield increase appeared to be primarily mediated through the movement of many fruit into the 2 ¾" and 3" size categories. For the early season when the benchmark for fruit size is 2 ½", the producer might be able to leave a few more fruit per tree and attain adequate marketable size.

It would was preferable to have conducted this study at a 4 and 8 ounce rate (recommended range of Messenger STS® label) rather than the 4.5 and 9 ounce rate reported. An error in working with the spray operator resulted in the 9-ounce rate we used. However, in this study, we had improved yield when Messenger STS® was applied at 4.5 ounces and better yields at 9 ounces. I am recommending that growers use an intermediate rate of 6 ounces/acre. Because it appears in this study and another (unreported) that we obtained better results in the early cultivar, I have to conclude that we have more work to do in optimizing the timing of application for mid to late season cultivars. At this time, I

recommend application at pit hardening for early cultivars and, preliminarily, at 3 to 5 weeks prior to harvest for later cultivars. Further study is underway in 2005 to determine the best timing for later cultivars.

Messenger STS® is an Earth and worker friendly material. The active component of Messenger STS® is a protein that can be inactivated by tank mixing with some chemicals or by placing it in a dirty spray tank. Tank mixing with many materials is okay. Read the label carefully concerning this issue. Messenger STS® must be mixed and used within 8 hours to prevent inactivation. Once opened, a package of Messenger STS® must be used in 21 days.

Weed Science Update

Bermudagrass Control in Peach Orchards

Wayne Mitchem,
North Carolina State University

Bermudagrass is extremely competitive with peach trees. It is capable of reducing tree growth, and it can cause significant reductions in fruit size and yield. In extreme situations, bermudagrass not only impacts yield and tree growth but it can also leave thick residue under trees, preventing the utilization of radiant heat during spring freeze events. Fusilade, and Poast can be used for bermudagrass control in peach orchards. Neither of these herbicides control broadleaf weeds, or nutsedge (nutgrass). Although less common, johnsongrass can be a weed pest in orchards too. These same herbicides are effective on Johnsongrass as well.

Bermudagrass and johnsongrass control is achieved with **timely**, **sequential** applications to actively growing weeds. Weeds must be the appropriate size or growth stage (refer to table for **maximum** size to make initial application). Treating weeds at an inappropriate size or growth stage will result in poor herbicide performance. Following the initial application with a second application is critical too. A commonly asked question is how long should I wait after the first application to apply the second application? The interval between applications depends on weather conditions at application time and the period immediately following. Generally, the second application is applied 3 to 5 weeks after the initial application. **DO NOT apply the second application prior to regrowth or it will have little benefit. Adding crop oil concentrate to the spray solution will be necessary as well.** For more detailed information on rates, crop oil, and weed size at application time refer to the table below and manufacturer labels. Remember to read and follow all directions on the herbicide label.

Herbicide*	Rate[@]	Johnsongrass Height	Bermudagrass Stolon Length
Poast	1.5 followed by 1.0 pt	10”	6”
Fusilade	1.5 followed by 1.0 pt	18”	8”

*Add crop oil concentrate at 1% v/v, refer to product label for details.
[@]Rates suggested for heavy weed pressure. Lower rates may be used where weed pressure is mild. See label for details.

Southeastern Regional Peach Newsletter

Volume 5, No. 2 July 2005

Editor, Phillip M. Brannen
Horticulture Assistant Editor, Kathy Taylor
Entomology Assistant Editor, Dan Horton
Weed Science Assistant Editor, Wayne Mitchem

Published quarterly. The Southeastern Regional Peach Newsletter is available through the following website http://resources.caes.uga.edu/publications/newsletters/SRPN/. If a hardcopy is desired, please contact your local county agent. Your local County Extension Agent is a source of additional information on these and other subjects.

PUTTING KNOWLEDGE TO WORK

The University of Georgia and Ft. Valley State University, the U.S. Department of Agriculture and counties of the state cooperating. The Cooperative Extension Service offers educational programs, assistance and materials to all people without regard to race, color, national origin, age, sex or disability. An equal opportunity/affirmative action organization committed to a diverse work force.