Southeastern Regional Peach Newsletter

Volume 3, No. 4 September 2003

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Editors Note

We have concluded yet another peach production season, and it was quite a season indeed! The Bible states that "He . . . sendeth rain on the just and on the unjust." I will leave it up to you to decide the category, but without regard, we all had enough rain this year – no more complaints about drought for a while. The rains sometimes resulted in overwhelming disease situations, but with the use of all the "bullets" in our arsenal, for the most part, it was a pretty good season. The combination of disease damage and insect pressure definitely made it interesting.

With the struggles of the last year in mind, we will address a new product for control of brown rot, Pristine™, and its potential fit. We also have some information on scab control which may be of benefit to you. With a new emphasis on peach industry pesticides as the EPA is sued by various groups, Harald Scherm gives an excellent review of the reality of pesticide use in peaches. Also, Wayne Mitchem updates us on fall weed control options. I hope you enjoy the information contained in this newsletter, and as always, let us know if there are specific topics you wish for us to cover or research.

Phillip M. Brannen
Editor

Focal Points – New Information for the Peach Industry

❈ **Pristine™ fungicide registered for control of multiple peach diseases.** BASF recently received a full registration for Pristine (previously coded as BAS 516). See the article below for more detail on the efficacy and use patterns.

❈ **Halford seed used for rootstock may be of mixed genotype and virus contaminated.** Producers should be aware that "Halford" seed stocks are probably a mixed bag. Dr. Simon Scott (Clemson University) has recently determined that "Halford" seed may be of mixed genotype, essentially the same as "cannery-run" seeds. In addition, high levels of peach viruses may be encountered in such seed, especially Prunus Necrotic Ringspot Virus (PNRSV). The Southeastern Budwood Testing Program is going well, and budwood stocks for southeastern peaches should be relatively clear of viruses. However, some viruses can come through seed stocks as well. This revelation concerning Halford indicates the clear need for a controlled seed stock. Establishment of a clean block (possibly Lovell) is highly desired – high on the "wish list."

❈ **Environmental groups and several states file lawsuits against EPA.** Bob Bellinger (Clemson University) recently forwarded information concerning the filing of suits against the EPA. The lawsuits essentially want the federal government to

enforce the Food Quality Protection Act statutes relative to additional protection of infants and children. Infants and children are protected 10X more stringently than adults, unless children do not have proven special sensitivities or exposure to pesticides in question. The lawsuits charge that EPA has not utilized this standard to protect vulnerable children or highly exposed personnel or their families. The Natural Resources Defense Council lawsuit of 1999 forced EPA to review several "high-risk" toxic pesticides, and EPA has subsequently banned or severely limited the use of several pesticides. Therefore, the filing of these new lawsuits could easily have similar impacts on production of commodities which utilize targeted pesticides.

❋ **Plum Pox Virus survey of Pennsylvania continues to find new "hits," including a nursery.** Producers should not be complacent about Plum Pox Virus (PPV). Though the survey and eradication program in Pennsylvania continues to go well, PPV continues to be found in the region. Nine infected sites were found this summer: 6 homeowner properties, 2 commercial orchards, and one fruit tree nursery location. The nursery is the most troubling site, since the implications are obvious. Trace-back and trace-forwarding investigations are being utilized to determine whether budwood or rootstocks played a role in the nursery infection. Needless to say, we have to do everything we can to prevent this from happening in Tennessee nurseries.

❋ **Telone label changes.** Application of Telone II for nematode control just became a little easier, thanks to some specimen label changes. See the label for specifics, but the PPE requirements have been substantially reduced, and the buffer zones have been reduced from 300 feet to 100 feet (especially important where peach acreage is adjacent to housing).

❋ **Scholar™ labeled rates are important.** Application of Scholar for control of postharvest brown rot and Rhizopus rot was an integral reason for less rejected loads in 2003, a year in which brown rot was extensive in most orchards. Surveys in Georgia and South Carolina have indicated that some producers are using lower than recommended rates of Scholar, an attempt to obtain suppression of brown rot and Rhizopus rot while reducing the financial investment in the fungicide. Bottom line – do not do this. Initial survey results indicate that the labeled rates really are necessary for optimum control of these pathogens in a postharvest environment.

Weed Science Updates

Weed Control for 2004 Begins this Fall

Wayne Mitchem,
North Carolina State University

Once again, summer is over, and so is peach season. Having been faced with a whole different set of challenges in 2003 than 2002, one can only hope for normal weather conditions in 2004. Hopefully, the extremes occurred in 2002 and 2003, and something right in the middle will be likely for the upcoming year.

Unfortunately, it is time to start thinking about management practices for 2004. Now is a good time to look at blocks and determine areas that may have special weed management needs for the upcoming year. It is an excellent time to note weed control differences among blocks that were managed differently. Simply put, survey what worked and what did not. However, in doing so, there are a few things I would encourage you to keep in mind. In 2003, annual grass pressure was probably the greatest it has been in several years. Grasses, especially annual species like crabgrass, goosegrass, or fall panicum, tend to flourish in extremely wet conditions. Therefore, break down in annual grass control is likely to be more common this year than in previous years.

This is also the time to put into place some management practices that will aid the 2004 crop. The foundation for a good orchard floor management program begins this fall with a pre-emergence herbicide application. A fall pre-emergence application provides a great deal more than you might think. Three significant benefits come to mind:

1. Winter annual broadleaf weed control. A fall pre-emergence herbicide provides residual control of winter annual broadleaf weeds that are host to cat-facing insects. In order to totally eliminate broadleaf weeds from the orchard floor, the area in the drive rows will have to be treated with a post-emergence herbicide.

2. Radiant Heat Benefit. Maintaining the herbicide strip weed free through winter and into spring increases the radiant heating.

3. Delays the need for a spring pre-emergence herbicide application. Using a fall pre-emergence herbicide can benefit summer annual weed control by delaying spring pre-emergence herbicide application several weeks. The delay extends residual weed control later into the summer, and potentially early fall in some situations.

As far as pre-emergence herbicide choices, several work well when used in the fall. Diuron, Simazine, and Solicam all provide effective control of a number of common winter annual broadleaf weeds. In areas where annual ryegrass is common, Solicam may be the most effective of the three.

The orchard in the photo below is the goal a producer should have in mind for established orchards in late winter or early spring – a weed-free herbicide strip under the tree, a ground cover in the drive middles free of winter annual broadleaf weeds, and a lot of opportunity for the growing season.

Plant Pathology Updates

Reductions in Pesticide Risk in Georgia Peaches, 1991-2001

Harald Scherm,
University of Georgia

Introduction. In recent years, pesticide use in peaches has received considerable attention by the general public and by regulatory agencies. This has led to significant usage restrictions for certain active ingredients, e.g., the complete ban of methyl parathion (Penncap M) in 1999 and the stepwise phaseout of azinphos-methyl (Guthion, http://www.epa.gov/oppsrrd1/REDs/factsheets/azm_fs.htm) and phosmet (Imidan, http://www.epa.gov/REDs/factsheets/phosmet_fs.htm) within the next five years. Other commodities have not experienced similar pesticide use restrictions, and there is thus a feeling among peach producers that the industry has been singled out unfairly. Clearly, pesticide usage in stone fruits in the Southeast is high (due to the perennial nature of the crop and the high pest pressure), but heavy usage expressed simply as numbers of sprays or total amount of active ingredient does not translate directly into risks to human health or the environment because pesticide ingredients differ considerably in their toxicology relative to the environment and to human health.

I applied the Environmental Impact Quotient (http://www.nysipm.cornell.edu/publications/EIQ.html), a pesticide toxicology assessment tool developed at Cornell University, to document and quantify reductions in potential pesticide risk in the Georgia peach industry during the 1990s. The goal of this exercise was twofold: 1) to demonstrate that heavy pesticide usage does not necessarily translate into high environmental and human health risks; and 2) to document quantitatively that the Georgia peach industry has already made progress in reducing pesticide risk during the past ten years.

Results. Data on the amount of individual pesticide active ingredients (a.i.) applied to Georgia peaches in 1991, 1995, 1997, 1999, and 2001 were obtained from the USDA National Agricultural Statistics Service (http://jan.mannlib.cornell.edu/reports/nassr/other/pcu-bb/). The data show that the total amount of a.i. applied has remained steady at around 50 lbs/acre since 1991, with fungicides accounting for 80 to 90% of the total (Figure 1). The large contribution of fungicides is not surprising, given that sulfur compounds, used widely in Georgia to control scab, need to be applied at relatively high rates to be effective. The contribution of insecticides to the total amount of a.i. was generally less than 10%, except in 2001 when it increased to >17% (Figure 1). This recent increase was due to heavier use of phosmet and oil, probably in an attempt by producers to compensate for the loss of methyl-parathion, a highly effective, broad-spectrum insecticide. Across all years, herbicides contributed very little (<5%) to the total amount of pesticide applied in peach orchards.

The Environmental Impact Quotient (EIQ) of a given pesticide is based on the active ingredient's potential effects on the health of farm workers and consumers and on potential adverse effects to non-target aquatic and terrestrial organisms. EIQ values for each a.i. were either obtained from the tables included in the original publication (http://www.nysipm.cornell.edu/publications/EIQ_values03.pdf) or calculated based on the chemical's toxicological and physical properties using the procedure outlined in the publication. When interpreting EIQ values, it must be borne in mind that these are *relative* numbers that aid in the comparison among years or active ingredients; they do not tell us anything about *absolute* risk (e.g., number of pesticide-associated bee kills per year).

Total pesticide risk, expressed as EIQ points per acre, has decreased by about one-fifth since 1991 (Figure 2A). When expressed in relation to the amount of fruit produced in the individual years, the decrease was larger (>35%) (Figure 2B). Most of the decrease in EIQ since 1991 was due to reductions in risks to farm worker health, for which a decline by almost 50% was observed. A more detailed breakdown of EIQ values for farm workers by pesticide group indicates a major drop for the fungicide component between 1991 and 1995 (Figure 3); this corresponds to the period when use of lime sulfur, a caustic fungicide with relatively high risk to applicators, was discontinued.

Risks to consumers, birds, and bees (the latter two representing potential terrestrial ecological impacts) have remained relatively unchanged since 1991 (Figure 2). It is reassuring that EIQ estimates of risks to consumers are low (constituting no more than 13% of the total EIQ per acre) compared with those for the three other risk categories considered in this analysis. The fact that risks for birds and bees are still high with current pesticides (accounting for about 60% of the EIQ total in 2001) highlights the importance of using application technologies that minimize potential exposure of these organisms. Georgia peach producers are already practicing this widely, e.g., by applying insecticides only during periods with limited bee activity and by excluding flowering weeds from their orchards during periods when insecticides are applied.

Conclusions. Since 1991, potential pesticide risk, estimated with the EIQ, has decreased by 20% per acre and by 35% per pound of produced fruit, although the overall amount of pesticide a.i. applied per acre has

remained constant. The largest drop (close to 50%) was observed in risks to farm worker health, whereas potential risks to consumers, birds, and bees have remained largely constant since 1991. EIQ estimates of risks to consumer health are relatively low (constituting no more than 13% of the total EIQ per acre) compared with those for the three other risk categories considered in this analysis. Potential impacts on birds and bees account for about 60% of the EIQ total in 2001; this highlights the importance of using application technologies that minimize potential exposure of these organisms.

The next release of pesticide use data by the National Agricultural Statistics Service is due in 2004. That data set should be very informative in determining how producer responses to changing pesticide regulation have affected pesticide use patterns and trends in pesticide risk.

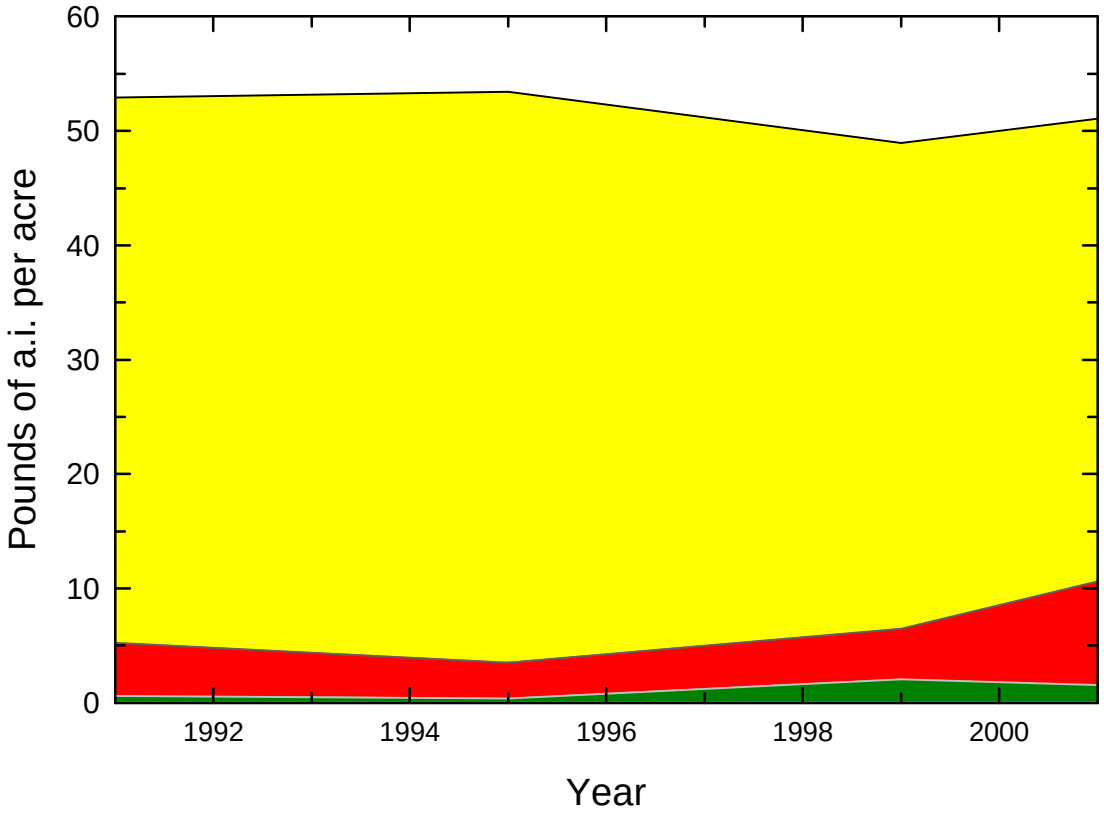

Figure 1. Total amount of fungicide, insecticide, and herbicide active ingredients (a.i.) applied in Georgia peaches from 1991 to 2001.

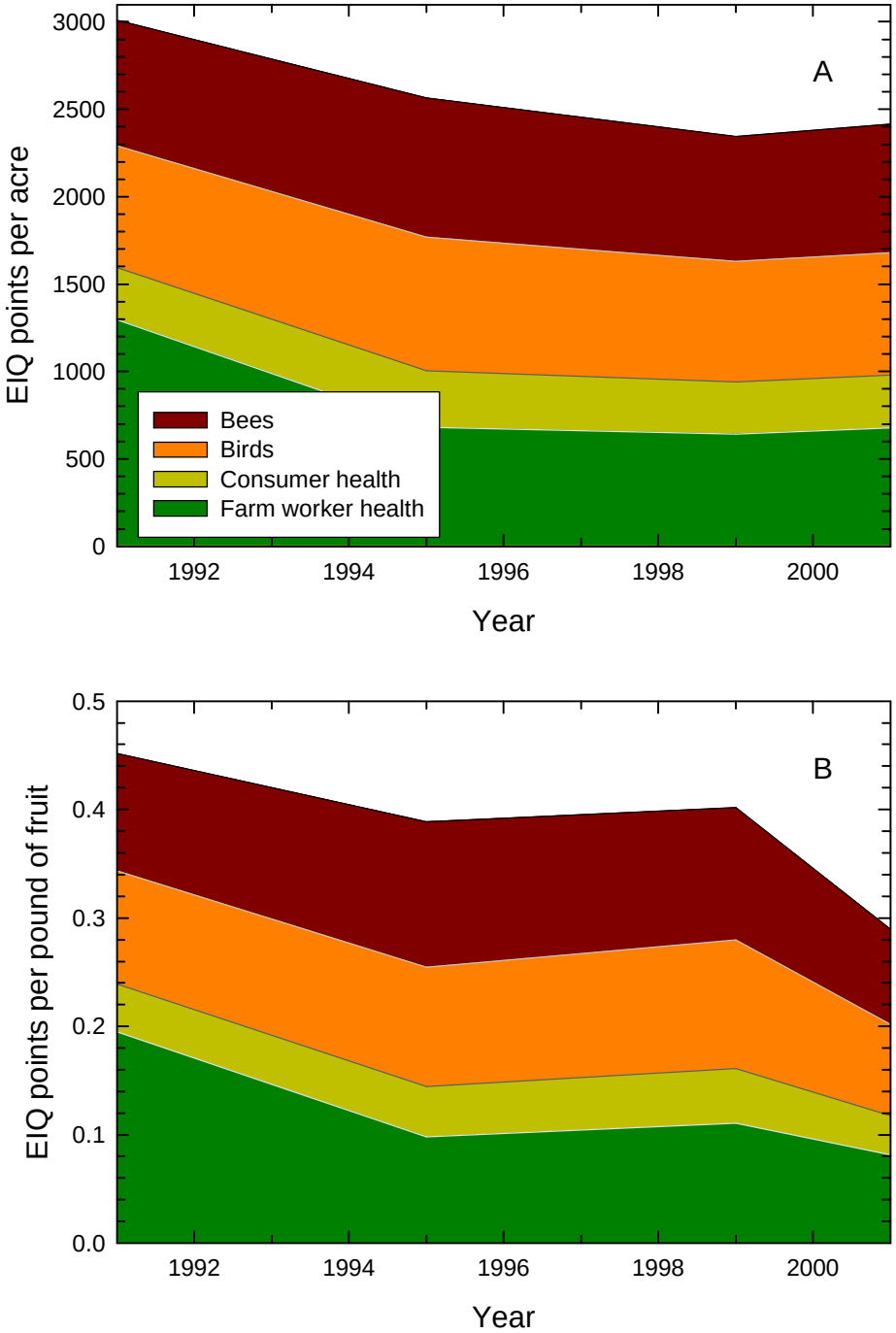

Figure 2. Potential risks to farm workers, consumers, birds, and bees associated with pesticide use in Georgia peaches from 1991 to 2001. Risk estimates were calculated using the Environmental Impact Quotient (EIQ) and expressed per acre (**A**) or per pound of fruit produced (**B**).

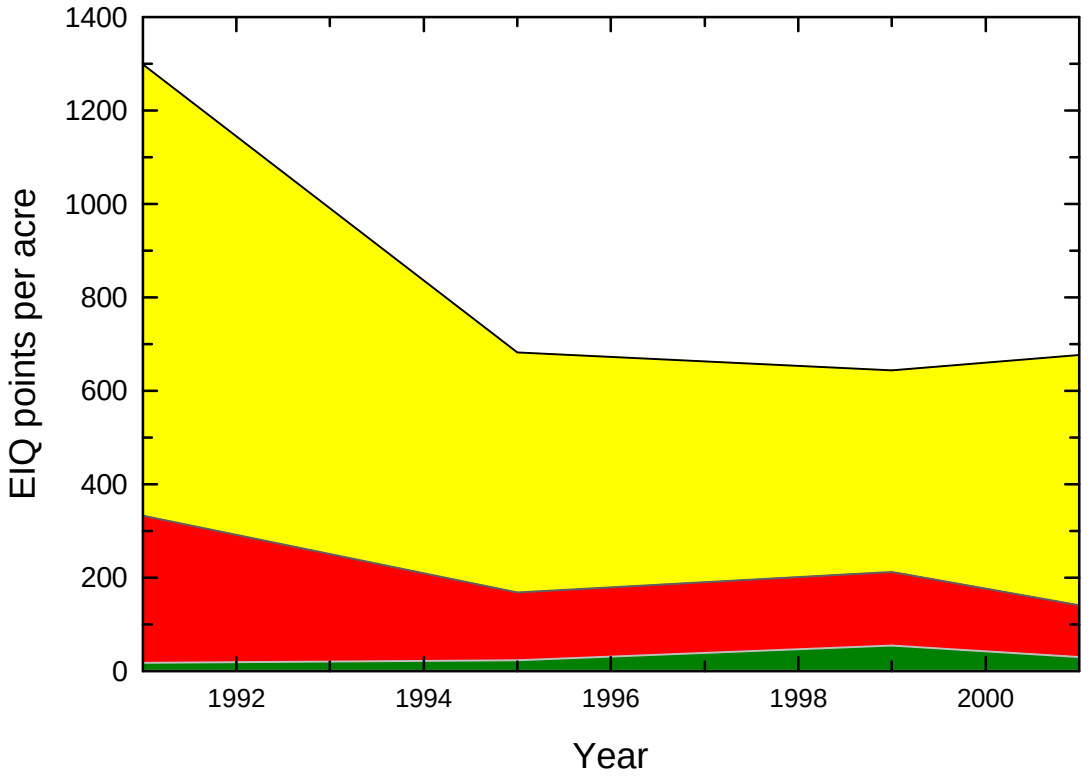

Figure 3. Potential risks to farm worker health associated with use of fungicides ☐, insecticides ☐, and herbicides ☐ in Georgia peaches from 1991 to 2001. Risk estimates were calculated using the Environmental Impact Quotient (EIQ).

Pristine, a New Fungicide for Peaches

Phillip M. Brannen,
University of Georgia

Pristine™ is a new fungicide from BASF (previously coded as BAS 516), and it will be a real help to our peach fungicide arsenal. It combines two chemicals from two unrelated classes of activity, pyraclostrobin (a strobilurin) and boscalid (an anilide). When combined, this product contains two broad spectrum materials, providing preventive and curative properties. By combining two products, it also has built-in resistance management properties. For peaches and nectarines, Pristine has control of blossom blight, brown rot, scab, powdery mildew, and anthracnose listed on the label. Independent testing in southeastern university trials has shown good to excellent activity on both scab and brown rot, comparable to the current chemical standards (see Tables 1-6 for Georgia trial results).

The label allows a maximum of five applications per season (application rate of 10.5-14.5 oz./acre with a maximum of 72.5 oz./acre per year). The REI is 12 hours for peaches, and the minimum time from application to harvest is 0. For resistance management, this product should not be applied more than two times in sequence before switching to materials with other modes of action (not carboxamides or strobilurins). **The major potential for resistance buildup will be with the strobilurins, since several of these are now registered for peaches (i.e. Flint and Abound); no more than five applications should be made per year with materials from this class.**

Table 1. Brown rot data (late-ripening variety) with BAS516 from Horticulture Farm trial (Watkinsville, GA; 2001).

	Brown rot incidence* (% infected fruit)		Rhizopus rot incidence (% infected fruit)	
Treatment and rate/A**	4 days after harvest	7 days after harvest	4 days after harvest	7 days after harvest
Untreated Control	28.8 a	41.9 a	30.5	37.2
Orbit 3.6EC 4 fl oz	0.0 c	10.0 b	41.7	41.7
Elevate 50WDG 1 lb + Captan 4L 8 pt	4.0 bc	5.0 b	52.3	63.7
BAS 516 38WG 0.658 lb	18.3 ab	23.5 ab	49.4	69.7
BAS 516 38WG 0.92 lb ..	8.3 bc	13.7 b	20.2	38.7
GX70001 3.6EC 4 fl oz. ..	2.8 bc	13.7 b	27.4	38.0
LSD (P = 0.05)	17.4	23.2	34.0	48.1

* Brown rot and Rhizopus rot incidence were recorded on fruit stored at ambient temperature. Means followed by the same letters are not significantly different according to Fisher's protected LSD test.
**Materials were applied at 14 and 7 days prior to harvest.

Table 2. Brown rot data (early-ripening variety) with BAS516 from USDA Fruit and Nut Research Center (Byron, GA; 2001).

	Brown rot incidence (% infected fruit) *			
	- Sealed storage regimen		- Normal storage regimen	
Treatment and rate/A**	4 days after harvest	7 days after harvest	4 days after harvest	7 days after harvest
Untreated control	97.5 a	98.8 a	73.8 a	90.0 a
Orbit 3.6EC 4 fl oz	48.8 b	80.6 ab	15.3 b	40.0 b
Elevate 50WDG 1 lb + Captan 4L 8 pt (first spray); Elevate 50WDG 1 lb (second spray)	97.5 a	97.5 a	67.5 a	88.8 a
BAS 516 38WG 0.658 lb	50.0 b	69.7 b	21.9 b	40.3 b
BAS 516 38WG 0.92 lb ..	40.3 b	65.6 b	20.6 b	42.2 b
GX70001 3.6EC 4 fl oz ...	46.3 b	88.8 ab	11.3 b	32.5 b
LSD (P = 0.05)	30.0	24.8	25.6	29.4

* Brown rot incidence was recorded on fruit stored at ambient temperature (four and seven days following harvest). Means followed by the same letters are not significantly different according to Fisher's protected LSD test.
**Materials were applied at 14 and 7 days prior to harvest.

Table 3. Brown rot data (mid-ripening variety) with BAS516 from USDA Fruit and Nut Research Center (Byron, GA; 2001).

	Brown rot incidence* (% infected fruit)	
Treatment and rate/A**	4 days after harvest	7 days after harvest
Untreated Control	73.8 a	86.3 a
Orbit 3.6EC 4 fl oz	22.5 b	41.3 bc
Elevate 50 WDG 1 lb + Captan 4L 8 pt	17.5 bc	45.0 b
BAS 516 38WG 0.658 lb	6.3 c	26.3 c
BAS 516 38WG 0.92 lb	12.5 bc	32.5 bc
GX70001 3.6 EC 4 fl oz	15.0 bc	30.0 bc
Abound 2.08F 15.4 fl oz (first spray); and Orbit 3.6EC 4 fl oz (second spray)	12.5 bc	41.3 bc
LSD (P = 0.05)	12.2	15.7

* Brown rot incidence was recorded on fruit stored at ambient temperature. Means followed by the same letters are not significantly different according to Fisher's protected LSD test.
**Materials were applied at 14 and 7 days prior to harvest.

Table 4. Brown rot data (late-ripening variety) with BAS516 from USDA Fruit and Nut Research Center (Byron, GA; 2001).

Treatment and rate/A	Brown rot incidence* (% infected fruit)	
	4 days after harvest	7 days after harvest
Untreated Control	68.3 a	85.0 a
Orbit 3.6EC 4 fl oz	38.3 b	60.0 b
Elevate 50WDG 1 lb + Captan 4L 8 pt	28.3 bc	55.0 b
BAS 516 38WG 0.658 lb	11.7 c	41.7 b
GX70001 3.6EC 4 fl oz	33.3 b	58.3 b
LSD (P = 0.05)	21.6	23.1

* Brown rot incidence was recorded on fruit stored at ambient temperature. Means followed by the same letters are not significantly different according to Fisher's protected LSD test.
**Materials were applied at 14 and 7 days prior to harvest.

Table 5. Brown rot data (early-ripening variety) with BAS516 from Horticulture Farm trial (Watkinsville, GA; 2003).

Treatment and rate/A	Brown rot incidence* (% infected fruit)		Rhizopus rot incidence (% infected fruit)	
	4 days after harvest	7 days after harvest	4 days after harvest	7 days after harvest
Untreated Control	8.8	27.5 a	15.0	26.3
Orbit 3.6EC 4 fl oz	0.0	3.8 b	7.5	26.3
BAS 516 38WG 0.92 lb ..	0.0	5.0 b	12.5	41.3
TD2448-01 19.2 fl oz	1.3	6.3 b	11.3	28.8
CaptEvate 5.25 lb	0.0	7.5 b	17.5	50.0
LSD (P = 0.05)	9.6	11.7	23.1	42.3

* Brown rot and Rhizopus rot incidence were recorded on fruit stored at ambient temperature. Means followed by the same letters are not significantly different according to Fisher's protected LSD test.
**Materials were applied at 14 and 7 days prior to harvest.

Table 6. Scab data with BAS516 from USDA Fruit and Nut Research Center (Byron, GA; 2002).

Treatment and rate/A*	Scab Incidence**	Scab Severity***
Untreated Control	54.3 a	6.6 a
Bravo Weather Stik 54L 4 pt ...	6.8 bc	0.4 b
TD2435-01 90DF 3 lb.....	5.0 c	0.1 b
BAS 516 38WG 0.658 lb	15.8 b	0.8 b
BAS 516 38WG 0.92 lb	9.3 bc	0.2 b
LSD (P = 0.05)	10.0	1.9

*Treatments were applied at petal fall and shuck split, and all treatments, except the untreated control, received maintenance sprays for scab (Yellow Jacket Sulfur at 9 lb/A) from 7-10 days after shuck split till harvest (total of seven applications).
**Scab incidence (percent infected fruit) was recorded for 40 randomly selected mature fruit from each plot. Means followed by the same letter are not significantly different when using Fisher's protected LSD test.
***Scab severity was determined by counting the number of scab lesions observed on each of 40 fruit. Means followed by the same letter are not significantly different when using Fisher's protected LSD test.

Sulfur -- Not a Good Substitute for Shuck Split Scab Control for Peaches

Phillip M. Brannen,
University of Georgia

Scab control continues to be a challenge for producers. Though we may be able to keep scab incidence and severity down, we continue to occasionally have scab at levels which can incur grade reductions. When using the current USDA grading system (United States Standards for Grades of Peaches; effective 2 October 1995), peach fruit is downgraded from #1 to #2 grade when scab damage occurs (defined as "cracked, or when aggregating more than 3/8 inch in diameter" – roughly 4-6 well-developed lesions on a fruit). When 10% or more of the fruit in a shipment has scab damage, as defined above, the whole shipment can be downgraded. Naturally, producers try to save money where they can, and the question arises as to whether sulfur sprays during the critical shuck-split application will provide scab control which is equivalent to that of the more expensive materials, such as Bravo (chlorothalonil), Flint (trifloxystrobin), and Pristine (pyroclostrobin plus boscalid).

In a test conducted this summer, in collaboration with Dr. Mike Hotchkiss and Dr. Chuck Reilly (USDA Fruit and Nut Research Center), we attempted to answer this question. **Bottom line, producers are taking their chances if they use sulfur alone for controlling scab during the shuck split timeframe.** When we only differed the shuck split application between sulfur and other, more-efficacious fungicides, the other fungicides consistently reduced the number of scab lesions on the fruit (disease severity), while also providing more fruit without lesions (disease incidence). **When using the USDA standards, the use of sulfur at the shuck split application would have resulted in a significant increase in scab-damaged fruit, enough to reduce the grade from #1 to #2 (11.3% of the sulfur-treated fruit would definitely have been considered damaged, with 10 or more lesions; Bravo, Pristine, and Flint had 3.8%, 5.6%, and 3.1% fruit with 10 or more lesions, respectively). Depending on how stringently this standard is applied in the packing house, this could have resulted in a substantial reduction in market value for the peaches in this example.**

Better control of scab requires utilization of materials other than sulfur during the critical period of petal fall to 2-3 weeks after shuck split. Applications of products containing chlorothalonil (i.e. Bravo) or strobilurins (i.e. Flint, Abound, or Pristine) should be utilized during this time. Sulfur materials are generally acceptable for the cover spray period. However, if conditions are exceptionally wet (such as those observed in 2003), materials such as Captan or Abound should be incorporated in the cover sprays, providing both good scab control and suppression of green fruit rot.

We plan to continue research to fine tune our scab spray programs, so stay tuned.

Table 7. Scab control with various fungicides applied at shuck split.

Treatment[a]	Average Number of Scab Lesions per Fruit	Percent of Fruit with Scab Lesions (one or more)
1. Sulfur @ 9 lb/A	5	34
2. Bravo @ 4 pt/A	2	20
3. Pristine @ 0.92 lb/A	1	18
4. Flint @ 4 oz/A	1	16

[a]All treatments received a petal fall application of Bravo + sulfur and sulfur cover sprays for the remainder of the season.

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