Ohio
Fruit ICM News

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In This Issue

Calendar

June 28: Ohio Fruit Growers Society Board Meeting, Burnham Orchards, Berlin Heights, OH, 6:30 to 8:00 p.m. Contact Tom Sachs at 614-246-8290 or e-mail Tsachs@ofbf.org or Kathy Lutz at 614-246-8292 or e-mail growohio@ofbf.org.

June 28: Ohio Apple Marketing Program Board Meeting, Burnham Orchards, Berlin Heights, OH, 8:00 to 9:30 p.m. Contact Tom Sachs at 614-246-8290 or e-mail Tsachs@ofbf.org or Kathy Lutz at 614-246-8292 or e-mail growohio@ofbf.org.

June 29: Ohio Fruit Growers Society Summer Tour, Burnham Orchards, Berlin Heights, OH, 8:00 a.m. to 3:00 p.m. Contact Tom Sachs at 614-246-8290 or e-mail Tsachs@ofbf.org or Kathy Lutz at 614-246-8292 or e-mail growohio@ofbf.org. See following article.

Ohio Fruit Growers Society Announces Summer Tour 2005

The Ohio Fruit Growers Society (OFGS) is pleased to announce that this year's Summer Tour will be held at Burnham's Orchard, Inc. located in Berlin Heights, Ohio on Wednesday, June 29, 2005. The farmis owned by Joe Burnham III, his wife Martha, and their son Joe Burnham IV. Joe Burnham IV is proud to be the sixth generation to farm this land and recently married Lily, who has joined the family business handling office management, human resources, and marketing.

The farm dedicates approximately 220 acres to the growth of peaches, apples, and, most recently, cherries. Over the years, the Burnhams have experimented with many different training systems for apple growth, such as Y-Trellis, V-Trellis, Vertical Axe, and their current favorite, the Super Spindle. The various systems will be showcased during the orchard tours that begin at 8 a.m. and run every half-hour. The Burnhams will share their vast knowledge of these systems during the tour, and it will be both entertaining and educational.

In addition to their experience with growing fruit, they also plant approximately 550 acres of their property to row crops, such as com, soybeans, and wheat. In addition, they produce pumpkins, gourds, and squash for use in their retail farm market.

The Burnhams market their fruit through many different avenues. They have an on-site retail farm market that opens with the ripening of the first peach in July and stays open until the very last apple is gone in May.

The Burnhams also market their fruit through direct wholesale to other farm markets and local grocery stores; however; the majority of their apple production is sold through the Fruit Growers Marketing Association, where Joe Burnham III has been a member of the board of directors and served as president for many years.

More recently, they have added an entertainment segment on five weekends during harvest in September and October, where they offer a 5-acre corn maze, a hay bale maze, hay rides, a pedal tractor course, pick your own pumpkins, and lots more!

They also produce apple cider that is flash-pasteurized for product safety and bottled on-site. They market this cider though their retail farm marketand local grocery stores. They also enter their cider in the annual OFGS Cider Contest. Bruce Benedict of the Ohio Department of Agriculture will be on hand to review last year's Cider Contest and give details and entry information for the upcoming November 11, 2005 Cider Contest at The Great Big Food Show in Cleveland, sponsored by The Food Network.

In addition to the orchard tours, we will tour the Burnhams' brand new 14,000 square foot apple packing facility that was built to increase the efficiency of the packing operation and to increase work space around the apple packing line. You will be able to tour the dry refrigerated storage area that includes three loading docks that allow the fruit to be cooled immediately after packing and keeps it cool until the fruit is loaded onto trucks for shipping.

During the tour, you will be able to take in an educational food safety audit conducted by Shari Plimpton, with the Center for Innovative Food Technology. Shari serves as food safety educator for the Ohio and Indiana Specialty Crop Food Safety Initiative, presented in partnership with the U.S. Department of Agriculture's Risk Management Agency and Mid American Ag and Hort Services.

The Summer Tour will present more than 30 exhibitors who support the fruit industry. Interaction with these exhibitors will allow participants the unique opportunity to network with industry professionals and discuss and learn about products and technology essential to growing and marketing better fruit.

A delicious chicken barbecue lunch provided by Ag Credit will be served from 11:00 a.m. to 1 p.m. At 1 p.m. Joe Burnham IV will convene the OFGS business meeting and we will hear from him and from members of the Ohio State University Fruit Team.

As an added bonus, the Burnhams have arranged a tour of another sixth generation Berlin Heights business, The Berlin Fruit Box Company. This company has a proud family tradition that began in 1858 with Samuel Patterson. The company has been supplying handmade fruit baskets to local orchards and farm markets for years and also make handmade maple baskets and accessories for the home. This tour is an interesting, behind-the-scenes look at yet another aspect of the fruit growing industry. Owner Matt Adelman will graciously open the doors of his facility to Summer Tour participants beginning at 2 p.m. on June 29, 2005. For more information about the company or for driving directions, you may visit its web site at: <http://www.samuelpattersonbaskets.com>

Registration opens at 7:00 a.m. and the registration fee is $15 individual/$20 family for OFGS members and $20 individual/$25 family for non-members.Orchard tours begin at 8:00 a.m. and continue until noon, and the exhibitor area will also open at 8:00 a.m. and stay open the remainder of the day. Lunch will be served from 11:00 am to 1:00 p.m. OFGS meetings convene at 1:00 p.m. and the tour of The Berlin Fruit Box Company begins at 2:00 p.m.

The Ohio Fruit Growers Society is thrilled to have our Summer Tour hosted by Burnhams Orchard, Inc., located at 8019 state Route 113, Berlin Heights,Ohio 44814. We hope that you will join us for a day filled with education, industry, and fun!

For more information about the OFGS Summer Tour, contact Tom Sachs at 614-246-8290, tsachs@ofbf.org, or Kathy Lutz at 614-246-8292, klutz@ofbf.org. For maps, directions, and information visit our web site at <http://www.ohiofruit.com>.

Scab Control Precautions

Source: David A. Rosenberger, Plant Pathology, Highland, Cornell University, Scaffolds Fruit Journal Volume 14, No. 4, April 11, 2005

Information and concerns about fungicide resistance were reviewed in a previous issue of Scaffolds (also Ohio Fruit ICM News, Number 11, March 31, 2005). This article provides some specific precautions and suggestions for scab control in orchards where growers suspect that SI fungicides (Nova, Rubigan, Procure) may be losing effectiveness.

With resistance to SI fungicides prevalent or emerging in many orchards, we have lost the safety net that the SI fungicides provided. When SI fungicides were effective, we could afford "limited-risk" fungicide programs that included omitting sprays at green tip, spraying at 10-12 day intervals, and alternate row spraying. Where SI resistance is documented or expected (based on poor scab control last year), those limited-risk strategies can lead to major crop loss to scab in a wet year!

Unfortunately, SI resistance often becomes evident only in the wake of disastrous control failures. As a result of control failures, orchards with SI-resistant scab often have exceptionally high levels of overwintering inoculum. The one-two punch of high-inoculum and SI resistance creates tremendous potential for continued scab problems.

In orchards with high inoculum and suspected SI resistance, the following strategies are essential. For orchards where SI's are still working, implementing items 1 and 7 from the following list will help to preserve effectiveness of the SI fungicides.

- Start protectant fungicide sprays at green tip. Allowing just a few infections to occur before the first fungicide spray is applied can torpedo the effective scab control for the entire season.

- Use full rates of protectant fungicides. Remember that 1 lb of mancozeb fungicide or 1 lb of Captan 50W per 100 gal of dilute spray is actually a half-rate of fungicide that was initially recommended as a complement for Benlate, Topsin M, or SI fungicides.
  Using mancozeb fungicides at only 1 lb/100 gal on a 7-day spray interval can result in a control failure in a high-inoculum orchard. In high inoculum orchards, a combination of 1 lb/100 gal of a mancozeb fungicide plus 1 lb/100 gal of captan 50W (or the equivalent amount of another captan formulation) may be the best option, especially during the period from tight cluster through bloom when rapid leaf expansion can dilute fungicide effectiveness. Or switch to Sovran or Flint at pink and bloom as outlined in #7 below.

- Use shorter spray intervals. Where SI fungicides are no longer working, plan on a 5- to 7-day spray interval with protectant fungicides. Protection might need to be renewed after 5 days following heavy rains or to ensure coverage ahead of slow-moving weather fronts that might impede spraying for several days.

  If mancozeb fungicides or Captan 50W or a combination thereof are applied at 2 lb/100 gal (6 lb/A for medium-sized trees), then residual activity should hold up through 1.5 to 2 inches of rain. (Other captan formulations would be equally effective when applied at similar rates of active ingredient.) If mancozeb fungicides or Captan 50W are applied at only 1 lb/100 gal, then fungicide protection will often be exhausted after only an inch of rainfall.

- Use Scala or Vangard to work around prebloom oil sprays or when 48-hr post-infection activity is essential. Both of these fungicides work best in cool weather. They have the advantage of providing 48 hr of post-infection activity, but as protectants they are no more effective than 1 lb/100 gal of mancozeb used alone. Where captan-mancozeb mixtures are used in high inoculum orchards, Scala or Vangard can be substituted for the captan in the mixture when oil is applied.

- Spray in the rain if necessary to protect new foliage during infection periods that last more than 2 or 3 days. If fungicide protection is removed by heavy rains at the beginning of a wetting period and rains are predicted to continue for several more days, then protectant fungicides should be re-applied during the rain to protect against ascospores that will mature as the wetting period continues.

Sulfur, captan, and mancozeb fungicides that are applied in the rain will provide several days of protection against scab infection, but don't count on sprays applied in the rain to provide more than 3 or 4 days of protection. Sovran, Flint, Vangard, Scala, Topsin M, and SI fungicides should never be applied in the rain because all of these fungicides must dry on the leaf to be fully effective.

- Be wary of alternate row spraying on an extended interval. Alternate row spraying often leaves a "shadow" of unprotected foliage on the back sides of tree trunks. Where SI's are no longer working, it is imperative that all leaves be protected every 7 days. If in doubt about spray coverage, use water-sensitive paper to evaluate coverage on the back sides of trees. Attempting to judge spray coverage based on visual analysis of the spray plume can be misleading, because the spray mist that refracts the most light carries a relatively small proportion of the fungicide load.

- Consider Flint or Sovran at tight cluster and pink or at pink and bloom, but keep the spray interval at 7 days. These fungicides often give slightly better control of scab than can be achieved with mancozeb or captan sprays. Sovran and Flint can be applied alone or in combinations with captan or mancozeb, but tank mixes have not improved control in our field trials.

  Using Sovran or Flint at pink and bloom provides two benefits: They will provide protection against early powdery mildew infections and they will suppress sporulation of any primary scab infections that slipped through the pre-bloom spray program. Note, however, that Sovran and Flint do not have post-infection activity equivalent to that of the SI fungicides, so using Sovran or Flint at pink and bloom is not an acceptable substitute for a green-tip spray.

- Where SI resistance is suspected, do not use any SI sprays before petal fall. Application of SI+protectant sprays in an orchard with SI-resistant scab may actually stimulate growth of scab lesions and might result in less scab control than would occur if a low rate of protectant fungicide were used alone.

  However, SI's may still be needed in petal fall and early cover sprays to control powdery mildew and rust diseases. Delaying SI sprays until petal fall will minimize risks of stimulating scab problems because most ascospore release will be completed by petal fall, and there should be no secondary scab inoculum if appropriate prebloom sprays were applied.

A Question of Scale

Source: Dick Straub, Harvey Reissig, & Peter Jentsch, Entomology, Highland & Geneva, Cornell University, Scaffolds Fruit Journal, Volume 14, No. 4, April 11, 2005

According to grower reports, this pest is again gaining ground in many orchards throughout the state. San Jose scale can seriously affect fruit quality and, if unmanaged for a number of seasons, can result in poor tree health, or even death. We are fortunate to have a list of efficacious treatments that can be employed at various windows during the season (see Table 1). In the universal language of spraying apples, however, good coverage is necessary for control of scale.

Treatment periods 1 and 2 (green-tip and half-inch green): Oil, Lorsban and Supracide directed against overwintered 'black caps' are long-time standards, and each still has a place in control programs. Treatment during one or both of these time periods represents a first line of defense against scale. In most instances, applications at both green tip and half-inch green are probably unnecessary, but at this busy and often inclement time of season, an option should be welcome.

Oil + Lorsban tank-mixed, of course, is a traditional treatment. Historical evidence and recent results by Harvey Reissig & Combs (2003) suggest that there is not much synergism in the combination; i.e., either oil alone or Lorsban alone perform just as well. Many growers favor the combination, however, believing that it increases the efficacy against overwintered OBLR larvae . This is probably true.

Treatment periods 3 and 4 (crawlers of the 1st and 2nd generations): Relatively new on the scene are Provado, Esteem, and Assail. Quite frankly, we have very little experience with Provado against this pest, but it may be worth a try if other susceptible insect species are present during recommended treatment periods. Esteem is an insect growth regulator that functions as a juvenile hormone mimic and thereby inhibits metamorphosis from one stage to another.

It is most effective when directed against crawlers, preferably at first appearance. Esteem has no contact toxicity and tends to act very slowly. Assail is a new-generation broad-spectrum neonicotinoid that, somewhat similar to Esteem, is most effective when directed against crawlers at first appearance.

Esteem and Assail are also effective when applied at half-inch green (Reissig & Combs 2003), but such usage is 'off-label' and less economical than other options during this treatment period. Although the efficacy of both materials is improved by the addition of oil, these tank-mixes may be phytotoxic and result in fruit finish problems.

Treatments to be applied at the first appearance of summer brood crawlers are best timed by the use of a degree-day model (1st generation, 500 DD50 from 1 March; 2nd generation, 1451 DD50 from 1 March). Because each generation of crawlers is produced (NOTE: SJS females do not lay eggs, but rather give birth to live young) for extended periods of time, for complete control a second application 14 days later is advised.

Real-time degree-day accumulations for specific sites throughout New York are available from the NEWA web site: <http://newa.nysaes.cornell.edu/base4504.htm>, or perhaps from other local sources.

Correct timing of treatments is critical with Esteem and Assail, and calendar dates are generally too imprecise to be of benefit. For example, Table 2 shows that on average, 1st appearance of crawlers occurs approximately 21 days after petal fall. Also evident, however, is the extreme variation, i.e., the 500 DD event at the Hudson Valley Lab during the last decade has occurred at intervals between 4 May and 19 May.

Reference: Reissig, W. H. and D. Combs. 2003. A why, what and when approach to San Jose scale. Proceedings 79th Cumberland-Shenandoah Fruit Workers Conf., Winchester, VA

Table 1. Treatment periods and insecticide choices for management of San Jose scale. Rates are listed as amount of material/100 gallons.

Period	Treatment Choices	Comments
1 - Green tip	3% oil	
2 - Half-inch green	Either: 2% oil Lorsban 4E (16 oz) Lorsban + oil Supracide 2E (32 oz) Supracide 2E + oil	
3 - 1st summer brood (crawlers)	Either: Esteem (1 oz) + oil (2%) Assail (1 oz) + oil (2%) Provado 1.6F (2 oz) + oil (2%)	Apply at 500 DD from 1st March + again 14d later
4 - 2nd summer brood (crawlers)	Either: Esteem (1 oz) + oil (2%) Assail (1 oz) + oil (2%) Provado 1.6F (2 oz) + oil (2%)	Apply at 1451 DD from 1st March + again 14d later

Table 2. Historical record of calendar dates and corresponding degree-day accumulations to the treatment period (500 DD) for 1st generation summer brood crawlers of San Jose scale.

Cornell's Hudson Valley Lab, Highland, NY

Year	Date	DD50	Petal Fall of McIntosh	Days Post	Cover Period
2004	23 May	495.4	13 May	10	1C
2003	6 June	508.6	19 May	19	1C-2C
2002	31 May	508.0	7 May	24	2C
2001	29 May	499.3	10 May	19	1C-2C
2000	31 May	498.8	8 May	23	2C
1999	1 June	513.2	13 May	19	1C-2C
1998	21 May	505.1	4 May	17	1C-2C
1997	12 June	508.0	14 May	31	2C-3C
1994	1 June	495.5	12 May	20	1C-2C
Averages		503.5	11 May	20.2	+/- 5.5 days

Frost Protection in Strawberries

Source: Marvin Pritts, Dept. of Horticultural Sciences, Cornell University, Ithaca, NY, New York Berry News, Volume 3, No. 4

Strawberry growers can ensure a full crop of berries only if they exert some influence on temperature during the year. Temperature control is especially important during the winter and early spring when flowers are susceptible to frost. Of all the factors that negatively affect strawberry production, frost can be the most serious.

Frost can eliminate an entire crop almost instantaneously. Strawberries often bloom before the last frost free date, and if a frost occurs during or just prior to bloom, significant losses can result. The strawberry flower opens toward the sky, and this configuration makes the flower particularly susceptible to frost damage from radiational cooling. A black (rather than yellow) flower center indicates that frost damage has occurred.

Strawberry growers occasionally delay the removal of straw mulch in spring to delay bloom and avoid frost. Research has demonstrated, however, that this practice also results in reduced yields. Also, applying straw between the rows just prior to bloom will insulate the soil from the air. This will increase the incidence of frost injury as solar radiation will not be absorbed by the soil and re-radiated at night. If additional straw is to be applied between the rows in spring, delay its application for as long as possible before fruit set.

Overhead irrigation is frequently used for frost control because flowers must be kept wet during a freeze in order to provide protection. As long as liquid water is present on the flower, the temperature of the ice will remain at 32°F because the transition from liquid to ice releases heat. Strawberry flowers are not injured until their temperature falls below 28°F. This four degree margin allows the strawberry grower to completely cover a field with ice and yet receive no injury from frost. However, if insufficient water is applied to a field during a freeze event, more injury can occur than if no water was applied.

Several principles are responsible for the ability of ice to protect strawberry flowers from injury. First, although pure water freezes at 32°F, the liquid in the strawberry plant is really a solution of sugar and salt. This depresses the freezing point to below 32°F. Also, ice crystals need nucleators to allow them to form initially. Certain bacteria serve as nucleators. Sometimes, in strawberry flowers, the bacteria that allow ice to form are absent, allowing the freezing point to be lowered.

The temperature of the applied water is usually greater than the temperature of the plants, so this serves to warm the flowers before heat is lost to the air. As long as liquid water is continually applied to the plants, the temperature under the ice will not fall below 32°F. When one gallon of water freezes into ice, 1172 BTUs of heat are released.

Several factors affect the amount of water that is required to provide for frost protection, and the timing of application. At a minimum, apply water at 0.1 to 0.15 in/hr with a fast rotating head (1 cycle/min). Water must be applied continuously to be effective. A water source of 45-60 gal/min-acre is required to provide this amount of water. Choose nozzle sizes to deliver the amount of water required to provide protection under typical spring conditions in your location.

Under windy conditions, heat is lost from the water at a faster rate, so more water is required to provide frost protection. For every gallon of water that evaporates, 7760 BTUs are lost. The application rate then depends on both air temperature and wind speed (see Table 1).

Under windy conditions, there is less chance of flower temperatures falling below that of the air because of the mixing of air that occurs at the boundary of the flower. Winds are beneficial if the temperature stays above the critical freezing point, but detrimental if the temperature approaches the critical point. Less evaporation (and cooling) will occur on a still, humid night. Under extremely windy conditions, it may be best not to irrigate because the heat lost to evaporation can be greater than the heat released from freezing.

Stage of development: Strawberry flowers are most sensitive to frost injury immediately before and during opening. At this stage, temperatures lower than 28°F likely will injure them. However, when strawberry flowers are in tight clusters, as they are when emerging
from the crown, they will tolerate temperatures as low as 22°F. Likewise, once the fruit begins to develop, temperatures lower than 26°F may be tolerated for short periods. The length of time that plants are exposed to cold temperatures prior to frost also influences injury. Plants exposed to a period of cold temperatures before a frost are more tolerant than those exposed to warm weather. A freeze event following a period of warm weather is most detrimental.

Flower temperature: The temperature of all flowers in a field is not the same. Flowers under leaves may not be as cold as others, and those near the soil generally will be warmer than those higher on the plant. On a clear night, the temperature of a strawberry flower can be lower than the surrounding air. Radiational cooling allows heat to be lost from leaves and flowers faster than it accumulates through conduction from the surrounding air. Soil also retains heat during the day and releases heat at night. It is possible that on a calm, cloudy night, the air temperature can be below freezing, yet the flowers can be warm. Wet, dark soil has better heat retaining properties than dry, light-colored soil.

Using row covers: Row covers modify the influence of wind, evaporative cooling, radiational cooling, and convection. Because wind velocity is less under a row cover, less heat will be removed from the soil and less evaporative cooling will occur. Also, relative humidity will be higher under a row cover, reducing heat loss from evaporation. In addition, convective and radiational heat loss is reduced because of the physical barrier provided by the cover. Plant temperature under a cover may eventually equal that of the air, but this equilibration takes longer than with uncovered plants. In other words, row covers do not provide you with additional degrees of protection, but they do buy time on a cold night as flower temperatures will fall less rapidly inside a cover. Often the temperatures fall so slowly under a row cover that irrigation is not needed. If irrigation is required, less water is needed to provide the same degree of frost protection under a row cover. Water can be applied directly over the row covers to protect the flowers inside.

Rules of thumb

- Store sufficient water for 2 or 3 consecutive nights of frost protection
- Use small diameter nozzles (1/16-3/16 in. diameter)
- A 30 X 30 ft. staggered spacing of nozzles is preferable
- Use metal sprinklers to minimize icing
- Minimum rotation of once per minute

Turning on the water: Since cold air falls to the lowest spot in the field, a thermometer should be located here. Place it in the aisle at the level of the flowers, exposed to the sky, and away from plants. Air temperature measured at this level can be quite different from the temperature recorded on a thermometer at the back of the house. The dewpoint temperature measured in the evening is often a good indication of how low the temperature will drop on a clear night, and is related to the relative humidity. Air temperature will fall less if the humidity is high. If the air is very dry (a low dewpoint), evaporative cooling will occur when water is first applied to the plants, so irrigation must be started at a relatively warm temperature. Most local weathermen can provide the current dewpoint, or it can be obtained from World Wide Web-based weather information services.

If the air temperature falls below 34°F on a clear, calm night, especially before 3 A.M., it would be wise to start irrigating, since flower temperatures could be several degrees colder (Table 2). On the other hand, if conditions are cloudy, it may not be necessary to start irrigation until the temperature approaches 31°F. If conditions are windy or the air is dry, and irrigation is not turned on until the temperature approaches 31°F, then damage can occur due to a drop in temperature when the water first contacts the blossom and evaporation occurs.

The range in air temperatures which indicates the need for irrigation at flowering is normally between 31° and 34°F, depending on cloud cover, wind speed, and humidity, but can be as high as 40°F. Admittedly, these numbers are conservative. Flowers can tolerate colder temperatures for short periods of time, and irrigation may not be needed if the sun is about to rise. Obviously, one does not want to irrigate too soon, since pumping is expensive and excess water in the field can cause disease problems.

Turning off the water: Once irrigation begins, it should not be shut off until the sun comes out in the morning and the ice begins to slough off the plants, or until the ice begins to melt without the applied water.

Waterless frost protection agents: Future solutions to frost protection could lie in waterless methods, such as genetically engineered bacteria that do not promote the formation of ice. However, to date, these materials have not been consistently effective, so they are not recommended as the sole basis for frost protection.

Table 1. Water application rate (inches/hr) for a given humidity and wind speed

Temp (F)	Wind Speed				
	0-1	2-4	5-8	10-14	18-22
Relative humidity of 50%					
27	0.10	0.20	0.30	0.40	0.45
24	0.10	0.30	0.35	0.45	0.60
20	0.15	0.35	0.45	0.60	0.75
18	0.20	0.40	0.50	0.65	0.80
Relative humidity of 75%					
27	0.05	0.10	0.20	0.25	0.25
24	0.10	0.20	0.30	0.35	0.40
20	0.10	0.25	0.40	0.45	0.60
18	0.15	0.30	0.45	0.55	0.70

FROSTPRO Model; North Carolina State University

Table 2. Starting temperature for frost protection based on dewpoint

Dewpoint	Suggested Starting Air Temperature
30°F	32°F
29°F	33°F
27°F	34°F
25°F	35°F
24°F	37°F
22°F	38°F
20°F	39°F
17°F	40°F

Dormant Applications of Fungicides on Grapes

Source: Mike Ellis, Ohio State University Extension Plant Pathologist

For the past two years we have been conducting evaluations of dormant applications of liquid lime sulfur and fixed copper (copper hydroxide-COCS) for control of Phomopsis cane and leaf spot on grape. We applied lime sulfur at 10 gallons per acre and copper at 3 lb per acre in 100 gallons of water per acre. We made applications in the fall (after leaf drop), in the spring at bud swell, and at both times (spring and fall). Our results indicate that both lime sulfur and copper applied in the spring resulted in a significant reduction of Phomopsis leaf and internode infection in the growing season. Lime sulfur was more effective than copper. There were no differences in disease control between the spring only and both the spring and fall applications. Although we got a significant level of disease control, we never achieved 100% control of Phomopsis with the dormant application. Therefore, the dormant application did not reduce the need for fungicide applications for Phomopsis control during the season.

We have been getting a lot of questions about the use of dormant applications of fungicides, so I will make the following comments at this time:

Dormant applications of lime sulfur or copper will provide some degree of Phomopsis control, but will not reduce the need for the standard recommended fungicide sprays for Phomopsis control during the growing season. We have no evidence to indicate that the dormant applications are effective against any of the other grape diseases. In short, they could help, but if you have a good spray program during the growing season, they probably will not result in much of an increase in disease control at the end of the season. Please remember that this assumes you have a good fungicide spray program during the season. We will be presenting the results of our studies with an economic analysis after this season. The bottom line is that if you have a good spray program and your vineyards are pretty clean, you probably do not need a dormant application of fungicide in the spring. I do not recommend a dormant application of fungicide in the fall for disease control.

I do recommend the use of dormant applications of lime sulfur in the following situations:

- In organic vineyards, this should be an important spray.

- In vineyards where Phomopsis is getting out of hand, this spray should be considered. In some Concord vineyards that are mechanically pruned, Phomopsis incidence is increasing. A dormant spray of lime sulfur would probably be beneficial here, but the economics on Concord needs to be considered. For wine grape vineyards where the level of Phomopsis infection is severe, the dormant spray should be considered. It has been my observation over the past several years that we can detect some level of Phomopsis in almost every vineyard we inspect. It is probably not realistic to expect 100% control of Phomopsis on internodes, even with a good full-season spray program (this is my personal opinion, Mike Ellis). In our studies, the dormant application of lime sulfur plus a good full season spray program has never resulted in 100% control of Phomopsis.

- If anthracnose is present in the vineyard, a dormant application of lime sulfur at the rate of 10 gallons per acre is very important. This spray is the major means of controlling anthracnose. We have seen serious anthracnose in several Ohio vineyards, mainly on Vidal and Reliance grapes.

In summary, a dormant application of lime sulfur (lime sulfur appears to be more effective than copper) is beneficial and even necessary in some situations as mentioned above; however, it is not a "silver bullet" that is going to reduce the need for a full-season fungicide spray program on wine grapes.

If you have questions, please contact Mike Ellis at 330-263-3849 or ellis.7@osu.edu.

Pest Patrol for Fruit and Vegetable Growers

Source: Shari L. Plimpton, Ph.D., Food Safety Educator - Ohio and Indiana Specialty Crop Food Safety Initiative via John Wargowsky, Executive Director - Mid American Ag and Hort Services, Inc.

Rats, flies, and other vermin. Centuries ago rats struck fear into the hearts of mankind because contact with them could lead to death. Well, we are past the medieval scourge of the Black Death, aren't we? Flies are only a "nuisance" in this day and age, aren't they? Deer, geese, ducks . . . isn't the only real concern for a grower the potential crop losses to thesepests? Simply put: no. You don't have to look any farther than the nearest newspaper or web news page to see stories about the bird flu and the latest petting zoo outbreak to realize that vermin, insects, fowl, and animals all still have the potential to carry microorganisms that can lead to human illness. Time and again wild animals, including rodents and insects, have been documented to carry E. coli 0157:H7 and other human pathogens.

Three words sum up the approach to reducing your risk of contamination from pests, large and small: *restriction*, *exclusion*, and trash/garbage *management*. Starting with the field, the best practice as defined by the Good Agricultural Practices (GAPs) program is to restrict access as much as reasonably possible. Using fences and other active deterrents, where practical, will help you minimize your risk. Remember that our goal is always minimizing risk, not eliminating it. Consider the water you are using for irrigation and spraying. If it's an open surface, restrict access by geese and other water fowl as much as possible. Also, test the reservoir quarterly and consider some form of water treatment if you detect fecal coliforms or E. coli.

In the packing facility, pest control is that much more important since this is often the last place produce is handled before reaching the consumer. Start outside and remove trash and/or culling piles from the building's perimeter. As far as rodents and insects are concerned, junk equipment and garbage piles are the best motels and fast food the country has to offer (outside of New York City). Effective trash and garbagemanagement will minimize the potential for attracting the pests that can cause you the most trouble.

The packing shed is where you can successfully practice exclusion. You are ahead of the game if you can minimize openings in the walls, floors, and ceilings of your packing shed and use screening and doors. Regardless of how open your shed is, you can reduce the presence of rodents in and around your facility by locating traps inside and outside doorways, including garage doors. Rodents like to move close to the wall along the floor and readily enter baited stations located tightly against the wall approximately every 20 feet within the building. Poison is not needed to capture and remove rodents and creates an unnecessary risk. If you undergo a third party audit, most auditors would significantly reduce your score and some would consider an automatic failure if they found poison inside the packing shed, even if it's within the bait station. Be sure to number and map your bait stations so you can keep track of them and more easily record when you monitor them, especially if you expect to undergo third party auditing.

Insect traps are only needed if you have a consistent, significant bug problem. If you do use something like zappers or pheromone traps, remember that they work because they attract the insects. Place them away from where the produce is held prior to entering the packing house and away from the packing line so the insects are drawn away from those areas. Also, check and clean them out frequently, so they don't become a potential source of contamination.

Each operation is unique and requires some creative thinking to address pest problems sufficiently. This year we have the Ohio and Indiana Specialty Crop Food Safety Initiative offering growers a variety of tools to address pests and other food safety issues. The Initiative is presented in partnership with the United States Department of Agriculture's Risk Management Agency.

Ohio and Indiana fruit and vegetable growers may contact Mid American Ag and Hort Services (MMAHS) at 614-246-8286 (voice), 614-246-8686 (fax) or maahs@ofbf.org or visit www.midamservices.org and click on "projects" for more information on this Initiative. Materials that provide additional information on this topic and free on-farm food safety consultations are available by contacting MAAHS.

Fruit Observations and Trap Reports

Site: Waterman Lab, Columbus
Dr. Celeste Welty, OSU Extension Entomologist

Apple: 4/6 to 4/13/05 Tight cluster on 4/13/05	
Redbanded leafroller	96 up from 9
Spotted tentiform leafminer	790 up from 2

Site: Medina, Wayne, and Holmes Counties
Ron Becker, IPM Program Assistant

The apple trees went from silver tip on April 5th to half inch green by April 10th. The peaches in the northern orchards showed several varieties with flower bud damage, ranging from 80% to 100% damage. Diane Miller would be very interested in knowing which varieties (especially newer ones) came through better than others -- something the growers may want to jot down and send to her. A grower in the southern part of the county called me today to report that he had similar loss of buds except for in Reliance, which seems to have the normal number of healthy buds.

Other Ohio Observations:
Ted Gastier, Huron County Extension Educator

Ohio Ag Statistics indicated 23% of the state's apple crop was at green tip and beyond as of April 10; 20% of the peach crop at green tip and beyond as of the same date. These figures are considered to be behind schedule. This is due to the majority of these crops being in the northern part of Ohio, where temperatures have lagged because of almost constant northerly winds off Lake Erie. The rest of the state has had more normal temperatures.

Peach producers are mostly cautiously optimistic about crop prospects. However, we have scattered reports of extensive bud damage so we will know more in several weeks.

Pest Phenology

Coming Events	**Degree Day Accum.** Base 50°F
Pear psylla adults active	7 - 33
Pear psylla 1st oviposition	11 - 53
Green fruitworm 1st catch	12 - 54
Redbanded leaf roller 1st catch	32 - 124
Tarnished plant bug active	34 - 299
Spotted tentiform leafminer 1st catch	39 - 113
Oriental fruit moth 1st adult catch	44 - 338
Rosy apple aphid nymphs present - 1st egg hatch	45 - 148

Revised thanks to *Scaffolds Fruit Journal* (Art Agnello)

Degree Day Accumulations for Ohio Sites

April 13, 2005

Ohio Location	**Degree Day Accumulations Base 50°**	
	Actual	**Normal**
Akron-Canton	53	64
Cincinnati	164	129
Cleveland	45	61
Columbus	120	88
Dayton	97	89
Kingsville	26	43
Mansfield	52	57
Norwalk	30	47
Piketon	149	136
Toledo	37	43
Wooster	64	50
Youngstown	47	48