INDEX

FFF00-04
April 19, 2000

Crop Conditions: To say this has been a strange season so far is an understatement. Warm early season temperatures pushed along development 3-4 weeks ahead of normal. At this stage we all knew we were at high risk of sustaining some frost or freeze damage. The following cooler temperatures helped to hold back development, but most fruit crops were already had begun development and had lost a lot of their hardiness. Right now apples and peaches are at a similar stage of development in many parts of the state, although peaches are a bit ahead of apples in the south. Generally, apples are at around petal fall in the south but only in tight cluster to pink in more northern areas of the state. Grapes are a little behind other crops with early varieties with 1-2 inch shoots and later varieties at various stages of bud swell in the south and bud swell to bud break in the north. Brambles have been moving slowly due to the cooler temperatures with 3-5 inch shoots south and 1-2 inch north. Blueberries are breaking buds. Strawberries are at early bloom south and trusses are out of the crown north. We've seen damage on strawberries from the recent cold temperatures. Brambles appear to be okay but may show symptoms later. Blueberries were likely damaged moderately, depending on stage of development and minimum temperature. Grapes have gotten by with minimal damage so far. We'll know more in another week or two and we'll have another update in the next issue.

Tree Fruits Damaged by Freeze: About 10 days ago, most of the state was hit by temperatures around the low 20's creating a lot of damage on apples around the state. Actually the cold wasn't too atypical, it was just that development was advanced for that time of the year. In many ways, it wasn't the cold that hurt us as the 70 degree days a few weeks earlier. To assess the amount of damage, the easiest way is to pinch the small flowers in half with your fingernail, and look at the center of the flower. Green is alive and brown indicates some damage. Even if just the pistil, which is the very fine thread like structure in the middle of the flower, is damaged, then the flower will not set a fruit. I'd suggest looking at about 50 flowers from each variety. If you find 5 or more live flowers out of the 50, then you're probably in good shape for a full crop. Less than 5 and a partial crop can be expected.

Good nutrition will help the buds withstand cold temperatures somewhat better, but there are different ideas on what can be done once the damage has occurred. Look in the Tree Fruit Handbook for details, but generally 2 lbs urea/100 gal in a dilute spray at pink and again at petal fall has been found to increase the growth of damaged leaves and therefore hopefully improve fruit set of the remaining flowers. Fruit size may also be improved by this urea spray. Including boron (with a material such as Solubor) with urea sprays may also help. These sprays will not repair the cold damage, but should improve growth and fruit set of remaining healthy flowers.

Often the first look at the problem is the worst. Remember that only 10% of live flowers means you probably have a full crop. There will still be a number of orchards in the state that will need chemical thinning, so don't throw the NAA and sevin away just yet. At full bloom I'd suggest taking a closer look at the trees and gaining a better picture of the situation. In the next FFF, we'll discuss chemical thinning in these orchards.

Wanted: European Red Mites: One of the questions I have about the changes to the Apollo label is how well Apollo will work as a rescue treatment. Because Apollo

kills only the eggs, the nymphs and adults will continue to feed for a couple of weeks or until they are killed by predators, weather, or old age. AgrEvo has kindly donated enough Apollo to my program to test it as a rescue treatment in growers' orchards this summer. If you have not used Apollo or Savey and develop a mite problem, please give me a call at 765-494-9572. I will then come to your orchard, set up the plot, take mite samples, and provide you with the Apollo you need to spray the problem area. I will then come back two weeks later and take additional mite samples to determine how well the application worked. All that I ask it that you leave some of the trees untreated during this two week interval. I can then provide you with Apollo to treat the remaining trees after I have evaluated the level of control achieved. Obviously, there will not be enough days in the summer to put out a trial at every orchard that runs into a mite problem. I will try to put out as many as I have time for, and I will probably have to go on a first come, first served basis. I would like to get about 8-10 good trials out this summer. That would give us a very good indication of just how well we can expect Apollo to work as a rescue treatment. As always, thank you for your cooperation. -*Foster*

Fire Blight: Do not become complacent about fire blight! Even though fire blight has been at a low level the past few years you never want to let your guard down on this disease. The best prevention for fire blight is the application of streptomycin during bloom. Apply streptomycin just as blossoms begin opening and repeat every 3-4 days if weather favorable for blossom blight infection persists. Be especially diligent in your fire blight program if you have M-26, M-9 and/or Mark rootstocks and/or interstems. Due to their high susceptibility, fire blight prevention is mandatory in orchards containing these rootstocks. The "MARYBLYT" computer software program will help you in determining when and if an infection event occurred as well as predict the risk for future infection periods. If you are interested in obtaining MARYBLYT contact Gempler's at 1-800-382-8473. *–Pecknold*

Apple Scab: The peak period for scab infection is now! Primary scab spores are ripe and ready to infect, all they need is a good scab rain. Are you prepared? For growers on a curative schedule, or for those who get caught with their pants down (unprotected), we suggest Nova, Flint, or Sovran. These fungicides will provide up to 96 hours "curative activity". However, the sooner you apply them the better! Do not sit around thinking there is no need to rush. *–Pecknold*

Rust Diseases: Cedar apple and cedar quince rust are now actively infecting foliage and fruit. Except for the northern areas of the state, we are now into the peak period for rust infection. The sterol-inhibiting fungicides, Nova and Rubigan, are excellent in preventing rust problems, as well as providing excellent control of powdery mildew...which is also infecting new leaf tissue, right now! *–Pecknold*

Nova, Rubigan & Tank Mixes: All Nova or Rubigan applications should be tank-mixed with a standard protectant fungicide to avoid problems with resistance to apple scab. However, it is especially important that your final spray (petal fall or first cover) of Nova or Rubigan be combined with a protectant fungicide such as captan, ziram, mancozeb, or Polyram. The addition of a protectant fungicide at this time will help provide protection from summer diseases such as black rot, sooty blotch and fly speck and also give added protection from fruit scab. Refer to Rubigan and Nova labels for additional information on tank mixes. *–Pecknold*

THE STROBILURINS: "SCAFFOLDS", the newsletter out of New York, recently had an excellent article on the new strobilurin fungicides. If you have questions on these fungicides or are considering their use, I highly recommend you read this article. *–Pecknold*

***Apple Disease Control with New Fungicides*:** Source: Wayne Wilcox and Dave Rosenberger, Plant Pathology, Geneva & Highland, New York. Apple growers have two new options for controlling diseases this season. "Sovran" from BASF and "Flint" from Novartis are broad-spectrum fungicides from the new chemistry class commonly known as strobilurins. Both materials received federal registrations for pome fruits (apple, pear, and quince) in 1999. They are welcome additions to the "tool chest", not only because of their inherent activities, but because they should take some pressure off the SI fungicides. This is important not only where the SIs have begun to "slip" due to resistance development, but also where they haven't (i.e., let's keep it that way). In an ideal world, each fungicide group would help keep the other alive.

Origin and mode of action of strobilurin fungicides
Strobilurin chemistry was derived from a natural antifungal compound that occurs in a small mushroom, *Strobilurus tenacellus*, which grows on fallen pine cones in Europe. Chemists in several companies modified the original compound to make it more stable and more effective as a fungicide.

The strobilurins are very active against a wide array of plant pathogenic fungi, generally at rates of only one to three ounces of active ingredient per acre. They have very low toxicity to birds, earthworms, beneficial insects, predaceous mites, and mammals (including humans). They break down quickly in soil but have good residual activity on foliage and fruit. Because of their broad spectra of activity and favorable environ-

mental profiles, they are the most significant new group of fungicides to be developed since the sterol inhibitors.

Unlike the SI fungicides, the strobilurins are excellent inhibitors of spore germination; thus, they are excellent protectant fungicides. These materials are retained primarily within the waxy cuticle of leaves and fruit, which means that they are more rainfast than traditional protectants. This also means that they don't redistribute very well from leaf to leaf in rainwater, although they do redistribute well within the waxy layers of a given leaf (or fruit). Furthermore, a small portion of the total dose does diffuse from the surface of a sprayed leaf and, after a few days, enough accumulates on the other side so that it offers fungicidal protection on that unsprayed side (termed "translaminar" activity). This general pattern of fungicide movement is unique to the strobilurins, and different manufacturers have made up their own trademarked names to describe it, e.g., "surface systemic" for Sovran and "mesosystemic" for Flint. You'll be hearing these terms in the advertisements.

In addition to being excellent protectant fungicides, the strobilurins are powerful antisporulants. That is, when applied beyond their period of true "kickback" activity, they allow lesions to develop but few secondary spores form on these lesions. This is particularly significant for a disease like apple scab, where economic damage (fruit scab) is usually caused by the secondary spores that develop on infected leaves. For instance, in trials conducted in Geneva in both 1996 and 1998, early infection periods were missed (unintentionally) and significantly less fruit scab developed when the first two sprays consisted of a strobilurin (Sovran in 1996, Sovran or Flint in 1998) rather than an SI plus mancozeb. This reduction in fruit scab was directly related to the reduced number of sporulating lesions produced on cluster leaves treated with strobilurins in the early sprays versus those treated with other materials.

The strong protectant and antisporulant activities of these materials are functions of their retention in the cuticle on the surface of the leaves and fruit. Conversely, good curative or kickback activity usually requires a fungicide to penetrate the cuticle and get inside the leaf, i.e., to get down where the fungus is doing its business after it has established an infection. Thus, the strobilurins generally are not as effective in a kickback mode as are compounds with a higher degree of systemic activity, such as the sterol inhibitors. However, apple scab may provide an exception to this general rule. That is, the apple scab fungus grows just beneath the cuticle, so enough fungicide to provide true postinfection control may actually "leak through" the underside of the cuticle and do the job. Both Flint and Sovran are labeled to provide approximately 4 days of postinfection control for apple scab. At this point, however, the trials that have led to these claims are extremely difficult to evaluate, and it's not clear whether postinfection sprays truly kill the incipient infections or merely keep them from sporulating (in which case, they could potentially reactivate without additional applications of the fungicide). There is no question that Sovran and Flint provide scab control when applied postinfection, but it seems risky to deliberately design postinfection control programs with these materials until more is known about the details just discussed.

Used alone without contact fungicides, Sovran and Flint will perform in the orchard similarly to SI-protectant tank mixes in their heyday. It is important to recognize that these strobilurin fungicides control scab (and many other diseases) on apple fruit at least as effectively as mancozeb and captan, and much more effectively than SI fungicides ever did when the SIs were applied alone. Sovran is labeled for use at 10-14 day intervals, whereas Flint is labeled for use at 7-10 day intervals. Based upon limited comparisons of the two (Flint has only been available to the university community since 1998), it would appear that this difference in recommended spray intervals is a result of "product positioning" by the respective manufacturers rather than differences in product activity. Spray intervals of greater than 10 or 11 days are not recommended during the primary scab season, due in part to the need to cover new tissues as they emerge.

What about fungicide resistance?

Strobilurin fungicides work by inhibiting a single biochemical pathway involved in mitochondrial respiration in fungal cells. Mitochondria are the energy-producing units within cells, so disrupting mitochondrial function results in death of the fungal cells as they "run out of gas". Because strobilurins inhibit a single biochemical step, resistant strains of various pathogens will develop if these fungi can utilize an alternative biochemical pathway that bypasses the step blocked by strobilurins. Resistance to strobilurins has already appeared in powdery mildews of cereal grains and cucurbit crops in Europe and Asia, as well as in Botrytis of greenhouse crops. Thus, resistance is a very real concern, and resistance management must be incorporated into plans for using strobilurin fungicides from Day 1 of their introduction.

To date, strobilurin resistance appears to follow the "Benlate model"; that is, resistant isolates are virtually immune to the fungicides and multiply rapidly if they are not controlled by some other material. Furthermore, a fungal strain that is resistant to Sovran will be resistant to Flint and vice versa. Therefore, both companies have agreed on identical labeling which requires use patterns that incorporate resistance-management principles:

1) No more than four sprays of any strobilurin may be

used per season; and
2) A strobilurin fungicide can be used no more than three times in a row; if two or three sequential applications are made, an effective unrelated fungicide must be used in the next two applications before strobilurin use can resume.

Note that tank-mix combinations are NOT a part of this strategy, and that both fungicides are priced to be used alone. Thus, this strategy is to
1) minimize the selection of resistant strains by limiting the number of selection events (sprays); and
2) limit the opportunity for resistant strains to multiply, by using unrelated fungicides in rotation. Restricting the number of sequential strobilurin sprays to two might be an even more effective anti-resistance strategy, although three is legal. Economics will help enforce the limited-spray strategy, but it is important that growers and advisors not deliberately short-circuit the intent to limit the buildup of resistant fungus strains; e.g., by failing to rotate with effective unrelated

materials. For instance, rotating Flint or Sovran with only benzimidazole/captan sprays would not be a good resistance-management strategy with respect to the powdery mildew fungus, because mildew is already resistant to the benzimidazoles in many orchards.

Strobilurin fungicides can be phytotoxic to some crops.
Sovran is phytotoxic to a few sweet cherry varieties and therefore will not be registered for cherries. All of the foliage on Somerset, Sweetheart, Valera, Van, and Vandalay can be killed if trees are sprayed directly with Sovran. Less severe phytotoxicity (mostly leaf spotting) has been observed on Cavalier, Emperor Francis, Royalton, Schmidt, Summit, and Viva trees that have been sprayed directly. Drift (other than direct blow-through) and the concentrations resulting from residue remaining on spray tank walls are believed to pose relatively little danger. Tart cherries and other sweet cherry varieties show little or no phytotoxicity from Sovran, even when sprayed directly.
Flint is phytotoxic to Concord grapes when applied directly, and is specifically not labeled for use on that variety. Azoxystrobin (Abound, Quadris), another strobilurin fungicide which is registered for use on grapes and some vegetable crops, is extremely phytotoxic to certain apple varieties (e.g., Macs, those with Mac parentage, and Gala), even at very low concentrations resulting from drift or spray tank residue. Thus, each of these strobilurins has a problem with phytotoxicity to a few varieties of one specific crop. Fruit growers producing apples and stone fruits or apples and grapes may wish to consider the potential for phytotoxicity when selecting which of these fungicides they will use on their farm.

Sovran and Flint provide excellent control of apple diseases.
In university trials, Sovran and Flint have provided excellent control of apple scab, powdery mildew, sooty blotch, flyspeck, and black rot. Both Sovran and Flint provide only marginal control of cedar apple rust and quince rust, especially when used at the lower end of labeled rates.

Which product is better, Sovran or Flint? That depends primarily on the rates of the respective products that are used in comparisons. Evidence to date suggests that Sovran and Flint provide comparable control of apple diseases when the rate of Sovran is double the rate of Flint. Thus, Sovran at 4 oz per acre will provide the same level of control as Flint at 2 oz per acre, and early indications are that the products will be priced accordingly. The Sovran label gives recommendations in rates per 100 gallons (1.0 - 1.6 oz) as well as rates per acre (4.0 - 6.4 oz) whereas the Flint label lists only rates per acre (2.0 - 2.5 oz). The minimum labeled Sovran rate of 1.0 oz/100 gallons may prove marginal under high apple scab pressure, based upon experience in our high-inoculum test orchards at both Highland and Geneva. Experience with Flint is more limited, but a rate response was also seen in the one comparative study conducted in Geneva. That is, a rate of 0.5 oz/100 gallons - presumably equivalent to the 1.0 oz/100 rate of Sovran - was less effective than a higher, unlabeled rate (1.0 oz/100).

Therefore, we suggest that apple growers in New York use Sovran at a minimum rate of 1.33 oz per 100 gallons of dilute spray for tree-row-volume applications. Technical support personnel from BASF recommend a minimum of 2.0 oz per acre even on the smallest trees, a recommendation that prudently recognizes the potential inefficiency of spray capture in small trees and the relatively high crop value in high-density plantings. We recognize that a rate of 1.0 oz per 100 gallons for Sovran may be adequate for purely protective sprays under modest pressure, but both the label and our personal experiences indicate the need for higher rates if postinfection activity is required. The minimum rate for Flint is 0.67 oz per 100 gallons dilute basis. The latter is based not only on the 2:1 formula for Sovran:Flint, but also is derived by dividing the lowest label rate (2 oz per acre) by 3, using the increasingly standard assumption that per-acre rates must be divided by 3 to arrive at rates per 100 gallons for apples in New York State. A common “fudge factor” (at least 150 gallons per acre dilute basis, even on the smallest trees) yields a minimum per-acre rate of 1.0 oz for Flint.

Suggested use patterns for Sovran and Flint
What is the best timing for strobilurin fungicides? There is no single “correct” answer. However, we believe that

the best timing in many locations is around the tight cluster plus pink bud stages, except in areas where quince rust is a concern. Applications at tight cluster and pink target the period of peak apple scab ascospore discharge and the beginning of the mildew season, and they will also suppress secondary spore production on lesions that managed to sneak through in earlier infection periods. Sovran or Flint applied at these early stages, before SI fungicides are used, will help "break the cycle" and limit the ability of SI-resistant scab and mildew strains to re-establish on new foliage. Using Sovran or Flint to control early-season infections will result in less selection pressure for scab and mildew strains resistant to the strobilurins because inoculum levels are lowest early in the season (an example of the old concept that X % resistant strains in a small population provides fewer problem individuals than X % resistant strains in a large population). Combinations of contact and SI fungicides can then be used at petal fall and first cover to provide continued protection against scab and mildew. Having a contact fungicide present at petal fall should reduce potential risks from a myriad of minor diseases for which we still have limited data on activity of strobilurin fungicides.

A typical apple fungicide program might therefore involve an initial application of a protectant fungicide (maybe two in very wet years), followed by two sprays of Sovran or Flint at approximately 10-day intervals starting about tight cluster. A single mancozeb spray may be needed during an extended bloom period to bridge the gap between the second strobilurin spray and the petal fall application. At petal fall and first cover, an SI-contact combination could be used to round out the scab and mildew season. If desired, a final strobilurin spray could be used to extend the period of optimal scab and mildew control and provide excellent flyspeck control, before switching to routine summer fungicide programs; or, summer programs could be initiated now. In blocks where scab pressure is low and no mildewcide is needed, the Sis might be omitted and contact fungicides used alone to provide protection through
petal fall and early summer.

In blocks where quince rust is a concern, the SI-contact combination should probably be used at tight cluster and pink, the period when quince rust infections occur on fruit. Sovran or Flint could then be used at petal fall and first cover when fruit are no longer susceptible to rust. Sovran and Flint will provide acceptable (but not perfect) protection of leaves against cedar apple rust, but they will not provide adequate protection against quince rust on fruit during the tight cluster and pink stages.

Sovran and Flint are very effective for controlling flyspeck (and sooty blotch) and could be used as substitutes for benzimidazole-captan sprays during summer, especially where the four-day re-entry interval for captan creates management problems. The best timing for Sovran and Flint in summer sprays remains to be determined, as does their cost effectiveness at this time in much of the Northeast. If Sovran or Flint scab sprays are applied at tight cluster and pink, then they should not be used again until second cover. During early summer, good spray coverage is still possible whereas dense foliage, fruit clustering, and limbs drooping under heavy crop loads often compromise spray coverage in late summer. However, if Sovran or Flint scab sprays are applied at petal fall and first cover, then additional summer applications would need to be delayed until July or August because of the requirement for intervening applications with some other class of fungicides.

Sovran has a 30-day preharvest interval and the label indicates that it should not be used as the last spray of the season. This prohibition was based on the assumption that growers might apply Sovran for scab control starting at green-tip, and using it both to end the season and begin the following season would compromise resistance management. Flint has a 14-day preharvest interval, and Novartis has actively investigated the value of late-summer sprays. Both Flint and Sovran appear to have residual activity against flyspeck that is equivalent to that provided by Benlate and Topsin M.

Note: The Finger Lakes Vineyard Notes recently had a similar article on fungicides for grapes written by Wayne Wilcox. We'll run a copy of it in the next Facts for Fancy Fruit.

Strawberry Frost Protection: Strawberries are in early bloom in southern and central areas of the state. Sprinkler irrigation equipment for frost protection should be set up, tested, and ready to go. Once flowers open they are susceptible to temperatures below 30˚F. Application of water through overhead irrigation can prevent temperatures from dropping below 30˚F even though the air temperatures may drop to 25˚F or colder. The principle behind this method of frost protection is that as water freezes, heat is released. As long as an adequate layer of freezing water covers the bud or berry, the temperature will remain at or near the freezing point. It is important to remember that a layer of freezing water must be present at all times. Ice without the continued application of water will not protect the flowers from freezing temperatures. This means that the rate of application of water must be carefully monitored. The rate at which water freezes is dependent on several environmental factors, including air temperature, humidity, and wind speed. Generally, the lower the air and dew point temperature, and/or higher the wind speed, the greater the rate of freezing. Application rates

for frost protection are fairly low compared to normal overhead irrigation rates. Most growers install a smaller set of nozzles in the sprinkler head specifically for frost protection. The correct rate of irrigation can be determined from the following table.

Air temperature at canopy level (˚F)	Wind speed		
	0-1 mph	2-4 mph	5-8 mph
At 50% relative humidity			
27	0.10 inches per hour	0.20	0.30
24	0.10	0.30	0.35
20	0.15	0.35	0.45
At 75% relative humidity			
27	0.05	0.10	0.20
24	0.10	0.20	0.30
20	0.10	0.25	0.40

Irrigation should be started before damaging temperatures occur. Start irrigation when the temperature in the lowest part of the planting reaches 34-32˚F at canopy level. Continue irrigation until ice begins to melt after sunrise. Irrigation can be very effective for frost protection, but it can also create problems such as excessively wet soils, nutrient leaching, and fruit rots. Misuse of irrigation for frost protection can cause more harm than good. –*Bordelon*

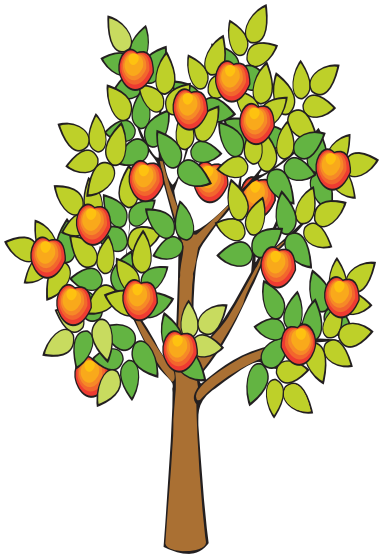
Excellent Strawberry Publication: The*Strawberry Production Guide for the Northeast, Midwest, and Eastern Canada* is available from the Northeast Regional Agricultural Engineering Service (NRAES). The guide, published in 1998, is a comprehensive, up-to-date resource for both novice and experienced growers in northeastern North America. It contains 178 pages, 115 color photos, 37 illustrations, 47 tables, and adjustable budget spreadsheets on diskette for Macintosh or IBM Compatible computers. The publication is the latest in the highly acclaimed series from NRAES that include the *Bramble Production Guide* (NRAES-35) and *Highbush Blueberry Production Guide* (NRAES-55). The cost is $45.00 plus postage and handling. Quantity discounts are available. It can be ordered from NRAES, Cooperative Extension, 152 Riley-Robb Hall, Ithaca, NY 14853-5701. Phone: (607)255-7654, Fax (607)254-8770, E-mail NRAES@cornell.edu, Web site http://rcwpsun.cas.psu.edu/NRAES. - *Bordelon*

Strawberries and Botrytis Fruit Rot: The most important sprays for control of Botrytis fruit rot of strawberry are those applied at bloom - starting at 10% bloom! There are some major changes in fungicide registrations for Botrytis control in strawberries. Ronilan can no longer be used on strawberries. The current Rovral label states “do not make more than 1 application per season and do not apply after the first fruiting flower” therefore, it is no longer recommended for control of Botrytis on strawberries. A new fungicide, Elevate received registration last year, so the only options for Botrytis control are Elevate, Benlate, and Topsin M. Neither of the three should be used alone for season-long control of Botrytis because of the potential for development of resistant pathogen strains. Benlate cannot be used on strawberries once the crop has been turned into “U-Pick” or “Pick-Your-Own” or similar operation. However, it can be used preharvest (bloom) and post-harvest as long as the field is not open to U-Pick. See ID-169, 2000 Indiana Commercial Small Fruit & Grape Spray Guide, for further information. - *Bordelon*

Grape Flea Beetle: With the prolonged period of bud break I think it’s important to remind growers about possible damage from the grape flea beetle. These insects can be a serious pest of grapes because they feed on developing buds after final pruning. Lost buds can relate to a direct loss of yield. On young vines, bud loss can cost a year in training. Grapes across the state have been holding in the critical early swell to budbreak stages when they are most likely to be damaged from flea beetles. Damage usually decreases as buds break and shoots become 1/2 inch or longer. Scout vineyards for these insects or their damage and control if necessary. Damage appears as holes eaten into the sides of buds. The insects are small (1/8 inch long) and shiny green, blue or black in appearance. They crawl quickly along the canes and tend to drop to the ground if

disturbed. Incidence often occurs in outer rows adjacent to fence rows or woods, making spot spraying an option. Scout the planting carefully and apply insecticides only where needed. Sevin will provide excellent control of this insect. Refer to the label or ID-169 (www.hort.purdue.edu/hort/ext/sfg/) for complete recommendations. *-Bordelon*

Return Bloom Fund As soon as I finish writing this, I am headed out to set up another experiment that the RBF has allowed us to start. This particular experiment is looking at ground cover under the trees and weed control. We are looking at a number of strategies to control weeds, especially hoping to do this using fewer or no herbicides. Some of the waste products from around campus will be used. Coal ash from the physical plant will be spread under trees and watered to form a crust on the ground and hopefully will eliminate weeds (the physical plant generates thousands of tons of coal ash every year). Slight composted wood chips will also be used along with a more heavily composted material. Consumers are increasingly aware of not only WHAT products we produce, but HOW we produce them. This is a first step to come up with a less chemical dependent form of weed control in orchards. Promising treatments will be used in a planting to compare organic versus convention apple orchard management (more on that later). Thanks again to contributors to the Return Bloom Fund for supporting our research programs. *-Hirst*



June 5-7 - Heartland Wine School, Ohio State University, Columbus, OH. The Heartland Wine School is a joint project of Purdue University, Michigan State University, and the Ohio State University and was created in response to requests for a regional opportunity to train winery personnel in classic wine making principles. Extensive tasting sessions will complement the presentations. Register early to be sure your place is guaranteed - space is limited and will be allocated on a first-come–first -serve basis. To obtain a registration packet contact Roland Riesen, OARDC, Department of Horticulture and Crop Science, 1680 Madison Ave., Wooster, OH 44691. Phone 330/263-3685. E-mail:riesen.1@osu.edu

Coming Meetings:

May 3 – Eastern Indiana Horticultural Society meeting, Muncie. Contact Harold Brown (765-747-7732).

May 9 – Twilight meeting. LaPorte Co. Contact Walt Sell (219-326-6808).

June 5-7 - Heartland Wine School, Ohio State University, Columbus, OH. Contact Roland Riesen, OARDC/ OSU Phone 330/263-3685. E-mail:riesen.1@osu.edu

June 6 – Eastern Indiana Horticultural Society meeting, Muncie. Contact Harold Brown (765-747-7732).

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