

FACTS FOR

Fancy Fruit



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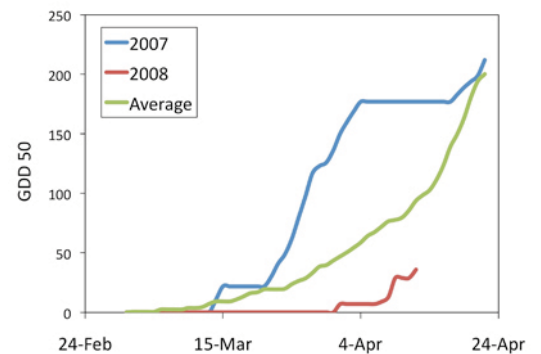
Crop conditions

Following a very cool spring, growth is speeding up with the recent warm weather. Peaches in the northern half of the state are either at or approaching bloom, while apples are still at tight cluster. In Lafayette, raspberries are at bud break to 1 to 3 inch shoots, blueberries are at bud break, and early grapes are at full swell. This is the latest spring in a number of years, which bodes well for avoiding frost damage this year. In most places around the state, crops are looking excellent, which is good news after widespread frost damage last year. However, some severe damage to peach flowers has been reported this year. Warm temperatures predicted this week will further accelerate growth.

Spring is running late

Wow, what a difference a year makes! This year appears to be the exact opposite of last year. If we look at the accumulation of growing degree days (see graph at right) this year is cooler than average and is running way behind last year. Much of this is due to unseasonably cool weather in the second half of March this year. In fact in mid-late March, daily temperatures in West Lafayette (Throckmorton farm) were on average 7 degrees cooler than average and 24 degrees cooler than last year. This cool weather really slowed down the development of all fruit trees and vines, and so pushed back the budding and flowering periods. This is good news since the later flowering occurs, obviously there is less risk of frost during the sensitive flowering period. Another benefit is that later flowering means that the critical cell division stage of fruit growth occurs during warmer

weather. Some of my recent research has shown that warmer temperatures have the effect of speeding up cell division. (Hirst)



Growing degree day accumulation in West Lafayette.

Apple thinning

If there was ever a year for being more aggressive with your thinning program, this is it! Most trees in the state carried light crops, or in a number of cases no crop at all, in 2007. In response to this, trees likely initiated a lot of flower buds last season and consequently we expect snowball bloom this year. The heavy expected flowering is one reason to be more aggressive with thinning this year. The other reason is that we're running so late that the risk of a damaging frost is greatly reduced. But bear in mind there's still a chance of frost. The all time record lows for today (April 22) are 20 in South Bend (1936), 27 in Indianapolis (1936), and 32 in Evansville (1978).

OK so this is the year to be aggressive, so what do you do?

- start early – no later than petal fall. Timing is

everything.

- On varieties that you've had difficulty thinning in the past, use sevin + ethephon at petal fall. Note that this combination is a very aggressive thinning approach
- Sevin and/or Maxcell at petal fall. This is still aggressive but less so than using ethephon as listed above. Adding oil to this combination can enhance the effect of the thinners.
- Sevin and/or Maxcell at 12 mm fruitlet diameter. This may not be aggressive enough for this year, except on easy to thin varieties such as Jonathan, McIntosh, Idared and Cortland.
- Use a combination strategy, also known as the nibble approach. Start thinning at petal fall, then wait at least 2 weeks before assessing the situation before considering applying a second thinner application. This approach spreads your risk and avoids putting all your thinning eggs in one basket.
- Try to time your thinning so it's in the middle of a warm period (70-80 F is best). The critical factors appear to be warm temperatures for 2 days before application, on the day of application and for 2 days afterwards.
- Take into account your experience with the varieties in your orchard. If you've had trouble in the past with removing enough

fruit from certain trees, this is the year to be more aggressive.

- Keep detailed notes to help build a clear picture of what works best in your orchard. You should take note of what material you used on each variety, the stage of crop development (eg, petal fall, 12 mm, etc), and the weather conditions prior, during and after application.

For more information refer to the thinning section in the [Tree Fruit Spray Guide](#). (Hirst)

Pruning Peaches

Bloom time is the perfect time for pruning peaches. Earlier pruning risks crop reduction from subsequent frosts or freezes, which cannot be adjusted for with lighter than normal pruning. The later the pruning, the smaller the fruit size will be. The pruning window is relatively small and a large crew is needed for those with large acreages of peaches. Pruning should not be done in cool, wet conditions, since perennial canker can be problematic. At bloom, trees are starting to grow rapidly and pruning wounds heal before the fungus has a chance to become established.

Peaches bear on 1 year-old wood, so copious growth is needed annually to have the wood available to set a crop. Annual pruning, fertilization, and crop protection promotes annual growth. Pruning removes damaged wood and selects for shoots that will bear the best quality fruit. Shoots that are too small or

too large produce peaches of poor quality. Select for pencil-sized wood, removing all wood that is small and spindly. It is critical that all the last year's small twigs that developed along the main scaffolds and trunk be removed completely to prevent canker infections.

Open-center trained tree height needs to be lowered annually. These trees should be lowered to about 8 feet in height to facilitate hand thinning and multiple picking. Simply bench cut to an outward-facing shoot with peach flowers at the desired height. Then thin out surrounding shoots, leaving only those oriented in the proper direction and of the proper size. Of course, cankered limbs need to be completely removed, and better early than later, since large cuts can further encourage winter injury and more canker. Pay particular attention to scaffolds with poor crotch angles. Remove these early before canker infection. Since peaches rarely lack for new growth, there should be sufficient replacement wood by the following year.

There are two schools of thought about how long fruit-bearing "hangers" should be left. One can shorten hangers, which will reduce the flower load and reduce the amount of hand thinning necessary, or allow hangers to remain long, and reduce the total number of shoots on the tree. There are advantages to both methods, but I prefer fewer, longer hangers.







Facts for Fancy Fruit is a newsletter for commercial and advanced amateur fruit growers. It provides timely information on pest control, production practices, and other topics likely to be of interest to fruit growers. All growers and interested persons are welcome to subscribe.

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<i>Current bud stages West Lafayette, IN</i>		
Apple	Blueberry	Grape
		
<i>tight cluster</i>	bud break/green tip	full swell
Peach	Raspberry	Blackberry
		
<i>pink</i>	1" to 3" shoots	1" shoots

Of all the planting systems available, the Perpendicular Vee for peaches has been very successful in New York, with high, early yields and excellent fruit quality. The advantages, in my opinion, heavily outweigh the disadvantages in NY, where canker and short life often limit the profitability of peach plantings. Early yield is very important in making a peach planting pay, and this system is among the fastest into production. The disadvantage of taller trees and some ladder work is overcome by early production, increased annual yield, and increased total production over the life of the planting. (Steve Hoying, Scaffolds Fruit Journal, Cornell University)

New Insights on the Effects of Apogee on Apple Flowering and Fruiting

Implications for Using Apogee as a Seasonal Growth Retardant Versus a Fire Blight Management Tool

The goal of this article is to explain the side effects of Apogee on fruit set and size, describe how to minimize these effects, and to describe circumstances when these effects are the lesser of two evils and should be ignored. Apogee is a plant growth retardant that is labeled on apple for controlling shoot growth and for fire blight management. It reduces shoot growth by blocking the synthesis of certain gibberellins, which are naturally-occurring growth promoters. Timely application of Apogee, beginning just as growth starts causes shoots to stop elongating. When used in the right combination of rate and timing, multiple applications of Apogee can give season-long control of growth. The benefits of vigor control include better light and spray penetration of the orchard canopy, resulting in improved fruit color and quality, as well as improved pest management. Apogee treated trees require less pruning labor. Early in the development of Apogee, it was recognized that it could also lessen the susceptibility of apple trees to fire blight, and this use was also labeled. Several application rates and

timing options of Apogee may be used for the effective management of fire blight depending on tree growth and fire blight risk, as is covered later in this article.

Apogee Effects on Fruit Set, Fruit Size and Return Bloom

Shortly after Apogee became commercially available, growers reported that treated trees produced smaller fruit. Some researchers documented that Apogee increased fruit set, while in other studies it had no effect on fruit number per tree. Similarly, variable results were also found for effects of Apogee on fruit size, and reductions in size were attributed to competition caused by increased fruit numbers. Increased set was often noted when high rates of Apogee were applied, leading to recommendations to use the lowest rate needed to achieve growth control. Increasing the rate of Apogee seemed to stretch the duration of growth control more than the degree. Part of the explanation for why Apogee increased fruit set seemed to be related to the timing of Apogee relative to the timing of

chemical thinning. Apogee should be applied when the emerging shoots at 1-3 inches in length, a stage of growth that often coincides with early petal fall. Apogee applied then takes about 10 days to suppress growth, a timing that coincides with chemical thinning. Chemical thinners are typically applied when fruits are 7-10 mm in diameter, as this size is linked to the beginning of a period of intense competition between many rapidly growing parts of the tree for carbohydrates. The stress caused by all this competition marks a time when weaker fruits can be thinned. To counteract the effect of Apogee on fruit set, pomologists recommended the use of lower rates of Apogee, and more aggressive chemical thinning: stronger thinner solutions, &/or additional thinner applications. Now there is new data to suggest that while Apogee sometimes increases fruit set, the fruit size reduction isn't due only to fruit competition. There also appears to be a direct effect of Apogee on fruit growth. Dr. Duane Greene, an authority on plant growth regulators in tree fruit, has published data in the April 2008 issue of HortScience showing that fruit size declines as the rate of Apogee is increased. The dose response is linear with increasing rate, and occurred even in seasons when fruit set was unaffected by Apogee. Increasing the rate of Apogee also reduced return bloom. This also appears to be a direct effect of Apogee, as it occurs even following years when crop load wasn't excessive. Dr. Greene's study was designed to examine the full commercial range of Apogee rates from one extreme to the other, and was conducted on two vigorous varieties: Mutsu and McIntosh. Duane also noted that all of the concentrations used gave comparable results in controlling shoot growth, concluding that "excellent commercial growth retardation... is possible using lower rates. Furthermore, reductions in fruit weight and return bloom were linear with increasing concentration; thus these consequences may be minimized by using these lower rates". [If you would like a copy of Dr. Greene's research paper, contact Peter Hirst.]

Apogee and Fire blight

The susceptibility of apple shoots to fire blight is greatly influenced by the vigor

of the shoot. High vigor shoots are much more susceptible to infection and canker expansion than lower vigor shoots. For an individual application, the efficacy of Apogee for shoot blight control increases linearly with increasing concentration. Fruit Times (Vol.27, No. 3) Cooperative Extension Service

However, lower rates of Apogee (3 to 4 oz/100 gal) applied several times throughout the early growth period of the tree will reduce fire blight risk over a longer period of time than a single high rate application (12 oz/100 gal). Single or a few high rate applications of Apogee may be warranted to slow down a fire blight shoot infection epidemic in highly susceptible cultivar or rootstock orchards due to a history of fire blight, wide-spread flower infections or if the rapid spread of fire blight is expected due to high wind and/or hail. As in shoot growth affects, 10 days is required after application before shoot blight inhibition can be expected. When calculating the gallons of water to use in an Apogee application, remember that thorough spray coverage is needed for maximum effectiveness in inhibiting fire blight shoot infection and spread.

Summary

Apogee is a valuable tool with two uses; however the use pattern and rate should be carefully considered for each respective purpose. When the risk of fire blight is low, Apogee can be used at the 3 or 4 ounces per 100 gallons to reduce shoot growth with minimal impact on fruit set and fruit size. Use multiple sprays at one- to four-week intervals for seasonal growth control. These lower rates, if repeated will be effective for growth management, and may provide some reduction in susceptibility to fire blight, while minimizing the negative side effects on fruit set and fruit growth. If there is a risk for fire

blight from high winds or hail, apply streptomycin within 24 hours of the beginning of the event. For cases of extreme weather events and high orchard susceptibility (such as 4-year-old Gala on M.26 or M.9), growers may want to tank mix streptomycin with Apogee at a high rate (9 to 12 oz/ 100 gallons) for fire blight management. The flowering and fruit side effects are just part of the price that growers will have to pay for fire blight control with Apogee, but dead trees bear no fruit. (Jim Schupp, Jim Travis and Henry Ngugi, Fruit Times, Penn. State University)

Thinning and Apogee at petal fall

Petal fall is considered by most to be the first opportunity to thin apples. Since we have no idea about the weather conditions that will occur at other more traditional times to thin, it is important to start the thinning process at this time. Perhaps the most unsettling thing about petal fall thinning is that we cannot make an accurate assessment of initial set, thus there is a certain amount of guess work involved. However, the whole chemical thinning season might be considered a series of best guesses. Petal fall thinning is recommended if bloom in the orchard was adequate and the pollination period, including bee activity, was fair to good. Over-thinning rarely occurs as a result of a petal fall thinning spray. Petal fall application of thinners is the one situation where you should not wait for favorable weather to be forecast before making an application. Once the bees are removed from the orchard petal fall application should be made. The only weather conditions to be considered for a petal fall application are do not apply in the rain and make the application under somewhat calm conditions to assure good spray coverage.

There are three thinners that can be effectively used at petal fall. Carbaryl is undoubtedly the most commonly used thinner. It has many advantages including the fact that it rarely over-thins, it can be applied again alone or in

combination with other thinners at a later date, and it is capable of breaking up clusters. Many also feel that it may make thinning easier and safer for later thinner applications since it may establish growth differential of fruit within clusters. It is typically applied at 0.5 to 1.0 lb/100 gal. Where more aggressive thinning is required NAA (Fruitone-N) is a very good choice. It is a stronger thinner than carbaryl thus it should be used alone or in combination with carbaryl on more difficult to thin varieties. NAA is not as potent a thinner when applied at petal fall. For example an application of 8 ppm NAA at petal fall is somewhat comparable to an application of 4 ppm at the 7 to 12 mm stage. NAAm (Amidthin) may also be used at petal fall. It is frequently used at this time on Macoun or on early maturing varieties. Rates of 25 to 50 ppm are generally used.

Apogee is a plant growth regulator that inhibits terminal growth by suppressing the synthesis of gibberellins. The initial application should be made when terminal growth is 1 to 3 inches which generally occurs at petal fall or slightly earlier. Apogee is absorbed through the leaves. Early application is necessary for effective growth control since it requires 10 to 14 days for Apogee to start to reduce growth. While earlier applications may be desirable, there is generally insufficient leaf area available for effective uptake if application is made much earlier than petal fall. A second application of Apogee is recommended 2 to 3 weeks after the first and often an additional application is recommended 3 weeks after the second. Apogee is effective over a relatively wide range of concentrations. We generally recommend an initial application of 3oz/100 gal based upon a tree row volume dilute calculation. While higher initial rates may slow growth slightly earlier, we recommend using the lower rate. Apogee reduces normal June drop thus making Apogee-treated trees more difficult to thin. In addition to early application other keys to successful use of Apogee are application with an effective nonionic surfactant and a water conditioner. The

Apogee label suggests putting 1 pound of ammonium sulfate in the tank for every pound of Apogee used. Water conditions such as Quest or Choice at 2 quarts per 100 gallons have been as effective as ammonium sulfate. Apogee is one of the most effective treatments to control the shoot phase of fire blight. Hence application for this purpose starts at petal fall but higher rates are used. Higher rates are required since part of the inhibitory activity of Apogee is due to metabolic changes in the tree brought about by Apogee. Subsequent follow up sprays will be required to maintain growth control and inhibition of fire blight. (D. Greene, Healthy Fruit, Univ. Mass.)

Free fungicide resistance testing

We are continuing to run fungicide resistance tests for Midwest orchard growers, to evaluate the level of fungicide resistance in the apple scab and brown rot fungi to four types of fungicides, including dodine, the sterol-inhibiting fungicides (Nova, Bayleton, Rubigan, Procure, Indar), the strobilurins (Flint, Pristine) anilinopyrimidines (Vanguard, Scala), and benzimidazole (Topsin-M). Other universities charge almost \$1000 for tests such as this, but we are doing this for free! If you are interested in having the brown rot or apple scab fungi in your orchard evaluated for fungicide resistance contact me by phone or email: Janna Beckerman 765-494-4628 or jbeckerm@purdue.edu ([Beckerman](#))

Copper

At the meeting last week in Goshen, copper was discussed as a dormant spray. The standard dogma is to not apply copper after half-inch green to minimize the risk of phytotoxicity. With the southern part of the state in bloom, and most of the state into tight cluster in apples and at least half-inch green on peaches, people should be putting away the copper for the year--EXCEPT (there's always an exception, right?) if 1). Your orchard had problems with fire blight last year, or 2).

Your orchard has streptomycin-resistant fire blight, or 3). Your orchard had chronic conditioner problems with bacterial spot on peach, or 4). You are an organic grower. If you fall under any of these four exceptions, the choice remaining is between the lesser of two evils: disease or phytotoxicity. With respect to fire blight management, the dilute applications of copper (2lbs metallic copper per acre), applied over the whole tree will reduce bacterial growth, thereby reducing the chance that disease will become epidemic when both the temperature (warmer) and rain are just right for bacterial growth; that said, it also likely causes some russetting and possibly stresses cluster leaves resulting in fruit drop later in the season. In the case of bacterial blight of peaches, even less copper should be used with the understanding that even that dilute rate carries the risk of leaf scorch. Even though fire blight first appears at bloom, and bacterial spot after peach bloom, the bacteria are in the orchard now. Reduced inocula=Reduced disease pressures. (Beckerman)

Apple scab

After the freeze last year, many growers understandably reduced their sprays-- which means that there is a lot of scab out there. Currently, there are plenty of mature inocula where tree growth has reached tight cluster. In areas that are still at half inch green (about the central to northern part of the state), the levels of scab inoculum is probably fairly low at the beginning of the rain over this weekend. However, as the tight-cluster and pink bud stages approach, the apple scab ascospores mature, increasing the risk for infection during wetting events.

That said, there was probably enough wetting this weekend to lead to the first round of infection throughout the lower part of the state. Now that the tissue is pushing out, we're approaching some serious levels of scab inoculum—around 5% in the central part of the state, and higher in the southern part of

Indiana. With any rain event, from this point until mid-June, the risk of scab infections will be high. This means you need to be out in the orchard getting your fungicide sprays on. Leaves should be well covered with a protectant fungicide before any rain events occur. From this point through bloom is NOT the time to skimp on scab protection. (Beckerman)

Peach Leaf Curl

The fungus that causes peach leaf curl (*Taphrina deformans*) infects the blossoms, fruit, leaves, and shoots of peaches, ornamental flowering peaches, and nectarines before or just as the buds are opening. The best time to treat for leaf curl is just before bud break. For those of us who's foresight doesn't match their hindsight, applications after bud break can reduce the disease, with the gentle reminder that better planning leads to better disease control. To avoid copper phytotoxicity issues, consider using Bravo, Carbamate 76 WDG or Ziram. (Beckerman)

Brown rot blossom blight

Any rains in the next week or two will bring pressure for brown rot on peaches (and other stone fruit). As temperatures this week become a little warmer, and bloom development continues, now is the time to apply a blossom blight fungicide. Many fungicides are available for control of brown rot blossom blight at pink ([Tree Fruit Spray Guide](#)). (Beckerman)

Brown Rot Blossom Blight Disease Control on Peaches at Pink

<p>1Topsin-M 70 WSB 8 oz 1.5 lb 2Captan 50 WP 1.3 lb 4 lb Bravo 1 - 1.4 pt 3.1 - 4.1 pt 2Captan 50 WP 2.6 lb 8 lb 3Rovral 50 WP 5 - 10.5 oz 1 - 2 lb Wettable sulfur 95% 6 lb 18 lb Ziram 76 DF 1.5 - 2.7 lb 4.5 - 8 lb Nova 40 WP 0.8 - 2 oz 2.5 - 6 oz 4Orbit 41.8 L 1.3 fl oz 4 fl oz 4Indar 75 WSP 2 oz Elite 45 DF 2 oz 6 oz Pristine 38 WG 3.5 - 4.8 oz 10.5 - 14.5 oz Elevate 50 WDG 1 - 1.5 lb Scala 5 SC 9 - 18 fl oz Vanguard 75 WG 5 oz ADAMENT 50 WG 4 - 8 oz</p>	<p>¹Topsin-M and the sterol-inhibiting fungicides (Nova, Indar, Elite, and Orbit) should always be alternated or combined with another fungicide such as Captan, so as to minimize the development of resistance. Topsin-M is also available in a flowable formulation (4.5 FL).</p> <p>²See note on Captan on page 16 of the 2008 Midwest Tree Fruit Spray Guide</p> <p>³No more than two applications of Rovral can be made per season, and Rovral may not be applied after petal fall on stone fruit.</p> <p>⁴Apply Orbit and Indar in a minimum of 50 gallons of water per acre.</p>
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Bramble Disease Control

Raspberries are beginning to show new growth. Delayed dormant applications of lime sulfur should only be made before buds are 1/2" long for control of many bramble diseases, including cane blight, spur blight and anthracnose. Unless cane blight, anthracnose or spur blight have been problems, fungicide applications prior to bloom are usually not required. This is especially true if the delayed dormant application of lime-sulfur has been made. Unfortunately, if you didn't make an application of lime sulfur, pruning out disease tissue is one of the only options available until 6-12" of growth, or bloom. At bloom, the captan/fenhexamid mixture (Captivate 68WDG) is labeled for control of anthracnose and spur blight on raspberries. Only 2 sequential applications of this product may be used before switching to a different group of fungicide chemistry. The strobilurins, which include azoxystrobin (Abound), pyraclostrobin (Cabrio EG and a pyraclostrobin/boscalid mixture (Pristine WG) should be used at disease onset. Pay careful attention to label restrictions for these products. Like Captivate, no more than 2

sequential applications of these products may be made before switching to an alternate chemistry.

A word to the wise on fungicide resistance development; Elevate, Rovral, Switch, and Pristine should not be used alone for season-long control of Botrytis fruit rot due to the high risk of fungicide resistance developing to each fungicide. The addition (tank mix) of Captan to Elevate (or the pre-mix CaptEstate), Rovral, Switch, or Pristine should provide a higher level of disease control and aid in preventing fungicide resistance development. Rotating the use of these fungicides in one-two-spray blocks is a good resistance management strategy. Keep in mind that because brambles are a relatively small market share for fungicide companies, fewer fungicides are available for use. For this reason, it is imperative to maximize the efficacy and to carefully rotate and/or tank mix fungicides to minimize the risk fungicide resistance development. (Beckerman)

Now is a good time to monitor for mummy berry in blueberries

It's mummy berry season again. The mummy berry fungus enjoyed the snow cover this winter, which provided sufficient moisture for mummies to germinate. However, the rate of germination is lower than last year, with a maximum of 6 percent mummies germinated at this time. The extended cold weather seems to have delayed their development. In addition, some sites are very wet and many mummies may actually be submerged. It is not known how well they can survive waterlogging, but wet soils in general are conducive to disease. At this time, some mummies are showing small finger-like extensions (apothecial initials) and some have small trumpet-like mushrooms (*apothecia*) ranging from having pin-prick size openings to about 1-2 mm in diameter. At 2 mm (1/12 inch) in diameter, they can start to release ascospores. However, the most spores are released when apothecia are 5-10 mm in diameter (1/4 to 2/5 inch). If there is no leaf tissue on the bushes, it does not matter since infection cannot take place without green tissue being visible. The mummies typically germinate over several weeks to a month, depending on temperature and soil moisture, so there may be more waves of germinating mummies ahead.

What to look for

Blueberry growers should be monitoring for mummies with trumpet-shaped mushrooms (see pictures). The number of germinated mummies (specifically the number of visible apothecia) is a better predictor of disease than simply the number of mummies under a bush, since germination is prerequisite for ascospore release and disease development. Mummy berry occurs primarily at wetter sites and in poorly drained areas; therefore scouting should target those sites. Dry, sandy sites may not have any mummies at all. The mummy berry fungus shoots ascospores out of the

apothecial cup as soon as the cup diameter is about 2 mm (1/12 inch) wide. Ascospore release continues until the cup collapses. Longevity of the mushrooms is affected by temperature close to the ground, e.g., at 70°F, the mushrooms may live for less than a week, whereas at 50°F, they can last two to three weeks, and at 40°F up to four weeks. At higher temperatures, the mushrooms expand more quickly (they can almost become dime-sized) and release more spores per day than at lower temperatures. A severe freeze may damage the cups, but research shows that they can partially recover their ability to shoot ascospores after exposure to temperatures of 22°F and above. The ascospores are windborne and can travel fairly long distances (supposedly up to a mile). So even if you don't have any mummy berry in your field, there is a chance that ascospores can drift in from other fields or nearby woods with wild or escaped blueberries.

Stages of infection

There are two stages of infection. First the developing shoots are infected by the ascospores released from the mummy berry apothecia. Shoot strike symptoms appear approximately two weeks after infection. Shoots are susceptible from bud break until they are about 2 inches in length. Sometimes flower clusters may also become blighted; these are called flower strikes. Both shoot and flower strikes are characterized by drooping/wilting symptoms and a layer of gray spores (conidia) on the surface. These conidia are spread by insects (primarily bees), wind and rain. Bees are attracted to the shoot and flower strikes due to their UV light pattern (a nifty trick of the pathogen) and pick up the conidia on their legs and bodies. Bees then inadvertently deliver the conidia to the flowers where infection takes place.

The conidia infect the flower stigma followed by colonization of the developing fruit, which eventually mummifies and drops to the ground. Flowers are susceptible for about four

days after they open. The more shoot strikes there are and the better the weather for pollination, the greater the risk of flower and fruit infection. Cultivars such as Berkeley, Bluetta, Bluejay, Earliblue, Jersey, Nelson, Patriot and Weymouth are susceptible whereas Bluecrop, Duke and Elliott are moderately resistant to the disease. Some cultivars are more susceptible to shoot strikes and less susceptible to fruit infection, whereas others are just the opposite.

Control

While there are multiple fungicides registered for mummy berry control, Indar consistently has outperformed other fungicides for both the primary and secondary phases of the disease in Michigan. Indar is a sterol inhibitor fungicide and therefore prone to resistance development in target fungi. It is recommended to limit the number of sprays of Indar to a maximum of two or three per season (five are allowed per the label). Orbit (propiconazole) and PropiMax (propiconazole), which are in the same chemical class as Indar, now both have a supplemental label for blueberries. Indar, Orbit and PropiMax all have a 30-day PHI. In small plot trials in Michigan, we found that Orbit was similar to Indar in the control of shoot strikes, but did not perform as well as Indar for control of fruit infection. PropiMax has not been tested in Michigan, but is expected to behave similarly to Orbit.

For fungicide resistance management, it is important to alternate SI's with fungicides in different modes of action, such as Bravo (fair to moderate efficacy), Captivate (moderate to good efficacy) Topsin M + Captan or Ziram (moderate efficacy), and Serenade (moderate to good efficacy). Systemic fungicides such as Indar and Topsin will likely provide better coverage of the flower parts (the stigma specifically). Cabrio and Abound have shown poor to fair efficacy in past trials in Michigan. While Pristine did not perform particularly well for control of mummy berry shoot strikes in small-plot trials in Michigan, it provided

good control of fruit infection. We suspect that the activity of Pristine is better at higher temperatures; it therefore may be a good option during bloom as it also controls anthracnose, Botrytis and Phomopsis twig blight and canker. (Schilder, Fruit Crop Advisory Team Alert, Michigan State University)



Mummies with trumpet-shaped mushrooms



Herbicide Drift Warning

Whenever we have a late spring such as this one, we run the risk of having significant herbicide drift problems from local farm fields. Farmers are pressed for time to get their crops planted, and sometimes in their rush they spray herbicides under conditions that may lead to off target drift. This is an especially important time to remind your farmer neighbors that you are growing herbicide sensitive crops. Grapes are very sensitive to drift from 2,4-D and dicamba, but brambles and blueberries may also be damaged. (Bordelon)

Getting the Most out of Early Season Weed Sprays

Fruit growers often apply a post-emergent herbicide beneath the tree or vine row in spring to control winter annuals and other weeds. A pre-emergent herbicide may be included in this application. Glyphosate (Roundup) is a post emergent systemic herbicide that is widely used for this first weed spray. In order for glyphosate to be effective, it needs to be absorbed into the plant. In soft water glyphosate has no problems in being absorbed. However in hard water glyphosate will be 'tied up' and not absorbed as readily. Hard water, common in many parts of Indiana, contains high concentrations of soluble salts, calcium and magnesium. When these cations are present they react with the negatively charged glyphosate to form compounds that are not readily absorbed by plants. This results in poor uptake and poor weed control.

The solution to the hard water problem is to add ammonium sulfate to the spray water before mixing with glyphosate. Ammonium sulfate ions tie up the calcium and magnesium ions forming conjugate salts. Additionally, some of the glyphosate reacts with ammonium to form a compound that some weeds preferentially absorb. Follow the Roundup label recommendations on the amount of ammonium sulfate to add.

Another problem associated with spray water quality is that many fungicides and insecticides break down quickly in high pH water. Captan, Imidan, malathion, and Omite are examples of compounds that are especially vulnerable to alkaline hydrolysis. Both the Midwest Commercial Tree Fruit and Small Fruit and Grape Spray Guides have a discussion of spray tank pH. Briefly, addition of about 2 ounces of food grade citric acid per 100 gallons of water will lower the pH from about 8.0 to about 5.5. (Bordelon)

Presidio, Another New Fungicide for Vegetable Crops and Grapes

Presidio 4.0 SC is another new fungicide that was recently registered for use on vegetables and grapes. Presidio contains 39.5% fluopicolide (4.0 pounds a.i. per gallon) and is a fungicide in group 43 (FRAC code 43). It is manufactured by Valent and can be used to control downy mildew and Phytophthora diseases of cucurbits; late blight and other Phytophthora diseases of fruiting vegetables (peppers, eggplant, tomatillo, tomato, and others); downy mildew and white rust of leafy vegetables (amaranth, celery, endive, lettuce, parsley, spinach, Swiss Chard, and other leafy vegetables except Brassica vegetables); late blight and pink rot of sweet potato; and downy mildew of grape. Presidio exhibits protective, curative, eradicated and antispore activity. It is locally systemic and translaminar and also moves systemically via xylem tissue. Optimum disease control is achieved when Presidio is applied in a regularly scheduled spray program used in combination and/or rotation with other effective fungicides that have different modes of action (i.e., non Group 43 fungicides). Tank mixing of Presidio with a fungicide from a different FRAC category and labeled against the same pathogens is recommended for resistance management. The maximum Presidio application rate is 4 fl oz per acre per application and 12 fl oz per acre per season. No more than 2 sequential applications of Presidio should be made before alternating with an effective fungicide from a different FRAC group. No more than 4 applications of Presidio per season should be made. Minimum time from last application to harvest (PHI) is 7 days for sweet potato, 2 days for all other vegetables, and 21 days for grape. More information on Presidio is available at <http://www.cdms.net/LDat/ld8J5001.pdf>. From Illinois Fruit and Vegetable News (Vol. 14 No. 3)

Fungicide Label Update

There have been several new fungicides that have been labeled for blueberries and some changes to existing labels. This article provides an update on these changes.

Indar (fenbuconazole) is a systemic fungicide that received a full registration for use in blueberries in 2007 and also has a supplemental label for disease control in cranberries. Indar was already labeled for use in stone fruit. It is available in two formulations: Indar 75WSP (water soluble packets) and Indar 2F (flowable). They have the same active ingredient and are for all practical purposes the same. Indar has repeatedly shown good efficacy against mummy berry and Phomopsis canker and twig blight in blueberries. The application rate for Indar 75WSP is 2 oz per acre; a maximum of 4 applications (8 oz) may be made per season. The application rate for Indar 2F is 6 fl oz per acre; a maximum of 4 applications (24 fl oz) may be made per season. Apply Indar in a minimum water volume of 10 gal/acre, if applied aerially, and 20 gal/acre if applied by ground. The pre-harvest interval is 30 days. Since Indar is the least systemic of the sterol inhibitor fungicides, a non-polymer containing spray adjuvant may be added to spray solutions according to the manufacturers use instructions to improve disease control by aiding penetration of Indar into the plant tissue.

Orbit (propiconazole) is a systemic sterol inhibitor fungicide labeled for use in blueberries, strawberries, raspberries, blackberries, currants, gooseberries, and cranberries. It is also labeled for stonefruit. It has protectant and curative activity. Orbit is a broad-spectrum material that is effective against mummy berry, rusts, powdery mildew, and Septoria leaf spot. We have found that Orbit is as effective as Indar against the shoot infection phase of mummy berry, but not as effective against the fruit infection phase. The PHI of Orbit is 30 days.

PropiMax (propiconazole) is a systemic sterol

inhibitor fungicide with the same active ingredient as Orbit that recently received a supplemental label for blueberries. It was already labeled for stone fruit and several other crops. PropiMax is expected to have similar efficacy as Orbit. The PropiMax label lists the following target diseases: mummy berry, rusts, powdery mildew, and Septoria leaf spot. PropiMax has a 30-day PHI. Topsin M (thiophanate methyl) is a systemic fungicide that has been used as a Benlate (benomyl replacement) for the past 5 years. However, we are still awaiting approval of the Section 18 (emergency 9 exemption) request for 2008 and will notify growers as soon as we are notified of the decision. Growers who want to use this product in blueberries should be in possession of a copy of the Section 18 label at the time of use. Target diseases on the label for blueberries are Phomopsis twig blight and canker, Fusicoccum canker, mummy berry, anthracnose fruit rot, and Botrytis blossom blight. The recommended rate is 1 lb of product per acre applied by ground or aerial application. The product may not be applied through any type of irrigation system. No more than 3 sprays (3 lbs product) may be applied per acre per year. A worker re-entry interval (REI) of 12 hours must be observed. The pre-harvest interval (PHI) is 7 days. Applications may be started at green tip and repeated at 7-10 day intervals. However, use of this fungicide will be most appropriate in the period from pink bud through early fruit development, as the Phomopsis, anthracnose, and mummy berry pathogens are all active at that time. Topsin M should be used in combination with non-benzimidazole fungicides, such as Ziram or Captan, to reduce the risk of resistance development. Other new(er) products that are available but have not yet been evaluated for disease control efficacy on blueberries in Michigan are:

1) Actinovate AG (*Streptomyces lydicus* WYEC108) is a protectant biofungicide that can be used as a soil drench, in-furrow or foliar application. It is labeled for all raw agricultural commodities, including apples, pears, cherries,

peaches, plums, nectarines, apricots, grapes, blueberries, strawberries, raspberries, blackberries, gooseberries and currants. The label lists suppression/control of *Pythium*, *Rhizoctonia*, *Phytophthora*, *Verticillium*, and *Fusarium* as well as powdery and downy mildew, *Botrytis*, *Monilinia*, and *Alternaria*. Actinovate is OMRI (Organic Materials Review Institute) listed which means it can be used in organic production and has a 0-day pre-harvest interval. Actinovate provided good control of mummy berry in small plot trials in Georgia in 2007 and will be evaluated in Michigan this year.

2) Sonata (*Bacillus pumilis* QST 2808), a protectant biofungicide that is OMRI listed and therefore can be used in organic production. Sonata is a cousin to Serenade (*Bacillus subtilis*) produced by the same company (AgraQuest). Sonata is labeled for use on grapes, blueberries, strawberries, raspberries, blackberries, gooseberries and currants. The label lists control of leaf rust and powdery mildew in berry crops. Sonata has a 0-day pre-harvest interval and a 4-hour re-entry interval. Sonata has been moderately effective against powdery mildew, downy mildew, and Phomopsis in grape trials in Michigan. Adding a nonphytotoxic spray adjuvant, such as Biotune, can improve coverage and control.

3) Sporan (rosemary oil, clove oil, thyme oil, wintergreen oil, lecithin, butyl lactate) which is marketed as a broad-spectrum protectant fungicide for use in apples, pears, cherries, peaches, nectarines, apricots, plums, grapes, blueberries, strawberries, raspberries, blackberries, and cranberries.

Sporan is OMRI listed so it can be used in organic production. Sporan has no re-entry interval and a 0-day pre-harvest interval.

4) Trilogy (clarified hydrophobic extract of neem oil) is another OMRI listed product and marketed as a contact/protectant fungicide, miticide, and insecticide. Trilogy is labeled for use on apples, pears, cherries, peaches, nectarines, plums, apricots, grapes, blueberries, strawberries, raspberries, blackberries, gooseberries, currants, and cranberries. Since

none of these products has been tested for disease control in blueberries yet, we cannot confirm the claims on their labels and do not make recommendations for their use. However, we thought it important for you to know what these products are in case you run across them.

(Schilder, Michigan State University)

New Interim Dean at Purdue

Purdue University officials announced Tuesday (April 15) that agricultural economist Jay T. Akridge will become interim dean of Purdue Agriculture.

Akridge, the James and Lois Ackerman Professor of Agricultural Economics and director of the Center for Food and Agricultural Business, currently is serving as the university's interim vice provost for engagement.

As interim dean, he will assume the post vacated by William R. "Randy" Woodson, who will be the university's new provost. Woodson was named provost on March 26, and the board of trustees ratified his appointment on April 11.

Akridge and Woodson begin their new duties May 1.

"Jay has done excellent work in the agricultural economics field and has proven leadership skills that will be an asset to Purdue Agriculture," said interim Provost Victor L. Lechtenberg. "His vision and management experience will help move the college and Purdue Extension forward during this time of transition."

Lechtenberg, who will return to his position as vice provost for engagement, said a search committee will be named and a national search for the new dean will be conducted.

Akridge will be responsible for administering academic programs in the College of Agriculture, the Indiana Agricultural Experiment Station, the Purdue Cooperative Extension Service and a number of state regulatory

services, including the State Chemist's Office, the Animal Disease Diagnostic Laboratory and the Indiana Wine-Grape Council. Akridge earned his bachelor's degree in agriculture and business administration from Murray State University in 1982. He earned his master's and doctoral degrees in agricultural economics from Purdue in 1983 and 1986, respectively. (Purdue News Service)



Dr. Jay Akridge

News from the US Apple Association

USApple Submits Comments on H-2A Reforms

On Monday, USApple submitted comments drafted by staff to the Department of Homeland Security (DHS) and the Department of Labor (DOL) on the Administration's proposed complex regulatory changes to the H-2A agriculture guest worker program.

USApple recommended adoption of specific employer-friendly measures and opposed several adverse proposals. The Administration had promised to streamline and simplify the program, and it did include several positive fixes along with a number of onerous new requirements and a significant increase in costs to growers. For a copy, contact USApple at jeastmond@usapple.org or call (800) 781-4443.

Our comments were aligned with those of the National Council of Agricultural Employers (NCAE), in which we are active, to do our part for agriculture to speak with one voice on this

important issue. Last year, NCAE spearheaded agriculture's effort asking the Administration to improve H-2A after failure of comprehensive labor reform legislation in Congress. USApple actively supports NCAE, with Foster a member of its Executive Committee and Foster and Kurrle on its Board of Directors.

Final DOL and DHS regulations may be issued later this year, depending on the volume of public comments received and how long agency review takes. In the meantime, USApple and other members of the Agriculture Coalition for Immigration Reform (ACIR) continue outreach efforts to key Members of Congress to make the case for an emergency agriculture labor program.

Immigration Enforcement & ICE Raids Continue

An immigration enforcement amendment was narrowly defeated last Tuesday over objections by House Republicans and some conservative Democrats. Attempts were made to include it in a \$1.1 billion dollar tax bill covering a number of issues, including debt collection and regulations surrounding Health Savings Accounts, which the House subsequently passed without the amendment.

It called for a crack down on so-called ³sanctuary cities² and would have given the IRS additional tools to prevent illegal immigrants from claiming the earned income tax credit. Though these issues do not directly affect the apple industry, the close vote underscores just how tough the current political environment is.

Pilgrim's Pride poultry plants in five states were raided by the Immigration and Customs Enforcement Agency (ICE) this week and foreign national employees were detained by the agency. ICE and the U.S. Attorney's Office (for the Eastern District of Texas) held a press conference to announce details of the ongoing enforcement operation targeting Texas, Arkansas, Florida, West Virginia and Tennessee. Of those taken into custody, it was

reported that ³many will be federally prosecuted for a variety of violations, including identify theft, Social security fraud and document fraud.²

It's good news that Rep. Heath Shuler's (R-NC) Discharge Petition still has 186 House signatures, unchanged from last week and short of the 218 needed to fast-track his enforcement-only bill, H.R. 4088. If a majority of the House signs the Petition, the bill would bypass committee, be taken directly to force a House floor vote with uncertain outcome. Given fall election pressures, an inflamed political scene on Capitol Hill with growing intense partisanship and the divisiveness of immigration politics, if the Petition gets to the floor it may be a very close vote.

Farm Bill Conference Committee Still Meeting Future Uncertain

At press time, the Farm Bill Conference Committee had scheduled another session in an attempt to resolve the most difficult challenges facing the bill where additional funds will come from to pay for it, whether farm tax provisions should be included, and if the policy changes demanded by the White House are a must-have for President Bush to sign the bill. USApple will attend, continuing a major focus as we went to previous Farm Bill negotiations earlier in the week. Staff answered questions there on apples and specialty crop issues. The Conference Committee met to discuss policy issues while Senate Finance Chairman Baucus (D-MT) and House Ways and Means Committee Chairman Rangel (D-NY) held parallel negotiations in an effort to come to a spending agreement.

With the current Farm Bill set to expire today (April 18), Congress passed a week long extension with the goal of finishing work by the 25th. USDA Secretary Schafer said Thursday that the draft Farm Bill failed to pay for itself and didn't include enough major policy changes. However, at press time, it

appeared that President Bush would sign it.

On Monday, the Specialty Crop Farm Bill Alliance (SCFBA) sent a letter to House and Senate leadership highlighting the importance of the specialty crop provisions and urging quick passage of a new and more equitable Farm Bill. USApple and other SCFBA members have been closely monitoring the work of the conference committee and discussing specific provisions and issues with key agriculture staff.

Mark Your Calendars! Outlook Conference in August

USApple continues to work on attracting sponsors and developing a comprehensive and informative program for the 2008 Apple Crop Outlook and Marketing Conference, which will be held August 21-22 at the Ritz-Carlton Chicago. In addition to the annual crop projections (from both USDA and USApple), the conference will feature presentations from several consumer marketing experts, roundtable discussions, networking opportunities and awards presentations. Online registration at www.usapple.org <<http://www.usapple.org>> begins May 15. USApple strongly advises those interested in attending to book early for the best room selection and rates.

USApple at PBH Board Meeting

This weekend, USApple's Director of Consumer Health and Education is attending the Produce for Better Health Foundation's (PBH) Annual Board and committee meetings. Discussion will focus on progress (including retail) of PBH's Fruits and Veggies More Matters Campaign to help increase fruit and vegetable consumption. The meeting also offers excellent networking opportunities to discuss new trends in fruit health marketing and to explore collaborative possibilities and exchange ideas to benefit the apple industry.

Washington hit by cold

Fruit crops in Washington state took a hit last weekend with snow and temperatures in the teens hitting areas around Yakima. Severe damage to berry crops, cherry, pear, and apple is expected. (Hirst)

Upcoming Events

May 6

Eastern Indiana fruit meeting. Time and location to be announced. Contact Dave Clamme, dclamme@purdue.edu, (765) 747-7732.

May 8

Central Indiana fruit meeting, Anderson Orchard, Mooresville, IN. 5:30 pm. For details contact Roy Ballard, rballard@purdue.edu, (317) 462-1113.

June 3

Eastern Indiana fruit meeting. Time and location to be announced. Contact Dave Clamme, dclamme@purdue.edu, (765) 747-7732.

June 22-25

International Fruit Tree Association summer tour. South Carolina and North Carolina. For more information: <http://www.ifruittree.org/>

Jan 19-21, 2009

Indiana Horticultural Congress, Adam's Mark Hotel, Indianapolis.



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