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THE OHIO STATE UNIVERSITY Newsletter Extension

Fruit ICM News

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In This Issue:

Calendar

June 28: Ohio Fruit Growers Society Annual Summer Tour, Vogley Enterprises, East Sparta, Ohio, Stark County. Watch for more details.

July 27-28: Ohio Berry Tour, Central Ohio. Starts mid-afternoon on the 27th and ends mid-afternoon on the 28th. Tour stops include Rhoads Farm Market (Circleville), Circle S Farms (Grove City), Schacht Farm Market (Canal Winchester), Jacquemine Farms (Plain City), and Doran's Farm Market (New Albany). We will keep you posted as definite times are set and registration information becomes available.

August 3: OVPGA & Ohio Fruit Growers Society Young Grower Tour, Stops at Farmers Produce Auction (Mt. Hope), Graf Growers (Akron), Hilgert's Berry Farm (Mogadore), K.W. Zellers & Sons (Hartville), and Hartville Kitchen.

Brown Rot Review

Source: Wayne Wilcox, Plant Pathology, Cornell University, Geneva, NY

Before stone fruits are in bloom and the rain comes, it's time for the annual review of brown rot control for blossoms and fruit. Remember that brown rot likes it warm and wet. Ideal temperature is about 70 to 77 degrees F. If inoculum of the brown rot fungus is plentiful, significant infection can occur after only a few hours of wetness at these temperatures, but as it gets colder and/or inoculum gets scarcer, progressively longer periods of wetness are required. For instance, we've used 12 hours of wetness at 60 degrees F and 24 hours of wetness at 50 degrees F as "ballpark estimates" of what's needed for significant infection of tart cherry blossoms under commercial conditions, but these figures are merely educated guesses based on the results of greenhouse experiments. We have also found that blossom blight is much more common when humidity is high during the next few days following a rain, whereas low humidity during this period reduces disease development.

Where it comes from: In relative order of importance, the main sources of blossom blight inoculum are mummies retained in the tree, mummies on the orchard floor, or nearby wild or abandoned stone fruit trees. On peaches and nectarines, twig cankers that developed from infected fruits last summer also can be very important. As a general rule, if you had more brown rot than usual last summer, expect to have more inoculum than usual this spring. Conversely, orchards and districts that were unusually clean due to drought conditions may experience less inoculum pressure than average.

Spores for fruit rot can come from these same sources, in addition to blighted blossoms, other diseased fruit in the tree, or thinned fruitlets on the orchard floor. (Peaches thinned before pit hardening cause fewer problems than those thinned afterwards.)

Fruit species susceptibility: Apricots and sweet cherries seem to be the most susceptible to blossom blight, sour cherries the least. Peaches and plums are somewhere in the middle. Remember that the very young fruit (before pit hardening) of all species except sour cherries are fairly susceptible to infection during wet weather conditions, and the usual influences of temperature and inoculum pressure should be considered when assessing the need for control. Sometimes these early infections show up immediately, but often they remain latent until the preharvest period, when they suddenly seem to appear from nowhere.

Thus, the first few weeks after petal fall can be an important time for protecting young fruitlets. However, many labels make no provision for brown rot control between petal fall and preharvest, although some do allow sprays for control of other diseases (peach scab, cherry leaf spot) during this time. Read the labels carefully and treat as needed.

Fungicide Choices: There are several general categories of fungicides now available for brown rot control:

Protectants (captan, Bravo, sulfur): These must be present before a wetting period occurs and need to be reapplied fairly regularly (depending on the material) if they are washed off by rain. Captan is not the best material for blossom blight, but is often good enough unless disease pressure is high. It's also one of the more economical choices. The drawbacks to captan are: the 4-day REI; it's phytotoxic to some sweet cherry and plum varieties; and new rates established in the 90s are not always effective. The 4 lb./acre rate for cherries is inadequate for large trees, especially for highly susceptible sweet cherries.

Bravo has several positive and negative properties. It is less prone to wash-off than captan, but it's more expensive and can't be used beyond shuck split. It is also the best material available for control of black knot on sour cherries and plums. If weather is wet at petal fall/shuck split and disease pressure is high, a

Bravo spray should provide good residual protection against fruitlet infection and black knot.

Dicarboximides (Rovral and Ronilan): Although once the Cadillac materials for brown rot control, these fungicides are in their golden years. Ronilan is no longer allowed on stone fruits, and Rovral use is limited to the blossom period only. Rovral provides both protectant and limited postinfection activity (about 48 hr at 68F). Significantly, it also interferes with the production of brown rot spores from infected blossoms, thus slowing the spread of an epidemic. However, it's rather expensive. Although it's nice to have alternatives to the SI fungicides for resistance management purposes, cheaper alternatives (e.g. captan) are more attractive unless disease pressure is high.

Sterol inhibitors (Elite, Indar, Orbit). Elite is labeled only on cherries, peaches, and nectarines. Indar is labeled on these crops plus apricots. Orbit is labeled on all of the major stone fruits; i.e., apricots, cherries, nectarines, peaches, and plums (except "Stanley type" plums). All three are labeled for brown rot control during bloom and again 2-3 weeks before harvest, but not during the potentially important period between petal fall and pit hardening. However, during this period Elite may be used on cherries to control powdery mildew and leaf spot; Indar may be used on cherries for leaf spot and on peaches for scab; and Orbit may be used on any listed stone fruit for powdery mildew and leaf spot. All three fungicides may be applied up to the day of harvest.

In my trials over the years, each of these SI's has provided excellent control when sprayed fruit have been challenged with brown rot spores shortly after the final application of the season. However, Indar has consistently shown the best residual activity. In one typical trial, when sour cherries were inoculated with brown rot spores 9 days after the final spray, disease incidences were: unsprayed = 72%; Elite = 24%; Orbit = 17%; and Indar = 1%.

For resistance management purposes, make an effort to rotate the SI's with a non-SI during the season. Using SI's exclusively won't burn them out over a single year, but it all adds up after awhile. Researchers in South Carolina recently showed that populations of the brown rot fungus are becoming less sensitive to these materials in some of their orchards, and experience in some N.Y. apple orchards shows that SI fungicides can start losing their effectiveness over time. So, as with most pesticides, don't rely on just one class of chemistry to do the job.

New fungicides: Vangard (cyprodinil) is a member of a new group of fungicides (the analinopyrimadines) not currently represented by any other products in North America. It's labeled on all of the major stone fruits EXCEPT sweet cherries (phytotoxicity to the fruit stems has occurred), but only for control of blossom blight. It is NOT labeled for fruit rot control, except in California. We have not been able to adequately evaluate its control of blossom blight in our trials, but have not been impressed with its activity against fruit rot. (In fairness, we've evaluated other materials that are much more effective against blossom infections than they are against fruit infections). Elevate (fenhexamid) is the first representative of yet another new chemical class. Federal approval of its proposed label for brown rot control is still pending. It has consistently provided poor control of fruit brown rot in our sour cherry trials.

U.S. Apple Association Having an Impact

Source: Peter Hirst, Dept. Of Horticulture, Purdue University, Facts for Fancy Fruit, April 5, 2000

Proctor and Gamble are set to launch a new product called "Fit" as an aid for removing pesticides, dirt,

and other contaminants from fresh fruit and vegetables. OK, so what's the problem? As part of their marketing for this product, the company intended to use a stylized apple on its packaging and mentions apples specifically. The U.S. Apple Association was concerned that this marketing strategy could generate consumer concerns regarding the safety of apples in particular. At a recent meeting between the U.S. Apple Association and Proctor and Gamble, it was revealed that the stylized apple has been dropped from the label. Whether apples will be featured in TV advertising for this product remains unclear. This is one small example of the impact of the U.S. Apple Association on behalf of apple growers nationwide.

Insecticide Residues in Apple Juice

Source: Rick Foster, Dept. Of Entomology, Purdue University, Facts for Fancy Fruit

As all of you know, one of the main objectives of the Food Quality Protection Act is to protect consumers from potential harmful affects of pesticides, particularly pesticide residues in food. The first group of pesticides being assessed are the organophosphate insecticides, which include the two most commonly used insecticides on apples in Indiana: Guthion and Imidan. In addition, apple is the crop that is first on EPA's list, primarily because of the high level of consumption by children. One of the concerns that many growers and others in the food production business has been that the EPA would use assumptions about pesticide use and residues rather than real data in making their decision.

I just received a report from USDA *Pesticide Data Program, Annual Summary Calendar Year 1998.* This report summarizes the results of a very large program in which USDA samples fruits, vegetables, corn syrup, soybeans, and milk for residues of a number of different pesticides. While I hate to bore you with a lot of data, I think that it is instructive to just go through the results for several commonly used organophosphate insecticides and the residues found in apple juice. No data were collected on residues on fresh apples, but with the emphasis of FQPA on children, the apple juice data are very important.

The process USDA uses is to take samples from throughout the country and analyze them for residues. The numbers I will report here include the number of samples taken, the number of samples that had any residue of the pesticide detected, the highest amount detected in any sample, and the tolerance for that pesticide in apple juice, which is the maximum amount of residue allowable. Finally, I have calculated how many times greater the tolerance is than the largest amount of residue actually detected.

Azinphos methyl, the active ingredient in Guthion, was detected in 29 of 694 samples of apple juice. The maximum amount detected was 0.071 parts per million (ppm). The tolerance currently is 2.0 ppm, or 28 times the maximum amount detected. By next year the tolerance will be lowered to 1.0 ppm, which is still 14 times the maximum detected.

Phosmet, the active ingredient in Imidan, was detected in 4 of 603 samples, with 0.025 ppm being the greatest amount detected. The tolerance is 10 ppm, or 400 times the maximum amount detected.

Neither chlorpyrifos, the active ingredient in Lorsban, nor diazinon were detected in 694 samples. Dimethoate was detected in 117 of 694 samples of apple juice. The maximum amount detected was 0.07 ppm, which is 29 times less than the tolerance of 2.0 ppm

Methyl parathion, the active ingredient in Penncap M, was detected in 1 of 694 samples. The maximum amount detected was 0.005 ppm which is 200 times less than the tolerance of 1.0 ppm. Penncap M is no

longer labeled for use on apples or other fruits, as a result of one of the first FQPA decisions handed down last summer.

The bottom line is that for each of these six organophosphate insecticides, there was not a single case in this 1998 study in which residues even approached the tolerance in apple juice. According to the introduction to this publication, these data will be used for risk assessment purposes in the implementation of FQPA. Certainly the use of these data will paint a much different picture of the risks associated with the use of organophosphate insecticides than assuming maximum use rates, maximum numbers of applications, and minimal pre-harvest intervals.

Apple Diseases

Source: Paul Pecknold, Dept. of Botany & Plant Pathology, Purdue University, Facts for Fancy Fruit, April 5, 2000

Tight cluster to pink is a time for maximum disease control efforts. During this period primary scab spores often reach their peak; powdery mildew infection is occurring on new growth; cedar apple rust is discharging spores with each rain; and fire blight is building, ready to be carried to opening apple and pear blossoms. It's not a pretty picture!

Apple scab: The potential for severe scab infection is *always* high. The amount of scab is directly dependent on the frequency *and duration* of spring rainfall. If we have a wet April, scab pressure will be high; if it turns dry, scab pressure will be low, spray accordingly.

Rust: The pink stage of apple growth generally coincides with the time rust spores begin to infect apple foliage and fruit. If rust is a chronic problem consider the use of a sterol-inhibiting fungicide such as Nova or Rubigan.

Powdery mildew: If mildew has been a chronic problem in certain blocks (Jonathan, Rome, Ida Red) the above mentioned sterol-inhibiting fungicides are excellent in helping to control mildew. The new strobilurin fungicides, Flint and Sovran, are also excellent for control of mildew, as well as scab and rust.

Fire Blight: Cool spring temperatures help prevent a rapid increase in the fire blight population; warm spring temperatures can cause very sudden, dramatic increases in the fire blight population. To date it's been a warm spring - be nervous.

Apple Scab

Source: Paul Pecknold, Purdue University, Facts for Fancy Fruit, April 5, 2000

The most important time of year for scab control is from green tip to petal fall. If you don't control scab during this period it's an uphill struggle the remainder of the season. Be sure sprayers are properly calibrated; thoroughly read the label of all pesticides you will be applying; use sufficient water to provide good coverage; choose calm, good drying conditions for spraying (good luck on this suggestion); prune trees so they have an open canopy allowing for good spray penetration; and maintain

a tight schedule if wet weather persists during the primary scab period.

Planting to Avoid Fire Blight

Source: Paul Pecknold, Purdue University, Facts for Fancy Fruit, April 5, 2000

When establishing new orchard blocks, consider varietal susceptibility to fire blight. Blight control is easier if plantings of susceptible trees can be isolated. Avoid interplanting susceptible apple varieties (Gala, Braeburn, Fuji, Ida Red, Jonathan, Lodi, Rome, etc.) with pears or in fields adjacent to pear plantings. In mixed variety plantings, set varieties susceptible to blight in solid rows for ease of spraying with blight control chemicals. Also, most of the more severe fire blight problems have occurred in orchards planted on poor sites. These sites can be characterized as having heavy, poorly drained, and/or highly acid soils. Planting trees on poor soil invites fire blight damage and poor fruit production.

Indar Receives Section 18 Exemption for use on Blueberries

Source: Bruce Bordelon, Dept. of Horticulture, Purdue University, Facts for Fancy Fruits, April 5, 2000

EPA has granted a section 18 Specific Exemption for fenbuconazole (Indar) fungicide on blueberries for the 2000 growing season. Indar 75WP is used for the control of mummyberry disease. Use recommendations are as follows: Apply one 2 ounce pouch (1.5 ounce a.i.) Indar 75WSP per acre by ground or air. Begin applications at early green tip and make subsequent applications at 10 to 14 day intervals.

Restrictions:

1. Do not make applications within 30 days of harvest.

2. Do not make more than 5 applications or apply more than 10 ounces (0.47 lb. active) per acre per year.

3. Do not use any spray adjuvants with Indar 75WSP.

4. Do not graze livestock in treated areas or feed cover crops grown in treated areas to livestock. The supplemental label for the Section 18 exemption has been issued by Rohm and Haas and there is a copy on the Purdue University Commercial Small Fruit and Grape Spray Guide website at http//www.hort.purdue.edu/hort/ext/sfg/.

This supplemental label must be in the possession of the applicator at the time of application. Check with your agricultural chemical dealer, contact Rohm and Haas Company, 100 Independence Mall West, Philadelphia, PA 19106, (215) 592-3000.

Grape Sprays

Source: Bruce Bordelon, Purdue University, Facts for Fancy Fruits, April 5, 2000

Bud swell to bud break is the perfect time to apply liquid lime sulfur for control of anthracnose. Lime sulfur has also been shown to reduce overwintering inoculum of black rot and powdery mildew. It is likely that it helps reduce inoculum of Phomopsis, but I know of no research proof. It is important to get thorough coverage of all plant parts, especially the trunks and cordons where bark crevices harbor fungal spores. Other important pests to control this time of year are flea beetles and climbing cutworms. These pests feed on swollen buds, destroying the primary shoot. The main damage is done when buds are in full swell. Once the shoots reach 1/2 inch long the damage caused by these pests is minor. Flea beetles seem to be the more common of the two pests in Indiana. Scout vineyards for these insects or signs of feeding beginning at early swell and continuing until shoots are about 1/2 inch long. The adult beetles are dark metallic greenish-blue or steel blue and about 1/8 inch long. They damage buds by eating a hole in the side or tip and hollowing out the center. Scout perimeter rows, especially those adjacent to woods or brushy areas where adult beetles overwinter. If bud damage averages 4% or more, an insecticide application may be warranted. Refer to the

Commercial Small Fruit and Grape Spray Guide http://www.hort.purdue.edu/hort/ext/sfg and the Midwest Small Fruit Pest Management Handbook http://www.ag.ohio-state.edu/~sfgnet/ for complete discussions of grape IPM.

Fruit Observations

Insect Key

AM:	Apple maggot
CM:	Codling moth
DWB:	Dogwood borer
LPTB:	Lesser peachtree borer
OBLR:	Oblique banded leafroller
OFM:	Oriental fruit moth
PC:	Plum curculio
PTB:	Peachtree borer
RBLR:	Redbanded leafroller
SJS:	San Jose scale
STLM:	Spotted tentiform leafminer
TABM:	Tufted apple budmoth
VLR:	Variegated leafroller

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

Apple: 4/6-4/12
RBLR: 1
STLM: 5
Peaches:
OFM: 0
LPTB: 0

Tree Development: Apples - Pink; Peaches - late bloom

Site: Eastern Erie County
Source: Ted Gastier, Extension Agent

Apple: 4/6-4/12
RBLR: 16
STLM: 0
Peach:
RBLR: 17
OFM: 0

Tree development: Apples - tight cluster to pink; Peaches - bloom

Site: Sandusky County

Source: Ted Gastier, Extension Agent

Apple: 4/6-4/12
RBLR: 24
STLM: 520
Peach:
OFM: 0
RBLR: 21

Tree Development: Apples - tight cluster to pink; Peaches - pink

Site: East District; Lorain County
Source: Jim Mutchler, IPM Scout

Apple: 4/6-4/12
STLM: 141
Peach:
OFM: 1
RBLR: 0

Site: Wayne County
Source: Ron Becker, Extension Program Assistant

Apple: 4/6-4/12
West
RBLR: 10
STLM: 73
East
RBLR: 0
STLM: 0

Moderate scab infection April 8 based on Spectrum Technologies monitor and software**.**

Ohio Fruit Crop Conditions

We are cautiously optimistic about the prospects for Ohio tree fruit crops. Some unconfirmed reports have indicated possible frost damage in isolated areas. For example, Dave Ferree believes that the cherry crop has been lost at OARDC. (Also see following article). However, those growers who have checked blossoms are finding little damage.

The temperature at which fruit buds are injured depends primarily on their stage of development. As flowers begin to swell and expand into blossoms, they become less resistant to freeze injury.

Stage of Development Red Delic. Apples	10% kill °F	90% kill °F
Silver tip	15	2
Green tip	18	10
½ inch green	23	15
Tight cluster	27	21
First pink	28	24
Full pink	28	25
First bloom	28	25
Full bloom	28	25
Post bloom	28	25

Golden Delicious and Winesap are approximately 1 degree hardier. Rome Beauty is 2 degrees hardier, except after petal fall, when all cultivars are equally tender.

Stage of Development Peaches	10% kill °F	90% kill °F
First swelling	18	1
Calyx green	21	5
Calyx red	23	9
First pink	25	15
First bloom	26	21
Full bloom	27	24
Post bloom	28	25

Stage of Development Bartlett Pears	10% kill °F	90% kill °F
Scales separating	15	0
Blossom buds exposed	20	6
Tight cluster	24	15

First white	25	19
Full white	26	22
First bloom	27	23
Full bloom	28	24
Post bloom	28	24

D'Anjou is similar but may bloom earlier and therefore may be more tender than Bartlett at the same date.

Stage of Development Sweet Cherries	**10% kill °F**	**90% kill °F**
First Swelling	17	5
Side green	22	9
Green tip	25	14
Tight cluster	26	17
Open cluster	27	21
First white	27	24
First bloom	28	25
Full bloom	28	25
Post bloom	28	25

Stage of Development Apricots	**10% kill °F**	**90% kill °F**
First swelling	15	-
Tip separates	20	0
Red calyx	22	9
First white	24	14
First bloom	25	19
Full bloom	27	22
In the shuck	27	24
Green fruit	28	25

Source: 1996-1997 Pennsylvania Tree Fruit Production Guide, Penn State Cooperative Extension

Additional Ohio Fruit Crop Condition Notes

Source: Drs. Dave Ferree and Diane Miller, Ohio State University Fruit Specialists

With this very early season we are seeing frost injury to spur leaves. Since these are the leaves that supply the apple during the cell division growth phase, they are very important to early fruit development and final fruit size. We have several studies that show that urea included in the early sprays can increase fruit size about 7%. These studies were on trees that were not nitrogen deficient by the normal measure. You need enough spur leaf area present so the first spray should not be earlier than pink. We have used 5 lbs of urea/100 gal or per acre and back off to 3 lbs if temperatures get above 75^{o}-80^{o}F. It is more important to have multiple sprays during the 35-50 day cell division period than to apply higher rates. These sprays have not cause excessive growth or deleterious effects to fruit quality.

Bloom Thinning: As many of you know, we have been evaluating various materials over the past several years. Most of the materials are not yet cleared for use, but we have been informed that Ohio is one of the states where Wilthin can be used. We have two years experience with this material. We applied it at about 80% open flowers to spur Delicious. It causes significant injury to flowers and some injury on foliage at the recommended rate. In 1998, it didn't cause a significant reduction in set, but did reduce crop 17%. It needed a follow-up spray of a regular thinner at 10-12 mm fruit size for adequate crop reduction. In 1999, Wilthin significantly reduced set by 33% and no follow-up thinning spray was needed to achieve a crop load equivalent to a spray of NAA plus Sevin applied at the normal time. Our experience is limited with this material, but it does have some potential to aid thinning in hard to thin blocks. At rates higher than recommended, we over-thinned and caused excessive foliar damage.

This past week of cooler temperatures has slowed development, but according to our records we started April 3-4 weeks ahead of normal. We see some flower loss on the earliest peaches, but still appear to have enough flowers for a crop. Some injury can also be found on the most advanced apple cultivars, but not enough injury to be of concern at this point.

Northern Ohio Apple Scab Activity

SkyBit Product & Spectrum Technologies Orchard Monitors

SkyBit based on observations: April 1, 5, 6, 7, 9-12; active but no infection, April 2-4, 8: possible infection & damage

Based on Forecasts: April 13-16, 19-22: active but no infection, **April 17,18: Possible infection & damage**
Spectrum Technologies Monitors and Software* Observations: April 2 & 4; Light Infections
(Software* based on Modified Mills Chart)

Degree Day Accumulations for Selected Ohio Sites January 1, 2000 to date indicated

	Actual DD Accumulations April 12, 2000	**Forecasted Degree Day Accumulations April 19, 2000**

Location	Base 43° F	Base 50° F	Base 43° F	Normal	Base 50° F	Normal
Akron - Canton	232	86	306	237	121	96
Cincinnati	349	141	466	425	203	118
Cleveland	245	94	313	223	126	91
Columbus	331	132	421	306	176	130
Dayton	318	125	411	308	172	133
Mansfield	235	85	307	229	118	94
Norwalk	231	83	297	203	114	82
Toledo	229	78	295	190	107	76
Wooster	264	98	331	215	128	83
Youngstown	221	83	287	206	114	83

Phenology

	Range of Degree Day Accumulations	
Coming Events	**Base 43° F**	**Base 50° F**
Redbanded leafroller - 1st catch	32-480	5-251
Tarnished plant bug adults active	71-536	34-299
Spotted tentiform leafminer - 1st adult catch	73-433	17-251
Rosy apple aphid nymphs present	91-291	45-148
Spotted tentiform leafminer - 1st oviposition	141-319	48-154
San Jose scale 1st catch	189-704	69-385
Lesser peachtree borer 1st catch	224-946	110-553
White apple leafhopper nymphs present	236-708	123-404

Thanks to Scaffolds Fruit Journal (Art Agnello)

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information that is complete, timely, and accurate, the pesticide user bears responsibility of consulting the pesticide label and adhering to those directions.

Keith L. Smith, Associate Vice President for Ag. Adm. and Director, OSU Extension.

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| Back |