THE OHIO STATE UNIVERSITY EXTENSION

Ohio
Fruit ICM News

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In This Issue

Calendar

February 1: Second Ohio Ag and Hort Human Resource Managers' Forum , Hilliard, OH. Contact MAAHS at 614-246-8286, maahs@ofbf.org or <www.midamservices.org> (click on "Events") for more information.

February 5: Berry Pruning Demonstration, East Sparta, OH. Gary Vogely will be hosting a bramble and blueberry pruning demonstration on his farm in East Sparta, Ohio on February 5th. The demonstration will be held from 9 a.m. to noon and will include demonstrations on the proper pruning of raspberries, blackberries, and blueberries. Sandy Kuhn, Berry Coordinator, OSU South Centers will be the presenter.
Vogely Enterprises is located at 3245 Battlesburg Street SE, East Sparta, OH. For more information call either Gary Vogely at 330- 484-4387 or Sandy Kuhn at 800-297-2072 (Ohio), 740-289-2071, or e-mail kuhn.37@osu.edu.

February 10-12: North American Farmers' Direct Marketing Conference and Trade Show, Boston Park Plaza Hotel, Boston, MA. Contact 413-529-0386, e-mail info@nafdma.com, or click on <http://www.nafdma.com>.

February 16: Addressing Regulations for Farmers Direct Marketing Fresh and Value-Reynoldsburg,OH.See<http://www.ohioagriculture.gov> for directions. Please call and register with Debra Strait at 614-728-6250. There is no fee.

February 16: Southwest Ohio Fruit & Vegetable School, Valley Vineyards & Winery, Morrow, OH. Contact Vickie Butler or Gary Gao at Clermont County Extension, 513-732-7070.

February 19-22: Ohio Wine Grape Short Course 2005, The Lodge and Conference Center, 4888 SR 534, Geneva on the Lake, OH. Register online at <https://www.webzar.com/~owp_ssl/sc_form2.htm> See following article for agenda.

February 22-23: Ohio River Valley Farm Marketing Conference, Mason, Ohio. Brochure for conference can be viewed on-line at <http://ocdc.osu.edu>.

February 25: Berry Growers' School, OSU South Centers, Piketon, OH. See second article for agenda and registration information.

March 1: Fourth MAAHS Annual Meeting and Employer Seminar, Wilmington, OH. See following article.

March 5: Fruit Tree Pruning Clinic, Rouster's Apple House, Milford, OH. Contact Vickie Butler or Gary Gao at Clermont County Extension, 513-732-7070.

Berry Growers' School

When: Friday, February 25, 2005, 9 a.m. to 4 p.m.

Where: OSU South Centers, 1864 Shyville Road, Piketon, OH.

- **Management of Whole Pest Complexes Berry Crops - With Emphasis on History of Virus Transmission** by Dr. Celeste Welty, Professor and Extension Entomologist, Ohio State University

- **Raspberry Production in High Tunnels** by Kathy Demchak, Senior Research Associate, Horticulture Department, Pennsylvania State University

- **Plasticulture Strawberries in Northern Climates** by Kathy Demchak

- **Disease Management of Berry Crops - Fungal and Viral Diseases** by Dr. Mike Ellis, Plant Pathologist, Ohio State University

- **Plasticulture Strawberries - Learning and Adopting a New Production System on Ohio**

- Dr. Paul Skinner - President and Soil Scientist Terra Spase, Inc., St. Helena, CA. Precision viticulture, weather, vineyard establishment, soil fertility, nutrition management for quality fruit production

- Rick Hamman - Viticulturist Hogue Cellars, Prosser, WA. From the 2000+ acres he manages at Hogue: vineyard practices resulting in 90+ Wine Spectator ratings, plus crop estimating

- Sigrid Gersten - Briand Lallemand, North America. Selection of bacteria, yeast, and nutrients plus latest yeast and malolactic strains for aromatics in whites and mouth-feel in reds
- Viticulture Workshop: The basics: from site selection to variety selection to care of young vines, to benefit new and existing growers

- Enology Workshop: Fundamental issues in starting a winery; setting up labs, design and essential vinification practices for quality wines from vine to bottle, to benefit potential and veteran winemakers

Fees: Pre-registration $50 by February 18, at the door registration $60 - lunch will be provided.

Agenda:

Farms by Brad Bergefurd, Extension Educator, Horticulture, OSU South Centers

- **Primocane Bearing Blackberries - What Are They? How Do They Differ from Traditional Blackberries?** by Shawn Wright, Horticulture, OSU South Centers

To register by phone, call 1-800-297-2072 (Ohio only) or 740-289-2071 or e-mail Kelly Roberts at roberts622@postoffice.ag.ohio-state.edu. For further information please contact Brad Bergefurd by e-mail at bergefurd.1@osu.edu or by phone at 740-289-2071.

2005 Ohio Grape Wine Short Course

Source: <http://www.ohiowines.org/cgi-bin3/calendar.pl?sc2005>

Featured Speakers:

- Dr. Ralph Kunkie - Professor Emeritus of Enology, UC Davis, CA. New advances in wine microbiology and winery sanitation

- Thomas Payette - Payette Consulting, Rapidan, VA. Talks in Sunday's ABC's winemaking workshop plus assessment and post fermentation management for mouth-feel in reds. Also in marketing: Agri-tourism, partner or perish, millennials' marketing

Featured Topics:

- Marketing Workshop: An over-view of essentials to sell the great wine grown and vinified, for newbees and front line staff of existing wineries

- Technical Sessions: Precision viticulture: GIS and GPS, season review with veterans panel, latest yeast/malolactic strains, new aspects in microbiology, winery sanitation, viticultural practices to enhance aromatics and complexity, assessment and post fermentation management for reds

- Breakfast Q and A Sessions in marketing, viticulture, and enology. . . and more

- Trade Show: Nearly 20 exhibitors will showcase vine to glass items, featuring nearly everything a wine grower will need to plant, grow, produce, market, and sell his wines and grapes

- Silent Auction: Dozens of things on sale. Proceeds to benefit the Robert Gottesman Fund at The Ohio State University, which is committed to the support and growth of the Ohio Grape/Wine Industry.

- Hall of Fame Presentation: Join the industry in saluting one or more of the grape and wine community's most distinguished luminaries

- ABC's of Winemaking: Todd Steiner

- ABC's of Wine-grape Production: Imed Dami

Complimentary box lunch for all morning workshop participants

Sunday
2:00 p.m. - 5:00 p.m. Technical presentations focusing on advanced enology, viticulture, and marketing

5:15 p.m.- 7:00 p.m. Annual meeting of Ohio Wine Producers Association

7:30 p.m. - 9:30 p.m. Sunday Grand Reception Progressive hors d'oeuvres event matching exceptional wines from our out-of-state speakers with appropriate cuisine

Monday
8:00 a.m. - noon. Advanced technical presentations in enology, viticulture, and marketing

ThemedLuncheon

1:30 p.m. - 5:00 p.m. Continuation of advanced technical presentations in enology, viticulture, and marketing

Program Schedule:

Saturday
10:30 a.m. - 5:30 p.m. The ABC's of Marketing: An exceptional marketing session for "newbees" and for frontline marketers from existing wineries. Additional registration fee required; additional optional prix fixe dinner that evening at *Debonne* and/or *Ferrante Winery*

Sunday
9:00 a.m. - 1:00 p.m. Back to Basics workshops: concurrent sessions designed for those just entering the business *as well as* for those who would benefit from a review of the essential principles and techniques

7:15 p.m. Ohio Grape Wine Industry Reception, Gourmet Banquet, and Hall of Fame presentation

Tuesday
7:00 a.m. - 8:00 a.m. Three concurrent breakfasts Enology group, viticulture group, marketing group: question and answer sessions covering relevant topics

8:30 a.m. - noon Technical presentations focusing on advanced topics in enology, viticulture, and marketing

Dates and times are approximate and are subject to change in the final program.

Dick Funt to Retire

Source: Michele Hobbs, Department of Horticulture & Crop Science, Ohio State University

Dr. Dick Funt will retire from The Ohio State University, Department of Horticulture and Crop Science in January. A retirement reception will be held for him on Tuesday, February 15, 2005 in the Kottman Hall lobby (2021 Coffey Rd., Columbus) from 3-5 p.m.

To recognize his achievements in Extension and in the Department during the past 26 years, Michele will be compiling a book of letters and photos from you and others who have worked with him on various projects. Please send your letter and/or photos to Michele by February 9. The book will be presented to Dr. Funt at the retirement reception. Additionally, I will be collecting money for a gift. You can send contributions and letters to Michele at:

Michele Hobbs
Department of Horticulture & Crop Science
2001 Fyffe Court
Columbus, OH 43210-1096

After his retirement, Dr. Funt will continue with his research and education collaborative with Armenian fruit growers. He will also continue his research on prevention of cancer and heart disease. Dr. Funt has been a strong proponent of consumer horticulture throughout his career and will continue to support the newly created Master Gardener Endowment. If you wish, you can designate your gift to one of these endeavors.

Note on Scab Control from Mike Ellis

Source: Dr. Mike Ellis, OSU Dept. of Plant Pathology

Many Ohio apple growers have experienced poor scab control in the past couple of years. In some orchards the scab level has been unacceptable. Although the last two years have been extremely wet , and this has undoubtedly added to the problem, it is likely that some orchards are experiencing the development of reduced sensitivity or resistance in the scab fungus to the Sterol -Inhibiting fungicides (Nova, Rubigan and Procure).

Since the introduction of these materials nearly 20 years ago, most growers have been spraying for scab on a 10-day extended interval program using the sterol inhibitors combined with a protectant fungicide such as Captan or Mancozeb. If resistance has developed in your orchard, the days of the 10-day spray interval may be past. For growers with resistance problems, we need to consider using a 5 to 7 day protectant program in the future (especially in wet growing seasons). Dr. David Rosenberger, Cornell University, has written the following articles. I feel it is very important for **ALL** Ohio apple growers to read and **STUDY** the information in Dr. Rosenberger's articles. Please feel free to contact me (Mike Ellis) with questions at 330-263-3849 or email at ellis.7@osu.edu.

How to Control Apple Scab: Relearning What Your Father Knew

Source: David A. Rosenberger, Professor of Plant Pathology, Cornell University's Hudson Valley Lab, Highland, NY 12528

For the past 40 years, apple growers have benefitted from development of new fungicides that allowed consistent control of apple scab along with increased flexibility in spray timing. When ferbam was introduced in the early 1950's, apple growers marveled at its effectiveness compared to sulfur. The introduction of captan, maneb, and mancozeb fungicides later in the 1950's provided more options for controlling apple scab and other apple diseases.

Then dodine, sold as Cyprex in the early 1960's, provided apple growers with the first fungicide that had both post-infection and anti-sporulant activities. As a result, dodine proved very effective for slowing or arresting development of secondary scab in orchards where early-season control failures would otherwise have resulted in significant crop loss. The 1970's brought the introductions of benomyl (Benlate) and integrated pest management. By the time the DMI fungicides (Rubigan, Nova, Procure) were introduced in the late 1980's, IPM was an accepted part of fruit-grower jargon and everyone was looking for methods to reduce pesticide use.

The DMI fungicides were tailor-made for IPM programs because they provided a scab-control safety net that enable growers to take risks that would have been inconceivable 20 years earlier. By tank mixing DMI fungicides with a protectant fungicide (captan, mancozeb, or Polyram), apple growers were able to capitalize on the benefits of both fungicide chemistries. The protectants in the mix provided excellent residual activity against scab on both leaves and fruit.

The DMI fungicides provided up to 96 hours of post-infection activity, excellent pre-symptom activity when applied after the 96-hour post-infection window, and anti-sporulant activity that suppressed production of secondary inoculum on leaves with visible lesions. With DMI fungicides, scab sprays at green tip became optional, 10-day spray intervals were the norm, and alternate row spraying on a 10-day interval was common during the prebloom period. Timing of scab sprays could be adjusted by a few days so as to coincide with insecticide sprays that had to be applied at pink or petal fall. Even when prebloom fungicide programs were less than 100% effective, back-to-back applications of a DMI fungicide at petal fall and first cover would correct the problem.

Holes in the safety net! Research in NY has shown that apple scab with resistance to DMI fungicides is now common in many orchards. Unfortunately, DMI-resistance often becomes evident only in the wake of disastrous control failures. As a result of control failures, orchards with DMI resistant scab often have exceptionally high levels of over-wintering inoculum. The situation is further complicated by the fact that scab in most orchards is also resistant to Topsin M and is sometimes resistant to dodine as well.

Suddenly, most apple growers with less than 50 years of experience are entering unfamiliar territory: How does one manage apple scab in high-inoculum orchards when no fungicides are available to arrest scab development after leaves become infected? For the first time since the introduction of dodine, apple growers must consider the possibility that just a slight error in prebloom scab control can result in season-long scab problems and a high incidence of scabby fruit. Prebloom scab control becomes analogous to a high-wire act with no safety net!

The scab control guidelines that follow might sound familiar to fathers and grandfathers of current-day apple growers. For younger apple growers, a quick attitude-adjustment is essential for minimizing potential losses to apple scab.

Attitude adjustments: Following are a list of common misconceptions about dealing with DMI-resistant apple scab:

- ***Misconception #1:*** *DMI-resistance is of no concern to me because the DMIs are still working in my orchards*. Wrong! Even if the DMIs have always worked well in your orchards, you never know when they may stop working. Why wait for an expensive control failure before shifting to more conservative strategies? Furthermore, by adopting more conservative spray strategies immediately, you may be able to conserve the post-infection activity of DMI fungicides for another decade in your orchards, thereby preserving the only remaining tool that can be used to arrest development of secondary scab in those unusual years where your conservative program is less than perfect.

- ***Misconception #2:*** *We'll ask Cooperative Extension or our fungicide supplier to run a quick test and tell us which fungicides are still working in our orchards.* Wrong! There are currently no quick tests for resistance to dodine or to DMI fungicides. Wolfram Koller at Cornell and Vincent Philion in Quebec are working to develop reliable tests, but it may be several years before a testing methodology is perfected. Even after a test becomes available, testing for fungicide resistance will probably cost several hundred dollars per sample and will require collection of scabby leaves or active apple scab lesions from an unsprayed "sample" tree. Availability of qualified service providers for this kind of work could also limit the usefulness of fungicide resistance testing.

- ***Misconception #3:*** *We can substitute Flint or Sovran for DMIs when DMI resistance appears.* Wrong! Sovran and Flint are great fungicides when they are used as protectants. However, they are less effective than the DMI fungicides because they have less post-infection activity (only 48-72 hr instead of the 96-hr for DMIs) and they have no pre-symptom activity to slow development of incubating scab lesions. As a result, Sovran and Flint have almost always been a disappointment when they have been used to stop epidemics in orchards where primary scab is already well established.

- ***Misconception #4:*** *The green-tip spray can't be that important because most ascospores aren't released until after tight cluster.* Wrong! It is true that relatively few ascospores are usually released at green tip. However, infections initiated between green tip and tight cluster pose greater risks to the apple crop than primary infections that are initiated after tight cluster. The early infections begin producing conidia just when fruit and terminal leaves reach their period of peak susceptibility around petal fall, and the huge numbers of conidia produced by a single lesion can overwhelm protectant fungicides in a wet season.

- ***Misconception #5:*** *I can still rely on dodine in a pinch.* Perhaps! In New York, however, lab tests showed high levels of dodine-resistance in many orchards where growers had assumed that dodine should still be effective. Most growers have relatively poor memories for what was actually sprayed in their orchards in the 1960's, and dodine resistance can persist a long time after it becomes established in the orchard.

- ***Misconception #6:*** *Switching to protectant fungicides should be an easy transition.* Perhaps! Maintaining scab control with protectant fungicides like mancozeb and captan is relatively easy in low-inoculum orchards. High inoculum and wet prebloom weather are a deadly combination, however, and the difficulties of controlling scab under those conditions should not be underestimated. In large operations where equipment and pesticide applicators were already stretched to the limit when applying DMI fungicides, it may be necessary to buy another sprayer and hire another applicator so as to ensure that all trees can be sprayed on a weekly basis during the prebloom intervals.

Essentials for prebloom scab control in the era of fungicide resistance:

Some of the following strategies should be integrated into scab control programs even where no scab control failures have occurred to date. These strategies become essential for orchards where DMI fungicides have already failed:

- **In high inoculum orchards, consider applying urea before bud break to reduce ascospore production.** Applying 40 lb/A of urea to the orchard floor in late winter or early spring can reduce ascospore production by more than 75%. In a high-inoculum orchard, that could spell the difference between effective scab control and a control failure, especially if wet weather between green-tip and petal fall favors scab development and hinders fungicide application.

- **Start protectant fungicide sprays at green tip.** It is absolutely essential to have the first fungicide applied BEFORE the first apple scab infection period. That means that prunings in the orchard must be chopped or removed well in advance of green-tip, and sprayers should be up and running by silver tip.

- **Use full rates of protectant fungicides.** Remember that 1 lb of mancozeb fungicide or 1 lb of Captan 50W per 100 gal of dilute spray is actually a half-rate of fungicide that was initially recommended as a complement for Benlate, Topsin M, or DMI fungicides. Using mancozeb fungicides at 3 lb/A on a 7-day spray interval can result in a control failure in a high-inoculum orchard.

- **Use shorter spray intervals.** Where DMI fungicides are no longer working, forget about 10-day spray intervals. Plan on a 5 to 7 day spray interval instead. Fungicide protection might need to be renewed after 5 days following heavy rains or to ensure protection ahead of slow-moving weather fronts that might impede spraying for several days. If mancozeb fungicides or Captan 50W are applied at 2 lb/100 gal (6 lb/A for medium-sized trees), then residual activity should hold up through 1.5 to 2 inches of rain. (Other captan formulations would be equally effective when applied at similar rates of active ingredient.) If mancozeb fungicides or Captan 50W are applied at only 1 lb/100 gal., then fungicide protection will often be exhausted after only a inch of rainfall

Spray in the rain if necessary to protect new foliage during infection periods that last more than 2 or 3 days. If fungicide protection is removed by heavy rains at the beginning of a wetting period and rains are predicted to continue
for several more days, then protectant fungicides should be re-applied during the rain to protect against ascospores that will mature as the wetting period continues. Sulfur, captan, and mancozeb fungicides that are applied in the rain will provide several days of protection against scab infection, but don't count on sprays applied in the rain to provide more than 3 or four days of protection. Sovran, Flint, Vangard, Scala, Topsin M, and DMI fungicides should never be applied in the rain because all of these fungicides must dry on the leaf to be fully effective.

•**Be wary of alternate row spraying on an extended interval**. Alternate row spraying often leaves a "shadow" of unprotected foliage on the back sides of tree trunks. Missing a few leaves here and there was not very important when DMI fungicides applied 7-10 days later from the opposite sides of the trees could arrest scab development on the few leaves that may have become infected. Where DMIs are no longer working, it is imperative that all leaves be protected every 7 days. If in doubt about spray coverage, use water-sensitive paper to evaluate coverage on the back sides of trees. Attempting to judge spray coverage based on visual analysis of the spray plume can be misleading because the spray mist that refracts the most light carries a relatively small proportion of the fungicide load.

•**Where DMI resistance is suspected, do not use any DMI sprays before petal fall.** Application of DMI+protectant sprays to a fully DMI-resistant scab population may actually stimulate scab growth and result in less scab control than would occur if a low rate of protectant fungicide were used alone. However, even where scab is resistant to DMI fungicides, the DMIs may still be needed to control powdery mildew and rust diseases. Delaying DMI sprays until petal fall will minimize risks of stimulating scab problems because most ascospore release will be completed by petal fall and there should be no secondary scab inoculum if appropriate prebloom sprays were applied.

Suggestions for a conservative scab control program:

- **Use a copper spray or mancozeb at silver tip to green tip.** In high inoculum orchards, this could be the most critical scab spray for the entire season! Copper is recommended for orchards with a history of fire blight. Otherwise, mancozeb fungicides will provide the most cost-effective protection. Neither copper nor mancozeb will provide any post-infection activity. Note, however, that protectant fungicides (copper, mancozeb, captan, sulfur) will usually be effective so long as they are applied before a Mill's period is completed. For example, approximately 40 hr of wetting are required for light Mill's infection period at 37 F, so a protectant fungicide could be applied up to 40 hr after the start of a wetting period if the mean temperature for the wetting period was 37 F.

- **Consider mancozeb-captan combinations from half-inch green through tight cluster.** In high inoculum orchards, a combination of 3 lb/A of a mancozeb fungicide plus 3 lb/A of captan 50W (or the equivalent amount of another captan formulation) may be the best option. Using 6 lb/A of mancozeb alone or 6 lb/A of Captan 50W alone are acceptable alternatives, but both alternatives have disadvantages. Using the higher rate of mancozeb prebloom triggers a label restriction against any mancozeb use after bloom, and mancozeb may be needed after bloom as a substitute for captan if insecticide+oil sprays are planned for early summer. The higher rate of captan alone is effective, but captan usually is more expensive than mancozeb.

- **Use Scala or Vangard to work around prebloom oil sprays or when 48-hr post-infection activity is essential.** Both of these fungicides work best in cool weather. They have the advantage of providing 48-hr of post-infection activity, but as protectants they are no more effective than the less expensive mancozeb fungicides.

- **Consider Flint or Sovran at tight cluster and pink or at pink and bloom, but keep the spray interval at 7 days.** These fungicides often give slightly better control of scab than can be achieved with mancozeb or captan sprays. Sovran and Flint can be applied alone; tank mixing with captan or mancozeb has not improved control in field trials. If oil sprays are applied at tight cluster, then Sovran or Flint can be used as a substitute for Captan or mancozeb + Captan when the oil is applied. Using Sovran and Flint at pink and bloom provides two benefits: They will provide protection against early powdery mildew infections and they will suppress sporulation of any primary scab lesions that may have become established at green-tip, thereby slowing secondary spread of scab during the period around bloom and petal fall and fruitlets and early terminal leaves are at peak susceptibility. Note, however, that Sovran and Flint will not completely arrest development of primary scab lesions in the way that DMI fungicides did, so using Sovran or Flint at pink and bloom is not an acceptable substitute for a green-tip spray. In an "easy" scab year where protectant scab fungicides were in place ahead of all prebloom infection periods, it may be more cost-effective to continue with a mancozeb + captan program until petal fall rather than using Flint or Sovran during bloom.

- **Use DMI-captan or DMI-mancozeb sprays at petal fall and first cover.** The DMI fungicides still provide the best available mildew control, and using them at petal fall and first cover optimizes their usefulness against mildew and against cedar apple rust infections on terminal leaves.

Managing Secondary Scab:

What course of action is recommended if primary scab lesions start appearing on leaves? This is a difficult question because of all the variables that must be considered. For example, a little bit of scab showing up on late terminal leave in the latter half of June poses less of a threat than a little bit of scab showing up at petal fall because by late June fruit will be more resistant to infection than they are at petal fall. Similarly, a little bit of scab on Empire, Honeycrisp, or

Red Delicious is of less concern that a similar scenario for scab susceptible cultivars such as McIntosh, Ginger Gold, or Silken. Finding scab on leaves just ahead of a predicted heat wave is less threatening than finding scab just before a week of cool wet weather. Finally, the fungicide-resistance status of the orchard must be considered when deciding what to do. Following are a few general principles:

- **Depend on captan; pray for hot, dry weather.** If the fungicide-resistance status of the orchard is uncertain, then the best defense against fruit scab will be to apply the full label rate of captan on a 7 to 14 day interval (depending on weather) until terminal buds are set or until hot weather intervenes to slow scab development. Several days with maximum temperatures above 85 F will reduce viability of scab conidia produced in new lesions. Hot weather also seems to increase the effectiveness of captan. During cool wet summers, protection with captan will need to be maintained throughout summer and to within two weeks of harvest. Lower rates of captan and 14-day spray intervals should suffice during July and August, but coverage will need to be renewed at shorter intervals if rain removes fungicide residues.

- **Sovran and Flint can help** because they reduce sporulation in lesions that are visible when sprays are applied. However, many growers have found that Sovran and Flint used alone are not satisfactory for stopping well-established scab epidemics. Therefore, I recommend that Sovran and Flint should always be used in combinations with the full rate of captan if they are applied in orchards with visible scab lesions. Using Sovran and Flint in combination with captan where scab lesions are already present will also limit selection pressure for resistance to Sovran and Flint.

- **Syllit could be an option in orchards where it is still effective.** Syllit is very effective for shutting down scab epidemics in the absence of dodine-resistance. However, using Syllit alone in orchards where there is dodine-resistance could result in complete crop loss. Therefore, even where Syllit-resistance is not suspected, Syllit should be used in combination with at least 3 lb/A of mancozeb or Captan 50W (or equivalent).

For effective presymptom and antisporulant activity, Syllit 400F must be used at a minimum rate of 12 fl oz/100 gal (or 36 fl oz/A for medium-sized trees).

- **Beware of late-summer under-leaf scab and the potential for late-season fruit infections.** Sovran, Flint, and Captan can protect new leaves and foliage during summer, but they usually will not completely eradicate scab from existing lesions. Some of these old lesions can become active again in late summer or fall. Conidia from older scab lesions can infect the undersides of leaves in late summer. If the harvest season is exceptionally wet, then inoculum from these late-summer under-leaf infections can contribute to fruit infections that appear as pinpoint scab or storage scab. If scab is evident on the undersides of leaves in early September, then an additional fungicide spray may be needed to protect fruit against pinpoint scab.

All of the options noted above for controlling secondary scab will prove extremely expensive as compared to adding one or two sprays of protectant fungicide during the prebloom period. Thus, in this era of fungicide resistance and failing fungicides, the importance of controlling primary scab cannot be over-emphasized!

Acknowledgements:

The concepts and guidelines presented in this document were derived from discussions and collaborative work with Dr. Wolfram Koeller and Dr. Bill Turechek, both from the Department of Plant Pathology at the N.Y. State Agricultural Experiment Station in Geneva.

Could "Green" Approaches for Scab Control Improve Profitability?

Source: David A. Rosenberger, Professor of Plant Pathology, Cornell University's Hudson Valley Lab, Highland, NY 12528

The title for this presentation may have raised expectations that will prove impossible to meet. What one envisions as a "green" approach to scab control is probably dependent prior experiences with apple scab, on the company that one keeps, and to some extent, on one's religion. This presentation will focus on the science of scab control as it relates to measures that can complement or substitute for traditional fungicide programs. I will not attempt to "weight" various options based on their acceptability to groups with widely divergent philosophical perspectives.

As with any business, profitability in apple production requires that income from selling the product must exceed the costs involved in producing,
packing, and marketing. "Green" approaches to scab control that inflate production costs may still be profitable if the "green" crop can be marketed to someone who is willing to pay a premium for food that is produced in a certain way.

Because I cannot assess your markets, I cannot predict which practices will prove profitable for any given farm operation. The best that I can provide is some estimation of how difficult and expensive it may be to incorporate new practices into existing production systems.

For purposes of this discussion, "green" approaches for scab control are subdivided into the four categories. Those categories are listed below starting with those I deem least useful and ending with those that have broader applicability:

1. Scab control with new "biorational" fungicides and nutrient sprays
2. Scab control via scab-resistant cultivars
3. Scab control with copper and sulfur compounds
4. Scab control via inoculum reduction

Scab control with new "biorational" fungicides and nutrient sprays. This approach to scab control requires the least discussion: "Biorational, green, or soft" fungicides introduced to date are uniformly ineffective for controlling apple scab. I have personally evaluated Serenade, Oxidate, and Messenger and found them less effective than sulfur. Other scientists have evaluated some of the other oils and natural products with similar results. These "green" products may be profitable for the manufacturers, but none of those tested to date will improve profitability for apple growers!

Scab control via scab-resistant cultivars. Scab-resistant cultivars provide the ultimate solution for low-cost scab control, but they will prove profitable only if they can be marketed. Marketing apple cultivars with new names can be difficult. If you really believe that you have a niche market that will buy a new scab-resistant apple cultivar, then consider asking the potential buyers to share some of the risk by signing long-term contracts that will bind them to purchasing the crop after you grow the trees! This may sound impossible. However, consumers who have become accustomed to pre-paying for their fresh produce each year via participation in community-supported agriculture (CSA) enterprises might be willing to pre-pay production costs for organically-produced scab-resistant apples.

Producers of scab-resistant apples will face several significant problems. First, organic production from the desert areas of Washington State is creating a very low floor for pricing of organic apples. Producers in non-desert regions will have higher costs for organic production because of greater pressure from diseases and insects. Second, many scab-resistant apple cultivars lack the taste and quality characteristics that consumers have come to expect in their apples, so finding an acceptable scab-resistant cultivar for your niche-market consumers may prove difficult.

Finally, scab-resistant cultivars may still require fungicide protection during summer to prevent sooty blotch, flyspeck, and summer fruit rots. If the objective of growing scab-resistant cultivars is to supply an organic market, then all aspects of pest control must be carefully considered before making a large investment in new cultivars.

Scab control with copper and sulfur compounds. Methods for scab control with copper and sulfur compounds were perfected more than 50 years ago, and those methods still work very well for anyone willing to expend the effort required. Copper applied at green-tip will provide the same level of scab protection as one would expect from a mancozeb fungicide. Copper sprays do not have any post-infection or eradicant activity, however. Copper sprays applied after green tip will often result in severe fruit russetting and/or blackening of fruit lenticels.

The best directions that I have found for controlling apple scab with sulfur compounds was published by Dr. Art Burrell in the 1945 Proceedings of the N.Y. Horticultural Society. Dr. Burrell suggested that growers should maintain a supply of three different products for scab control. Wettable sulfur was to be mixed with water and applied as a spray ahead of predicted infection periods. If the grower had a duster, then a finely ground sulfur was to be applied as a dust when foliage was wet after or between rains. Dusters could cover an orchard more quickly than a sprayer, and the dust tended to stick to wet trees better than sulfur applied as a spray. Finally, liquid lime-sulfur was needed to cover trees that could not be protected before the end of a Mill's infection period.

Liquid lime-sulfur provides 60 to 70 hours of post-infection activity, counting from the beginning of a wetting period. It also acts as an anti-sporulant when applied to trees where primary scab lesions are just beginning to appear. However, lime-sulfur has a number of undesirable qualities that must be considered. First, it is caustic and must be handled with caution by applicators. Second, it can cause severe leaf burn if applied to wet foliage. Third, even when applied to dry foliage, each application causes a slight reduction in both leaf size and fruit size. Fourth, application of lime sulfur anytime between bloom and second cover can result in appreciable fruit thinning. The thinning capabilities of lime sulfur are not necessarily bad in situations where reduction of crop load is desirable. However, applications of lime sulfur might be undesirable if crop load is already light.

Sulfur fungicides can differ significantly in their efficacy. Among wettable sulfur formulations, the Microthiol Special formulation has proven particularly effective, probably because that formulation includes a bentonite clay carrier that may help to improve resistance to wash-off during rains.

Regardless of the sulfur formulation that is used, sulfur sprays must be renewed frequently during rainy seasons. Protection provided by sulfur sprays is probably gone after one-half to three-quarters of an inch of rainfall. Those attempting to use sulfur as their primary scab fungicide should be prepared to recover orchards every three to five days between green tip and the third cover spray.

Scab control via inoculum reduction. This "green" approach offers the greatest potential for improving profitability. Inoculum reduction is absolutely essential for organic orchards or for orchards where DMI fungicides (Rubigan, Nova, Procure) are no longer effective due to fungicide resistance. Inoculum reduction will not provide adequate scab control when use alone, but inoculum reduction can reduce losses that might otherwise be incurred with sulfur programs or even with protectant fungicide applied in high-inoculum orchards.

The objective of inoculum reduction is to eliminate some of the ascospores that over-winter in fallen leaves. Reducing the number of ascospores makes it easier to prevent leaf infections with fungicides applied in spring, and it decreases the likelihood that scab infections will be initiated at green-tip or half-inch green when only a small proportion of ascospores are ready to discharge. By avoiding early-season infections, the risk of developing fruit scab is significantly reduced.

Three effective approaches for inoculum reduction have been documented in the scientific literature:

a. Urea sprays (40 lb urea/A) applied to fallen leaves in autumn or spring
b. Shredding of leaf litter with a flail mower
c. Application of dolomitic lime (2.5 ton/A) over fallen leaves in autumn

None of these approaches will eliminate 100% of the ascospores, but any one of them can reduce inoculum production by at least 50 to 80%.

Urea works by stimulating microbial breakdown of over-wintering leaves. It may also inhibit ascospore formation in the surviving leaf litter. Urea should be applied at 40 lb/A to fallen leaves using a sprayer that provides coverage of the entire orchard floor. Spraying trees with urea before leaf drop in autumn is less effective than spraying leaves on the ground because leaves that remain on the tree for 7 days after the urea application will translocate the nitrogen into the twigs, thereby making it unavailable to assist in decay of the fallen leaves. Surprisingly, even when ground sprays of urea are applied as late as green-tip, they have been shown to reduce ascospore release by 40-86%.

Shredding leaf litter with a flail mower can reduce inoculum in several ways. First, it provides more "edges" in the leaf litter for invasion by the microflora that cause the leaves to decay. Second, if flail mowing is done in spring, the chopping action will
result in re-orientation of most leaf pieces on the orchard floor and many ascospores will discharge into the soil rather than into the air. In New Hampshire, leaf shredding was least effective when it was done in December, presumably because shredding at that time did not allow for leaf decomposition before winter and also failed to cause disorientation of ascospore release. (The pseudothecia in over-wintering leaves have not yet formed in December and therefore cannot become disoriented).

Effective leaf shredding can be accomplished only with a flail mower that is set so low that it nearly scalps the sod in the row middles. Effectiveness is also dependent on having a very level orchard floor and on being able to shred most of the leaves beneath the tree canopy. If the flail mower cannot be off-set to reach beneath trees, then it may be necessary to blow leaves from beneath trees into the sodded row middle or to remove leaf litter from beneath trees using a brush rake ahead of the flail mower.

Dolomitic lime has been less widely tested as an inoculum reduction technique, but it was very effective when tested in Oregon when it was applied at 2.5 ton/A was applied after leaf drop in autumn. Lime presumably works by raising the pH of fallen leaves to a level where they are more subject to breakdown by bacteria and yeasts. Effectiveness of lime applied in springtime has not been tested, but it would probably be less effective than lime applied in late autumn.

Will any of these "green" approaches improve profitability? Inoculum reduction, when applied to high inoculum orchards, may improve profitability by reducing the potential for severe scab infection the following year. This is especially true if prebloom weather turns out to be extremely conducive for scab development. Profitability of other alternative approaches for scab control is doubtful because protectant fungicide such as captan and mancozeb are extremely cost-effective when used properly!

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Changes To Small Fruit Spray Guide

Source: Ric Bessin, Kentucky Extension Entomologist

There have been a number of insecticide/miticide recommendation changes to the Midwest Commercial Small Fruit Spray Guide 2005. In this article, I'll summarize those changes for insect and mite control for grapes, blueberries, bramble crops, and strawberries.

Grapes

The insecticide/miticide Pyramite 60 WP has been replaced with another insecticide/miticide with the same active ingredient, pyridaben. The new product, Nexter 75 WP, is also a wettable powder, but is formulated at a higher concentration. Nexter 75 WP has the same uses as Pyramite 60 WP, but different ranges of rates. Nexter 75 WP can be used on grapes.

The insecticide Guthion 50 WP that was being phased out has been replaced with Guthion 2 L. As the formulation is different, the rates listed in the guide have changed.

Entrust 80 WP has been included for control of leafrollers and grape berry moth on grapes, but it is only for use in a few states, not Kentucky. In those states where it is cleared, Entrust 80 WP is OMRI approved for organic production. Entrust 80 WP can be used on blueberries and strawberries in Kentucky.

There is a new miticide for grapes, Fujimite 5 EC. This product is included in the sections on mites, grape mealybug, and leafhopper control. Efficacy ratings are not included in Table 3, as no data are available from the lower Midwest.

There is a new formulation of chlorpyrifos, Lorsban 75 WP. Like Lorsban 4 E, this can be used for grape rootworm control in grapes.

Blueberries

The insecticide Guthion 50 WP that was being phased out has been replaced with Guthion 2 L. As the formulation is different, the rates listed in the guide have changed. There was a mistake with the maximum amount that could be used per season. That has been corrected and is listed as 127 fl oz per season. The old guide listed the limit incorrectly as 27 fl oz per season.

Provado 1.6 F has been included for Japanese beetle and blueberry maggot control. Note that Provado 1.6 F is labeled for blueberry maggot control only in some states, and Kentucky is not included in that list. It can be used for Japanese beetle control on blueberries in Kentucky.

Blackberries and Raspberries

The insecticide Guthion 50 WP that was being phased out has been replaced with Guthion 2 L. As the formulation is different, the rates listed in the guide have changed.

Asana XL, Brigade 10 WSB, and Discipline 2 EC have been included for leafroller control. Brigade is also listed for mite control on bramble crops. Align (azadirachtin) has been replaced with Aza-Direct for leafroller control as Align is no longer available.

Guthion Solupak is now listed along with Sniper 2 E for raspberry crown borer control. Both these products have azinphosmethyl as their active ingredient.

Strawberries

The insecticide Guthion 50 WP that was being phased out has been replaced with Guthion 2 L. As the formulation is different, the rates listed in the guide have changed.

The new formulation of chlorpyrifos, Lorsban 75 WP, is now included for strawberry clipper control on strawberries. Lorsban 4 E can still be used