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1999 SPRING PEST MANAGEMENT FIELD MEETING

Timothy E. Martinson

Join us on May 19, 1999 at Lance Fullager’s Vineyard Supplies, 5 miles S of Penn Yan on County Rd #17 (Old Bath Rd) for our annual Spring Pest Management Field Meeting and Barbecue. This year’s meeting will feature University and Industry updates, a DEC presentation on enforcement of worker protection standards (Yes, they plan on visiting vineyard operations this year), and a special demonstration of new equipment for low-volume herbicide application, organized by Dr. Andrew Landers.

Dr. Landers has arranged for demonstrations of equipment from several manufacturers. These include:

- Environist - An Australian-designed controlled droplet sprayer that uses a spinning disc to give reduced application rates
- Mantis - From Europe, which also uses the ‘spinning disc’ technology for low application rates

Patchen - A California company, will demonstrate their weed sensor, that can distinguish between weeds and soil, and switches the spray nozzle on and off to target only weeds.

Phil Brown Manufacturing - uses a steel hood to cover a hydraulic nozzle spray boom.

In addition, Canandaigua Wine Company will bring its new ‘Prop-tec’ vineyard sprayer for demonstration. This sprayer, built in New York by Dick Slawson, is similar to the sprayer demonstrated last year at this meeting. Canandaigua plans on using it in their Naples vineyards this summer, with reduced application rates (30 gpa). A research project of Dr. Landers will evaluate performance and disease control.

Pesticide recertification credits will be offered, so bring your certification number to the meeting. Please pre-register by calling our office at 315-536-5134. If outside of office hours, leave a message on the answering machine, with names and the number of people attending. There is no charge for registering, but we need to plan for food. The barbecue is sponsored by industry representatives, who will be acknowledged in the next newsletter.

Meeting Schedule:

2:45-3:00 First look at equipment displays/product factsheets, etc.

3:00 - 3:30 Cornell Research Updates
- Tim Weigle, IPM Program (Weed Identification)
- Dr. Wayne Wilcox, Plant Pathology (Disease Management)
- Dr. Greg English-Loeb, Entomology (Mites, Insects)

3:30 - 3:45 DEC Update on Worker Protection Standards enforcement
- Mike Searles, NY State DEC

3:45 - 4:15 Label Changes/ New Registrations Industry Representatives

4:15 - 4:30 Spray Adjuvants
- Mike Burlee, Ag Chem Service
to note that we do not have Rovral resistance in our test block; thus, in vineyard blocks where Rovral has been used regularly for a number of years and where it seems to be slipping, Vangard might offer improved control. Incorporating Vangard into your Botrytis control program should help maintain the future effectiveness of Rovral, but it won’t replace Rovral completely. For the sake of keeping both compounds effective, they should be rotated and/or tank-mixed until new fungicides and/or regulations change this equation in the future.

Vangard is highly prone to resistance development, therefore it is labeled for a maximum of two applications per season. Unfortunately, the label specifically calls for one application at early bloom and a second application at berry touch, veraison, or preharvest. Although the intent of this language was to limit total use, a literal interpretation would mean that Vangard could not be used in both of the “traditional” Botrytis sprays recommended in NY, i.e., at veraison and 2 wk later. DEC tends to interpret pesticide labels quite literally, so until this language is clarified (the company already has agreed to change the label wording, but it will take time for EPA approval), you’re limited to a single postbloom spray with the material. This “technical restriction” is not reflected in the 1999 Grape Pest Management Recommendations, so read the label closely and follow it. The preharvest interval for Vangard is 7 days, the re-entry interval is 12 hr.

The labeled rate for Vangard is 10 oz/A when used alone or 5 oz/A when used in a tank mix with another registered Botrytis fungicide; right now, Rovral is the only fungicide that I’d consider effective enough to tank mix with it for reliable results. In our trials, we’ve gotten equivalent control using Vangard at 10 oz alone or 5 oz mixed with 1 lb of Rovral 50WP (equivalent to 1 pt of the 4F formulation). The 5 oz rate by itself didn’t do the job. Currently, Vangard is selling for approximately $4.00/oz, which should provide a tangible incentive to avoid excessive usage if the resistance-management concept doesn’t.

Vangard is a systemic fungicide (resists washoff) and has shown limited (48 hr) postinfection activity against other diseases on other crops. It is classified as a “reduced risk” fungicide by the EPA due to its favorable environmental and toxicological properties.

2. Abound. (a) The re-entry interval has been shortened to 4 hr (it was 12 hr previously). (b) In our Botrytis control trial last year, we were surprised to find that Abound provided 80% control of this disease when used by itself at bloom, bunch closing, veraison, and preharvest. I wouldn’t count on Abound for Botrytis control (nor is it specifically labeled for such), and I want to see these results repeated to be certain that last year wasn’t a fluke. Still, if you’re using Abound to control other diseases during the bloom through bunch closing period, you might get some additional Botrytis control as a bonus.
3. Elite (tebuconazole). Elite has received a federal label for use on grapes, but the NY approval still is pending. It’s a sterol inhibitor fungicide in the same chemical family as Nova. In repeated trials, Elite at 4 oz/A and Nova at 4 oz/A have given us the same level of control of both black rot and powdery mildew. Based on the prices that I hear, Elite is about 25% cheaper than Nova.

4. eKsPunge (monopotassium phosphate). Monopotassium phosphate (or, dihydrogen phosphate) is a foliar fertilizer (0-52-34) that also provides control of powdery mildew. Last summer, a formulation with the trade name “eKsPunge” received federal registration for use as a fungicide to control this disease on grapes; NY registration still is pending, but a decision is expected on or before June 11.

We’ve worked with eKsPunge extensively since 1996, both in small plots at Geneva and in two commercial Finger Lakes vineyards. At a rate of 8 lb/A (plus surfactant), we’ve obtained good results using it in alternation with a more effective material (like Abound), but control generally has been only fair when it was the only powdery mildew fungicide used for the entire season. Similar results have been obtained in California and Israel. Nutritionally, we’ve found that several annual applications cause a significant increase of P levels in the petioles, but K levels have not been as responsive.

eKsPunge is not the strongest powdery mildew fungicide on the block, but it works and its dual-purpose use (powdery mildew control plus foliar feeding) is intriguing. At this point, I don’t know what the retail price will be, which obviously will determine its cost-effectiveness.

5. Ziram. The NY State DEC has renewed its approval of the Section 24(c) registration for the use of ziram to control Phomopsis black rot, and downy mildew. This is most relevant to growers of juice grapes who can’t use mancozeb after bloom; for those who can, mancozeb is usually the preferred option (significantly better downy mildew control and cheaper).

6. Mancozeb. As Greg English-Loeb discussed at the Waterloo meeting in March, pretty solid evidence is accumulating to establish a link between the use of mancozeb and the suppression of a “good”mite that feeds on the European Red Mite (i.e., the plant-feeding mite responsible for problems in a limited but increasing number of Finger Lakes vineyards). Mancozeb is undeniably a useful and important component in most grape growers’ disease control programs, but those who are having trouble controlling mites may want to at least consider experimenting with other fungicide options (note that Ziram has the same negative effect as mancozeb). Check with Tim Martinson for details if this is an important issue for you.

7. Sovran (kerosoxin-methyl). This is one of the “Abound-like” fungicides that also will be registered for use on apples. Federal registration is still pending, but is “anticipated” (i.e., hoped for) by mid-May. NY registration will take an additional 6 months, but you’re likely to be hearing about it as soon as the EPA registration is announced.

We’ve worked with Sovran pretty intensively for the last few years, and here’s my comparison of it versus Abound: a little stronger against powdery mildew, weaker against downy mildew (probably good enough for moderately susceptible varieties but I’m nervous for vinifera and other highly susceptible varieties); equally good against black rot, equally mediocre against Phomopsis. The trade-off versus Abound will be somewhat reduced downy mildew control versus no danger of drift onto apples (a major issue in some regions).

POWDERY MILDEW (PM) REMINDERS

1. Most berry infection occurs during the first few weeks after the start of bloom. Disease that you see on the berries later in the season usually is caused by a combination of favorable weather and problems with the spray program during that time. You’ve been hearing this for a couple of years now. It’s still true. Do an excellent job with the immediate prebloom and 1st postbloom sprays (best materials, best coverage, etc.), and it will be relatively easy to keep the fruit clean for the rest of the year; goof up then, and it’ll be hard to get out of the hole.

Concord berries become virtually immune within 3-4 weeks after bloom starts; vinifera berries lose most of their susceptibility at this same time, although they do not become fully immune until considerably later. Susceptible hybrids seem to act like viniferas, e.g., on ‘Rosette’, we typically get 90% control of berry infection from just the prebloom plus first postbloom sprays, whereas we get nearly 100% control on Concord.

Leaves also lose susceptibility as they mature, but new susceptible tissue is constantly produced so long as the shoots keep growing. On vinifera and susceptible hybrid varieties, there’s a direct relationship between control of foliar infection and fruit quality (including Brix). In contrast, Concord fruit are remarkably unaffected by foliar infection at moderate cropping levels, but they do respond negatively to foliar PM at higher cropping levels (e.g., 10 tons/A and above).

2. Resistance to SI fungicides is an issue that must be dealt with. Last year, it became clear that many growers who used Abound in the immediate prebloom and first postbloom sprays had less PM than those who relied on the SI materials during that critical period.

This is not to say that the SIs no longer work; for the most part, they do, but they’re less reliable than they once were and there’s less margin for error when using them.

Abound and related fungicides (the strobilurins or “strobies” for short) are excellent for controlling PM, but they can’t be used exclusively. Already, we are hearing the first reports from Europe and Asia concerning resistance to these materials on other crops (barley, cucumbers) where powdery mildews were treated too intensively without adequate resistance management strategies in place.
remaining trial was conducted in a vineyard with a history of excessive black rot losses and very high inoculum levels; in this case, an additional spray 2 wk before the immediate prebloom application provided an additional measure of control.

3. Mummies retained in the canopy provide more pressure for BR development than those dropped to the ground. This should be no-brainer, but it was striking to see how much this simple practice contributed to disease control when we examined it side-by-side in a machine-pruned vineyard where mummies had been retained in the canopy after hedging. That is, where we went in after hedging and dropped mummies to the ground by hand in certain plots, we ended up with much less BR than in plots where the mummies were left hanging. Don’t ignore this aspect of sanitation if you’re having trouble with BR control.

With respect to BR fungicides: nothing beats Nova (or Elite) for control, but mancozeb, ferbam, and ziram will do a good job under most conditions. Abound has been equivalent to mancozeb and ziram in some of our tests, and a little better in others under high rainfall conditions (it’s less likely to wash off). Sovran has been equivalent to Abound. Copper is poor. Don’t count on Rubigan or Procure.

DOWNY MILDEW (DM) REMINDERS

Recall that inoculum overwinters in last year’s infected leaves on the vineyard floor. The first spores become mature about 2 to 3 weeks before bloom, and cause infection during rainy periods when temperatures are 50° F or higher. These primary infections can continue to occur until about 2 weeks after bloom.

The destructive phase of the disease is caused when spores produced from primary infections blow through the vineyard and cause repeated cycles of secondary infections if humid nights are followed by rainy days. At optimum temperatures of approximately 60 to 80° F, this cycle can repeat itself every 4 or 5 days, allowing an “explosive” disease epidemic when favorable weather conditions persist. Young fruit is highly susceptible to infection, but appear to lose susceptibility quite quickly with age, much as with PM and BR. For instance, on ‘Chancellor’ (extremely susceptible fruit), we usually get 85-90% control with just two applications of Abound in the intermediate prebloom and first postbloom spray.

General control strategies are:
(i) DM sprays should start on highly susceptible varieties about the 10-inch shoot growth stage (i.e., 2 to 3 weeks before bloom) unless the vineyard was very clean last year or you’re sure it won’t rain before the next spray.

(ii) All but the most resistant vineyards should receive a DM fungicide in the immediate prebloom and first postbloom sprays unless the weather is bone dry. This is the critical time to protect against fruit infection.

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(iii) By the time the first postbloom spray wears off, primary inoculum is pretty well shot and the need for additional treatments should be based on the usual array of factors: presence or absence of established disease in the vineyard, weather, and variety. Typically, DM “goes on vacation” during much of July (many of the spores that spread the disease probably are killed by the spate of hotter, dry weather that we usually get at that time), then it reactivates as days get shorter and nights get dewier in August.

Ridomil remains the “Cadillac” material, in both performance and cost. However, its lack of activity against other diseases and the new availability of Abound will probably relegate it to “rescue treatment” status even more so than before. In our trials, Abound has been excellent, equal to mancozeb in some trials and better in others (e.g., when the first spray was applied late or in high rainfall years). Copper, mancozeb, and capitan are old standards for a good reason: they work.

BOTRYTIS BUNCH ROT

As in 1994 and 1996, our 1998 spray timing trials showed that Rovral applied at bloom and bunch closing provided additional control when they were added to the “traditional” sprays at veraison and 2 weeks later (note that all three of these years were wet during the bloom and early postbloom periods). Last year, in fact, treatments applied only at bloom and bunch closing were as effective as those applied only at the “traditional” times.

There are many good reasons not to apply Botrytis fungicides at bloom and bunch closing: they’re frequently not necessary, they’re expensive, and reducing the number of seasonal applications is important for fungicide resistance management. It’s clear that in the majority of years, the period between veraison and harvest is the most important for control of the disease, and this should remain the period of primary emphasis. Of course, specific timings should be juggled during these periods (within label constraints) to provide protection during wet spells and ease up when it’s dry. However, it’s also clear that the bloom through early postbloom period can be important for controlling Botrytis if the weather is wet during that time. Those with “problem” varieties and sites might want to consider this option if they’re looking to improve their Botrytis control programs.

The new registration of Vanguard (see discussion above), the pending registration of additional (unrelated) Botrytis fungicides, and the apparent Botrytis activity of Abound place. Our objective should be to maintain the effectiveness that we still have with the SIs, so that we can use them in rotational programs with the strobies and keep both groups alive.

Below are a few reminders with respect to SI resistance management:

FINGER LAKES VINEYARD NOTES
(i) Limit SI use, preferably a maximum of three sprays per year, and rotate with unrelated fungicides (important for the strobies, too).

(ii) Thorough spray coverage is CRITICAL for adequate performance and resistance management. The surest way to encourage SI resistance is to use low rates of these fungicides. The surest way to provide low rates to certain parts of the vineyard is to provide uneven spray coverage. It really is that simple.

(iii) The Sls will perform much better, and less resistance will develop, when they're used to combat a small PM population rather than a large one. Position them early in the season (not an optimal timing for the strobies) or use them to maintain a clean vineyard mid-season. You're just asking for trouble if you try to use these materials to clean up or slow down a PM problem that's already developed (this is true for the strobies, also).

We’ve seen little difference in efficacy between the various SI fungicides that are available (excluding Bayleton, which is dead for all practical purposes). They’re as effective as Abound where resistance isn’t a problem, but less effective where it is. With JMS Stylet Oil, it’s looking like the best time for use might be in the early season, for two reasons: (i) We’ve seen some evidence of Brix suppression with relatively high use rates in the midsummer; and (ii) Unlike most fungicides, oil has the potential to actually eradicate early (primary) infections, thus limiting their ability to spread. However, don’t get sucked into thinking that this will happen if you apply 20 gal/acre every other row; since Stylet Oil just won’t work without excellent coverage.

BLACK ROT (BR) REMINDERS

1. As with powdery mildew, berries are highly susceptible to BR from bloom through the early fruit set period, but they become highly resistant by approximately 4 wk after the start of bloom. We’ve seen this in both years of a trial in which berries of Cayuga White, Chardonnay, Concord, and Riesling were inoculated at weekly intervals after bloom. Similarly, in both commercial Finger Lakes vineyards and local research plots, we’ve noted much higher BR levels in years when this period was wet (1995 and 1998) versus those when it was dry (1996 and 1997). So, be extra vigilant with your BR control practices if conditions are wet in late June and early July; relax a bit if they’re dry.

2. Most BR control comes from the immediate prebloom and first two postbloom sprays. In fact, all of the control obtained in seven out of eight spray timing trials we’ve conducted since 1995 has come from these sprays (i.e., additional sprays applied earlier and later provided no additional benefit). The remaining trial was conducted in a vineyard with a history of extensive black rot losses and very high inoculum levels; in this case, an additional spray 2 wk before the immediate prebloom application provided an additional measure of control.

3. Mummies retained in the canopy provide more pressure for BR development than those dropped to the ground. This should be a no-brainer, but it was striking to see how much this simple practice contributed to disease control when we examined it side-by-side in a machine-pruned vineyard where mummies had been retained in the canopy after hedging. That is, where we went in after hedging and dropped mummies to the ground by hand in certain plots, we ended up with much less BR than in plots where the mummies were left hanging. Don’t ignore this aspect of sanitation if you’re having trouble with BR control.

With respect to BR fungicides: nothing beats Nova (or Elite) for control, but mancozeb, ferbam, and ziram do a good job under most conditions. Abound has been equivalent to mancozeb and ziram in some of our tests, and a little better in others under high rainfall conditions (it’s less likely to wash off). Sovran has been equivalent to Abound. Copper is poor. Don’t count on Rubigan or Procure.

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The destructive phase of the disease is caused when spores produced from primary infections blow through the vineyard and cause repeated cycles of secondary infections if humid nights are followed by rainy days. At optimum temperatures of approximately 60 to 80°F, this cycle can repeat itself every 4 or 5 days, allowing an “explosive” disease epidemic when favorable weather conditions persist. Young fruit are highly susceptible to infection, but appear to lose susceptibility quite quickly with age, much as with PM and BR. For instance, on ‘Chancellor’ (extremely susceptible fruit), we usually get 85-90% control with just two applications of Abound in the immediate prebloom and first postbloom spray.

General control strategies are:

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(ii) All but the most resistant vineyards should receive a DM fungicide in the immediate prebloom and first postbloom sprays unless the weather is bone dry. This is the critical time to protect against fruit infection.

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Ridomil remains the "Cadillac" material, in both performance and cost. However, its lack of activity against other diseases and the new availability of Abound will probably relegate it to "rescue treatment" status even more so than before. In our trials, Abound has been excellent, equal to mancozeb in some trials and better in others (e.g., when the first spray was applied late or in high rainfall years). Copper, mancozeb, and captan are old standards for a good reason: they work.

**BOTRYTIS BUNCH ROT**

As in 1994 and 1996, our 1998 spray timing trials showed that Rovral applied at bloom and bunch closing provided additional control when they were added to the "traditional" sprays at veraison and 2 weeks later (note that all three of these years were wet during the bloom and early postbloom periods). Last year, in fact, treatments applied only at bloom and bunch closing were as effective as those applied only at the "traditional" times.

There are many good reasons not to apply Botrytis fungicides at bloom and bunch closing: they're frequently not necessary, they're expensive, and reducing the number of seasonal applications is important for fungicide resistance management. It’s clear that in the majority of years, the period between veraison and harvest is the most important for control of the disease, and this should remain the period of primary emphasis. Of course, specific timings should be juggled during these periods (within label constraints) to provide protection during wet spells and ease up when it's dry. However, it's also clear that the bloom through early postbloom period can be important for controlling Botrytis if the weather is wet during that time. Those with "problem" varieties and sites might want to consider this option if they're looking to improve their Botrytis control programs.

The new registration of Vangard (see discussion above), the pending registration of additional (unrelated) Botrytis fungicides, and the apparent Botrytis activity of Abound and other strobilicides are providing significant new options to improve Botrytis control, but they won’t be cheap.

One last reminder: don’t ignore the relationship between berry moth damage and Botrytis infection. Those "problem" rows near the woods often owe more to the infection of berry moth injury sites than they do to the extra shading that might get blamed. Of course, the importance of providing good air circulation via cultural practices (leaf pulling, shoot positioning, etc.) shouldn’t even require a reminder.

**PHOMOPSIS (Ph) REMINDERS**

The incidence of Phomopsis shoot infections seems to be increasing in the Finger Lakes region over the last couple of years. Although the economic losses from this phase of the disease often are questionable, they can be serious if the early season is wet and new shoots are unpruned. Furthermore, the canes, spurs, or pruning stubs that originate from these shoots eventually serve as the main source of inoculum for economically important rachis and fruit infections in later years. Bottom line: it’s an easy disease to control and worth it over the long haul.

Recall that during the 1980’s, Jay Pscheidt and Roger Pearson showed that fruit become infected by Phomopsis when intense and/or frequent rainfall occurs during the bloom through pea-sized berry period, although infected fruit do not show symptoms until near harvest (symptoms resemble those of black rot, and the two diseases are difficult to tell apart on the fruit). The most important time for rachis infection appears to be from the early period of cluster emergence until several weeks after bloom. The risk of Phomopsis losses (and the relative need to control them) can be judged to some extent by (i) the recent history of the disease (an indication of the inoculum potential in the vineyard); (ii) the pruning and training system (shoots, rachises, and fruit that develop beneath old spurs and pruning stubs are at greatest risk); and (iii) the weather (frequent and/or prolonged rains).

Mancozeb, captan, and ziram have all provided good control of the basal shoot infections in our fungicide trials. Abound and other strobilicides have not done as well, and Nova did nothing (probably true for the other SI fungicides as well).

**PUTTING IT ALL TOGETHER**

There are many good programs for controlling these diseases. Here are a few considerations. Just because it isn’t listed here doesn’t mean it’s a bad idea. Only products currently labeled in NY State are listed. Readers in other states have the option of substituting Elite for Nova wherever it appears; Sovran also may become an optional substitute for Abound (recognizing the downy mildew weakness), depending on its future registration status.

1-INCHE SHOOT GROWTH. A Ph spray may be warranted if wet weather is forecast and the training system or recent block history suggests high risk. Option A: Nothing. Option B: Captan or mancozeb.

3-5 INCH SHOOT GROWTH. A traditional time to control Ph shoot infections; early rachis infections also are possible now. Time to start control of PM in vinifera and some hybrid blocks (where crop value justifies it). BR control is unlikely to be justified unless disease was severe last year AND weather is wet. Even less necessary to control BR now if Nova will be used in the next spray. Option A: Nothing. Option B: Nova (PM, BR). Use the 3 oz rate (about $1.2/A). Option C: Rubigan (PM). At 2 fl oz/A, cost is only about $4/A. Cheaper than
Nova but won't control BR; however, most vineyards won't need BR control at this time and mancozeb will provide it if applied for Ph. Option D: Sulfur (PM). Not very active at temps below 60°F. If you really need this spray, sulfur is a questionable choice unless it's warm. Doesn't control other diseases. Option E: JMS Stylet Oil (PM). Should eradicate young infections IF thorough coverage is provided. Can use with mancozeb (or ziram), but not with captan (phytotoxicity). Option F: Mancozeb (BR, Ph). Will also control angular leaf scorch (ALS) on susceptible varieties if very wet. Option G: Captan (Ph). Easier on predator mites than mancozeb or ziram, but not as effective against BR. Option H: (C or D or E) + F (PM, BR, Ph, ALS).

10-INCH SHOOT GROWTH. Traditionally, we've recommended not to wait any longer to control BR. Continued experience tells us that this recommendation is conservative (the spray generally isn't needed) unless BR was a problem last year and/or weather is unusually wet. Don't wait any longer to control PM on susceptible varieties. DM control will be needed on highly susceptible varieties if disease was prevalent last year and rains of at least 0.1 inches at temps >50°F occur. Rachis infections by Ph are a possibility, particularly if weather is wet. Option A: Abound (PM, BR, DM, Ph). Label allows only two sequential sprays before alternation with other materials, thus spraying now will not allow use in both of the following two sprays, which are the most critical ones of the year. Option B: Mancozeb (BR, Ph, DM, ALS). A broad spectrum, economical choice if PM isn't a serious concern. Or tank mix a PM material. Option C: Nova (PM, BR). Option D: Rubigan (PM). No BR but cheaper than Nova. Option E: JMS Stylet Oil (PM). If (and only if) coverage is thorough, this spray should eradicate early PM colonies that may be starting because previous PM sprays were omitted. At a retail cost of $11/gal, a use rate of 1% (1 gal oil/100 gal water), and 50 gal/A spray volume, cost is about $5.50/A. Also may help with mites. Option F: sulfur (PM). Reduced activity at low temperatures is still an issue at this time of year. Option G: Mancozeb (BR, Ph, DM, ALS) + a PM material (Nova, Rubigan, Procure, sulfur, JMS Stylet Oil). Choose PM material based on previously-discussed characteristics and cost.

IMMEDIATE PREBLOOM (OR VERY EARLY BLOOM). A critical time for PM, BR, DM, and Ph (rachis and fruit infections). Also important for ALS on susceptible varieties. This is the first postbloom spray of the season—DON'T CHEAT ON MATERIALS, RATE, OR COVERAGE! Option A: Abound (PM, BR, DM, Ph). The best choice if SIs seem to be slipping against PM and multiple disease control is needed. Even if no problems yet with the SIs, a good choice to reduce resistance-development pressure. May provide some Botrytis control if a wet bloom period. Cheaper than Option B at typical rates. Option B: Nova + mancozeb (PM, BR, Ph, DM). Nova is the big gun against BR, so probably the best choice if pressure is high and BR control is the most important consider-
1998 Boron Trial in Concord Grapes

Timothy E. Martinson

In previous issues (Newsletter #4, April 4, 1998; Newsletter #9, September 4, 1997; Newsletter #3, May 22, 1997), I have provided recommendations on boron applications in vineyards. This time I will report results of a trial we conducted last year in a mature Concord vineyard to look at effects of boron applications in a site with previously low (<20 ppm in petiole test) boron levels. We undertook this study for two reasons. The first is because boron improves fruit set, and adequate fruit set has been a problem in area vineyards in the past several years. The second reason was to educate your Extension Specialist (i.e. me) on the effects of boron applications on petiole boron levels and on vines.

In this trial, we looked at all possible combinations of soil application (at the 5 lb solubor/acre rate) and foliar applications (two applications of different rates, 1 lb or 2.5 lb solubor, applied at 16 inch shoot growth and immediate prebloom). All possible combinations means we had treatments with soil application only, foliar applications only, no application, and soil + foliar applications. In each treatment we evaluated yield, cluster number, cluster size, and also took petiole samples at bloom and late August, to determine how the applications affected petiole boron levels.

Results are summarized in the following figures. All applications increased yield and cluster weight, compared to untreated check plots, and increased petiole boron levels. Please keep in mind that the boron rates are lb/acre of Solubor. Because solubor contains 20% boron, the actual amount of boron applied was: 1 lb boron/acre (soil), 0.2 lb boron/acre foliar and 0.5 lb boron/acre foliar. The details:

- **Figure 1: Soil and Foliar Applications increased yield per shoot.** Soil + foliar applications (squares) showed a greater response than foliar applications alone (circles) or soil application alone. With no foliar application, the soil treatment increased yield/shoot by 5%; soil + 1 lb/acre foliar solubor increased yield/shoot by 18%, soil + 2.5 lb/acre solubor by 35%. With no soil application, yield/shoot increased for the 2.5 lb foliar rate by 15%; no increase was seen with the 1 lb/acre foliar application (no soil application).

- **Figure 2: Berries per cluster.** Soil application increased the number of berries per cluster by 2 to 4 at any rate of foliar application (none, 1 lb/acre, or 2.5 lb/acre). Foliar-only treatment showed an increase of 2 berries/cluster only at the 2.5 lb/acre rate. This effect accounted for most of the yield increase - and is what one would expect (i.e. more berries) for a nutrient that increases fruit set.

- **Figure 3. Cluster Weight.** Soil + foliar application of boron dramatically increased cluster weight, compared to the untreated plots, or plots without soil application.

- **Figure 4. Boron in Petiole Samples.** Petiole samples taken at bloom (top) and late August (bottom) showed that foliar application had a much greater effect on tissue boron levels than the soil application alone. The target range for boron is between 35 and 50 parts per million (ppm). At bloom, the 2.5 lb foliar application raised boron levels to above the 50 ppm level, while the 1 lb/acre solubor foliar rate raised petiole levels to around 40 ppm - with or without the soil application. Late season samples showed effects of soil application (raised B levels by 2 ppm) only when no foliar applications were made.

FINGER LAKES VINEYARD NOTES
was in the 3-4 T/acre range. Yield potential in 1999 should be much higher, due to low 1998 yields and the early harvest. The other point to keep in mind is that this vineyard started out with very low boron levels. Your vineyards may have higher levels to begin with. Many Finger Lakes soils have low boron levels. If you haven't applied any for the last several years, your vineyards would probably benefit, and the risk of ending up with too much in the soil would be minimal. While soil boron application at recommended rates (1-2 lb actual boron, or 5.0 lb solubor/acre) is inexpensive and safe, the best guide to boron needs is still petiole tests. The cost of keeping boron at adequate levels (between 35-50 ppm in fall petiole tests) is low, but the payoff in increased fruit set can be great.

**NOTE ON NITROGEN**

The series of articles on nitrogen usage and fertilization will resume in the next *Vineyard Notes*. Topic for next time is *Where nitrogen comes from, where it goes, and when*. Please refer to previous issues of *VN* (1997, 1998) for practical information on nitrogen fertilization.

**CODE-A-PHONE IS NOW ‘FINGER LAKES VINEYARD UPDATES’**

We resumed the *Finger Lakes Grape Program Vineyard Updates* (formerly known as Code-a-phone) on April 26, 1998. Messages will be updated via e-mail and telephone answering machine weekly on Mondays, and twice-weekly on Mondays and Thursdays, from late May through August.

Messages include vine development, cultural practices, pest management, degree-day and weather updates, and announcements of upcoming events. **We encourage you to provide us with an e-mail address if you have one**, so you can receive the written version, which also includes links to appropriate information available on the world-wide-web (Web pages). Call our office at 315-536-5134 or send an e-mail message to tom2@cornell.edu to be placed on the e-mail distribution list. Include your name and e-mail address in the message. Please note that you must be an enrollee or subscriber to *Vineyard Notes* to receive e-mail *Vineyard Updates*.

The telephone message contains the same content and is available 24 hours a day at:

**Finger Lakes Vineyard Update:**

315 - 536 - 5549

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What Does This Mean. My interpretation of these results is that the soil and foliar boron applications had different effects. Soil application resulted in increased fruit set above what was obtained from foliar applications alone. Foliar application, on the other hand, had the greatest effect on tissue boron content. The higher foliar rate (2.5 lb solubor/acre) resulted in tissue levels close to those that cause boron toxicity (>60 ppm). The best results were obtained with a combination of soil and foliar application. My interpretation is that soil application allowed for more sustained uptake by vines, while the foliar applications provided a 'shot' of boron at critical times in the flower development cycle. Without soil application, foliar applications had much less effect. With the soil application, most of the benefit from adding foliar sprays was obtained at the 1 lb solubor/acre rate. This suggests that the best strategy for avoiding leaf burning (from boron toxicity) while gaining the benefit of boron is to apply 1 lb/acre solubor instead of 2.5 lb/acre in the foliar sprays.

A Final Note. Keep in mind that 1998 was a poor year for fruit set in native grapes, due to extended cool weather during bloom. Even in the best plots of this trial, total yield
**CONTACTING US**

As the field season gets underway, I am frequently out of the office making field visits. Here are some tips for getting in touch:

- **Monday mornings are office hours.** I will be in the office between 8 and 12 every Monday morning.
- **Voice Mail.** Call our office any time at 315-536-5134. If I am out of the office, the office staff will ask you to leave a voice mail message. I check these messages twice a day, and will try to get back to you within 24 hours. If you call after office hours, let it ring – it will pick up eventually.
- **E-mail.** If you have e-mail, send a brief message to tem2@cornell.edu.

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**UPCOMING EVENTS**


The objective of this program is to provide information and hands-on activities on enjoying and managing forests and rural properties. Learn how to manage a woodlot, attract birds and wildlife, landscape your property, identify trees and shrubs, maintain a healthy pond, manage deer problems and much more. Contact Cornell Cooperative Extension - Yates Association at (315)536-5123 for further information.

**July 7. Prop-tec and Airblast Sprayer twilight meeting.**

Canandaigua vineyards, Naples. Tentative plans are to demonstrate drift-reducing air-inclusion nozzles for airblast sprayers and find out about Canandaigua’s early experience with their new Prop-Tec vineyard sprayer. Details to follow.

**July 14-17. International Oak Symposium and 24th Annual Meeting of ASEV/ES**

St. Louis, Missouri. The Eastern Section of the American Society for Enology & Viticulture has organized an outstanding symposium on the use of oak in winemaking. This international symposium will be held in conjunction with the annual technical meeting and trade show. Oak Symposium: 14-16 July 99, Trade Show and Annual Meeting: 16-17 July 99. Call our office (315)-536-5134 for registration forms and information.

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