

## FURTHER GRAPE FUNGICIDE UPDATES, 2018

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Bryan Hed from Penn State has recently prepared and distributed an excellent and comprehensive update on the grape fungicide scene. Rather than repeat the information that he provided, for which there's no need (read and save it if you haven't already), I'd simply like to make a few brief additional points and provide a further perspective on some of the new(er) products available.

Within this context, I'm also providing the detailed results of three fungicides trials that we conducted in Geneva last year, for those who might be interested (others can just read the cut-to-the-chase comments below). These are pretty busy tables and it's easy to get lost in the weeds, so a few bits for context for those who wish to wade into them:

- All three trials were conducted in a manner where each treatment was applied to four individual “replicate” plots scattered randomly throughout the block/s of vines (the downy mildew treatments were applied in two separate blocks, one of Chardonnay to evaluate control on leaves, one of Chancellor to evaluate control on clusters). Each of the plots consisted of a single panel containing four vines. Treatments were applied using a hooded-boom sprayer (similar to the Lipco units, without recirculation) to prevent drift onto vines belonging to a different treatment. Spray volume was 50 gal/A through bloom and 100 gal/A postbloom.
- Data are presented in terms of disease incidence and disease severity. Incidence refers to the percentage of leaves or clusters that had any disease, severity refers to the percentage of the surface of each leaf or cluster that showed disease symptoms. Severity is the more meaningful measure, but we present both: a treatment with a low severity rating was clean, but if it had a low incidence rating as well, it was clean as a whistle. The data presented are the averages (“means”) for all four of the replicate plots per treatment. The accompanying statistical analyses are useful but need to be interpreted knowingly: if the mean values for two treatments are “significantly different”, that means that there is a 95% probability that the difference is “real” and not just the result of random variability among the four small plots of each treatment. Conversely, if they are not significantly different (i.e., they are followed by a common letter in the table), there is less than a 95% chance that the difference is real. But this does not distinguish between a 94% chance of a real difference and a 2% chance of a real difference. Some people tend to lose this perspective when they note that differences between two treatments “were not significant”.
- These trials are designed to look at relative differences among various materials, so do not reflect real-world usage patterns in several respects. For example, we often spray a single product throughout the entire season, without rotation. Not a recommended practice of course, but when a new product “works” in a rotational program, it's often difficult to tell whether the new product was doing a bang-up job or if most of the heavy lifting was being done by the rotational partners, which are usually known to be effective. Furthermore, vines in these plots are subjected to greater disease pressure than they would be in most commercial settings: there is high carry-over inoculum from last year from unsprayed check plots and relatively ineffective treatments, there is current-season inoculum for disease spread being produced from the same, we start later on the PM and DM trials than would be recommended for commercial growers, we typically use 14-day intervals for the PM and DM trials even when it's raining all of the time (e.g., last June and July), we use highly susceptible varieties, our Botrytis trial is in a block surrounded by woods where air circulation is dreadful. In other words, we get more disease than a decent commercial grower would, and materials or programs that look mediocre for us might be just

fine in a commercial setting where someone isn't doing all they can to turn up the pressure. But it does allow us to see which materials or programs are most likely to break if things start going south (as they do from time to time) and which ones can take the heat.

#### CUT TO THE CHASE:

- *Pre-mix products*. More and more manufacturers are developing “combination” products that mix two active ingredients. Unfortunately, you need a calculator and a little time to determine just how much of each component is being provided at the labeled rate/s, which can vary among competing products even from the same manufacturer. Table 1 (“Comparative doses of individual active ingredients provided by ‘combination products’ at label rates”) has been updated to account for several new products on the market.
- *Luna Experience (LE)*. Discussed for several years, finally available to NY growers (except those on Long Island). All of the major companies are developing and releasing “new generation” SDHI (Group 7) fungicides, but LE has been the one that has given consistently top control of both PM and Botrytis in my trials over the years (see Trt #9 in Table 2; in general, results from the 2017 Botrytis trial were not definitive, but note that LE [#6, Table 4] and Elevate [#1] were comparable). As Bryan mentioned, we’ve found in previous years that 6 fl oz/A, the rate recommended for PM control, is adequate for Botrytis during the bloom/post-bloom period. That is, you don’t need to spend the extra bucks to go up to the 8 fl oz rate unless you want the extra tebuconazole for black rot. Which you won’t need if you’re tank-mixing with mancozeb for DM control or if you bump with an extra 1.25 oz/A of a generic tebuconazole 45DF generic (e.g., Toledo).
- *Luna Sensation*. A product just released, after Bryan’s article was published. A combination of the SDHI component of Luna Experience (fluopyram) and trifloxystrobin, the active ingredient in Flint. Not sure what this brings to the table that LE doesn’t, perhaps an extra bit of Botrytis control if strobilurin resistance isn’t an issue. But the only place where Botrytis resistance to strobilurins has been investigated (Virginia, by Anton Baudoin at VPI), it was found to be rampant in commercial vineyards. Quite a rate range for Sensation, check to compare what you’re paying per ounce of fluopyram versus Experience, since this active ingredient is why you’d buy either product.
- *LifeGard*. Labeled for use in NY (including Long Island) last year. Over the years, I’ve tested a number of products purported to induce the grapevine’s natural defense system/s, but none of them have controlled disease. Until LifeGard. Last year was the third time out of three trial years that LifeGard provided downy mildew control comparable to commercial standards, even under very high pressure (see Table 3). It was the first year that we looked at it against powdery mildew and it did very well by itself (Trt #1, Table 2) and was outstanding in a rotational program (Trt #2, compare with #5 to see the LifeGard contribution to that program). Unfortunately, it didn’t do much for Botrytis control (Trt#7, Table 4). We’ll be looking at it again against all three diseases this year.
- *Prolivo (pyriofenone)*. Recently labeled in NY, including Long Island. In the same family (resistance group) as Vivando, controls PM only. Last year was the first time we looked at it. Unwise to draw firm conclusions from one trial, but in this one look it was close to Vivando although a tad less efficacious (compare Trts #6, 7, and 8 in Table 2).
- *Fracture*. Discussed previously, and by Bryan. My results are very similar to his: only so-so control of PM (Trt#24, Table 2) but control of Botrytis comparable to commercial standards (Trts #8 and 9, Table 4). We’ve obtained similar results against both diseases in previous years and also have seen efficacy against sour rot. Pricey, as Bryan notes, but might have a fit in some late-season programs for rot control, especially for those who are interested in the fact that it is considered safe enough that there are no EPA limits on its residue levels.

- *Aprovia/Aprovia Top*. Discussed well by Bryan. See Table 1 to compare the amount of the active ingredients (solatenol, also difenoconazole for Aprovia Top) provided by different rates of these products and others containing difenoconazole. Aprovia has provided excellent control of PM in my previous trials (it was not included in 2017), but unlike Luna Experience, it does provide control of Botrytis.

*Correction provided by Wilcox: Aprovia and Aprovia Top DO NOT control Botrytis. Luna Experience DOES provide some control of Botrytis.*

- *Oils and oil-like products*. See Trts #20-23 to compare the powdery mildew control provided by JMS Stylet Oil, two rates of Timorex Gold, and Thymeguard on season-long programs: JMS was modestly to substantially more effective, although to be fair I would have expected the other two to do a lot better if the spray interval had been shorter (they probably washed off with the heavy rains). Also note the excellent control provided by JMS in a rotational program (Trt#3). Surprising to me, both Timorex Gold and Thymeguard provided significant control of downy mildew when applied at 7-day intervals (Trts #10 and 11, Table 4). None of these products provided control of Botrytis (Trts #10-12, Table 4).



**Table 2. Control of powdery mildew on 'Chardonnay' grapes, 2017 (Geneva, NY)**

| Trt #, Material and rate/A  | Timing <sup>y</sup>    | % POWDERY MILDEW [% control] <sup>z</sup> |     |      |               |     |      |                   |     |      |                  |     |      |
|---|------------------------|---|-----|------|---------------|-----|------|-------------------|-----|------|------------------|-----|------|
|   |                        | Leaf incidence                            |     |      | Leaf severity |     |      | Cluster incidence |     |      | Cluster severity |     |      |
| 1. Lifegard WG 4.5 oz <sup>x</sup>  | 1 thru 7               | 60.0                                      | c-g | [40] | 12.5          | g-k | [86] | 33.8              | d-j | [66] | 6.5              | d-h | [93] |
| 2. Lifegard WG 4.5 oz <sup>x</sup><br>Vivando 300SC 10.0 fl oz <sup>w</sup><br>Luna Experience 6.0 fl oz <sup>x</sup><br>Microthiol 5.0 lb <sup>v</sup>   | 1,3,5,7<br>2<br>4<br>6 | 42.5                                      | f-j | [58] | 2.9           | h-k | [97] | 7.5               | ij  | [93] | 0.4              | h   | [99] |
| 3. JMS Stylet Oil 1.5%<br>Vivando 300SC 10.0 fl oz <sup>w</sup><br>Luna Experience 6.0 fl oz <sup>x</sup><br>Microthiol 5.0 lb <sup>v</sup>               | 1,3,5,7<br>2<br>4<br>6 | 27.5                                      | g-k | [73] | 1.6           | i-k | [98] | 5.0               | ij  | [95] | 0.2              | h   | [99] |
| 4. Fracture 24.0 oz <sup>x</sup><br>Vivando 300SC 10.0 fl oz <sup>w</sup><br>Luna Experience 6.0 fl oz <sup>x</sup><br>Microthiol 5.0 lb <sup>v</sup>     | 1,3,5,7<br>2<br>4<br>6 | 33.8                                      | g-k | [66] | 2.5           | h-k | [97] | 5.0               | j   | [95] | 0.4              | h   | [99] |
| 5. Vivando 300SC 10.0 fl oz <sup>w</sup><br>Luna Experience 6.0 fl oz <sup>x</sup><br>Microthiol 5.0 lb <sup>v</sup>                                      | 2<br>4<br>6            | 98.8                                      | a   | [1]  | 35.3          | c-e | [60] | 45.0              | d-h | [55] | 7.0              | d-h | [93] |
| 6. Vivando 300 SC 10.0 fl oz <sup>w</sup>   | 1 thru 7               | 38.8                                      | f-j | [61] | 2.1           | h-k | [98] | 25.0              | g-j | [75] | 2.7              | f-h | [97] |
| 7. Prolivio 4.0 fl oz <sup>x</sup>  | 1 thru 7               | 75.0                                      | a-e | [25] | 12.7          | f-i | [86] | 41.3              | d-i | [59] | 4.2              | e-h | [96] |
| 8. Prolivio 5.0 fl oz <sup>x</sup>  | 1 thru 7               | 22.5                                      | h-k | [78] | 1.2           | i-k | [99] | 47.5              | d-g | [53] | 6.5              | d-h | [94] |
| 9. Luna Experience 6.0 oz <sup>x</sup>  | 1 thru 7               | 5.0                                       | k   | [95] | 0.6           | k   | [99] | 12.5              | h-j | [88] | 1.0              | gh  | [99] |
| 10. Torino 0.85 EC 3.4 oz <sup>x</sup>  | 1 thru 7               | 16.3                                      | jk  | [84] | 1.5           | jk  | [98] | 13.8              | g-j | [86] | 0.9              | gh  | [99] |
| 11. Revus Top 7.0 fl oz <sup>x</sup>  | 1 thru 7               | 31.3                                      | g-k | [69] | 2.6           | h-k | [97] | 27.5              | f-j | [73] | 6.3              | e-h | [94] |
| 12. Rhyme 2.08EC, 7.0 fl oz <sup>x</sup>  | 1 thru 7               | 58.8                                      | c-h | [41] | 5.9           | g-k | [93] | 38.8              | d-h | [61] | 4.5              | d-h | [96] |
| 13. Mettle 1SC 5.0 fl oz  | 1 thru 7               | 82.5                                      | a-c | [18] | 32.6          | c-f | [63] | 85                | a-c | [15] | 38.5             | Bc  | [51] |
| 14. Topguard EQ 5.0 fl oz   | 1 thru 7               | 48.8                                      | e-j | [51] | 6.8           | g-k | [92] | 26.3              | e-j | [74] | 3.4              | e-h | [97] |
| 15. Topguard EQ 5.0 fl oz<br>Vivando 300SC 10.0 fl oz <sup>w</sup><br>Quintec 4.0 fl oz <sup>x</sup><br>Microthiol 5.0 lb <sup>v</sup>                    | 1,3<br>2,5<br>4,6<br>7 | 57.5                                      | d-h | [44] | 4.4           | h-k | [95] | 45.0              | d-h | [55] | 3.7              | d-h | [96] |
| 16. Rhyme 2.08EC <sup>x</sup><br>Vivando 300SC 10.0 fl oz <sup>w</sup><br>Quintec 4.0 fl oz <sup>x</sup><br>Microthiol 5.0 lb <sup>v</sup>                | 1,3<br>2,5<br>4,6<br>7 | 53.8                                      | d-i | [46] | 10.7          | f-j | [88] | 88.8              | a-c | [11] | 12.4             | d-f | [85] |
| 17. Rally WSP 5.0 oz <sup>x</sup><br>Vivando 300SC 10.0 fl oz <sup>w</sup><br>Quintec 4.0 fl oz <sup>x</sup><br>Microthiol 5.0 lb <sup>v</sup>            | 1,3<br>2,5<br>4,6<br>7 | 32.5                                      | g-k | [68] | 3.0           | h-k | [97] | 6.3               | ij  | [94] | 0.2              | h   | [99] |
| 18. Mettle 1 SC 5.0 oz <sup>x</sup><br>Vivando 300SC 10.0 fl oz <sup>w</sup><br>Torino 0.85 EC 3.4 oz <sup>x</sup><br>Microthiol 5.0 lb <sup>v</sup>      | 1,3<br>2,5<br>4,6<br>7 | 15.0                                      | i-k | [85] | 0.8           | jk  | [99] | 8.8               | ij  | [91] | 0.5              | h   | [99] |
| 19. Revus Top 7.0 fl oz <sup>x</sup><br>Vivando 300SC 10.0 fl oz <sup>w</sup><br>Luna Experience 6.0 fl oz <sup>x</sup><br>Microthiol 5.0 lb <sup>v</sup> | 1,5<br>2,4<br>3<br>6,7 | 11.7                                      | jk  | [88] | 1.1           | i-k | [99] | 16.3              | g-j | [84] | 1.8              | f-h | [98] |
| 20. JMS Stylet Oil 1.5%   | 1 thru 7               | 45.0                                      | f-j | [55] | 7.8           | h-k | [91] | 43.8              | d-h | [56] | 9.4              | d-h | [91] |
| 21. Timorex Gold 14.0 fl oz   | 1 thru 7               | 100                                       | a   | [0]  | 51.5          | bc  | [42] | 100               | a   | [0]  | 46.6             | b   | [53] |
| 22. Timorex Gold 21.0 fl oz   | 1 thru 7               | 95.0                                      | ab  | [5]  | 42.6          | b-d | [52] | 83.8              | a-c | [16] | 19.7             | cd  | [80] |
| 23. Thymeguard 32.0 fl oz   | 1 thru 7               | 100                                       | a   | [0]  | 64.4          | b   | [28] | 100               | a   | [0]  | 44.8             | b   | [55] |
| 24. Fracture 24.0 fl oz <sup>x</sup>  | 1 thru 7               | 76.0                                      | a-d | [24] | 24.0          | e-g | [73] | 71.3              | a-d | [29] | 15.7             | d-f | [84] |
| 25. Microthiol 5.0 lb (w/o Cohere)  | 1 thru 7               | 41.3                                      | f-j | [59] | 6.3           | g-k | [93] | 65.0              | c-f | [35] | 16.3             | c-e | [84] |
| 26. Microthiol 5.0 lb <sup>v</sup> (w/ Cohere)  | 1 thru 7               | 47.5                                      | e-j | [53] | 5.8           | h-k | [94] | 70.0              | b-e | [30] | 7.3              | d-h | [93] |
| 27. Untreated check   | -----                  | 100                                       | A   |      | 88.9          | A   |      | 100               | a   |      | 99.8             | a   |      |

<sup>z</sup> Spray timings: 1 = 3 Jun; 2 = 15 Jun (pre-bloom); 3 = 27 Jun; 4 = 11 Jul; 5 = 26 Jul; 6 = 9 Aug; 7 = 22 Aug

<sup>y</sup> Values represent the means from four replicate plots per treatment, 20 leaves or clusters per plot. Means not followed by a common letter are significantly different according to Student's t-test ( $P=0.05$ ). Percent control values presented [in brackets] are reductions in disease incidence or severity relative to the untreated check.

<sup>x</sup> "Induce" surfactant included in spray solution at 0.125% (v/v) concentration.

<sup>w</sup> "Kinetic" surfactant included in spray solution at 0.05% (v/v) concentration.

<sup>v</sup> "Cohere" surfactant included in spray concentration at 0.06% (v/v) concentration.

