

Virginia Wine Board  
Project #13-1731-02  
**Progress Report - July 2014**

**Assessment of Variability of Grape Downy Mildew Sensitivity to  
Phosphonates (phosphites)**

**Investigators**

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**Objectives**

1. Collect grape downy mildew isolates from vineyards with histories of heavy phosphonate fungicide use, and immediately assay their sensitivity to phosphonate fungicide.
2. If resistance or reduced sensitivity is found, determine its stability by periodically assaying and comparing isolates maintained on treated as well as untreated plants
3. Conduct a field trial by applying phosphonate repeatedly to small area of a vineyard with history of heavy use, to determine if this can induce temporary resistance

**General**

Two graduate students have started work in my lab in the Fall of 2013. One is working mostly with downy and powdery mildew, the other with Botrytis (separate report).

**Activities and Results**

A downy mildew strain obtained in 2012 that appeared to show some tolerance to phosphite fungicides was maintained by regular transfers on both untreated and phosphite-treated plants (Prophyt 0.2 or 0.25) during the summer and fall of 2013 – bioassay results were reported in the January progress report. However, during the winter, these could no longer be maintained on whole plants – the experiment with offspring of these same isolates was restarted on plants in early summer.

Bioassays of a number of downy mildew isolates collected in the Fall indicated high sensitivity of all isolates collected and only small variations in sensitivity (Figure 1). Two

methods of estimating disease were compared: estimating infected area, and estimated number of spore stalks (sporangiophores). Results were very similar, and since spore stalk estimates were more convenient and reproducible, this will be used in future experiments.

A few more collections have been made in the 2014 growing season, both from vineyards and wild grapevines 2013, both from vineyards and wild grapevines. Material is stored frozen for clade identification, and attempts are continuing to maintain all isolates on grape leaves in isolation.

Phosphite application schedules are being pursued in three separate vineyards in 2014, but the weather has been fairly dry in all locations and downy mildew development so far has been minimal or absent.

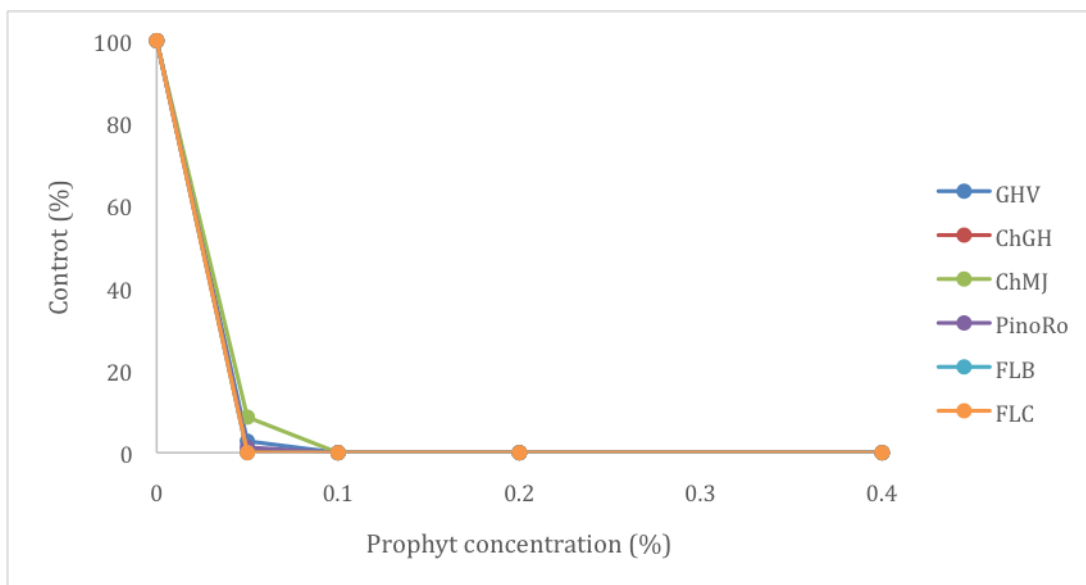


Figure 1. Sensitivity of 6 grape downy mildew isolates to phosphite fungicide. Isolates FLB and FLC are members of “clade vinifera” as described by Rouxel et al. (2013, 2014), whereas the other four isolates are expected to be “clade aestivalis”, the common downy mildew clade in Virginia (this needs to be confirmed).

## Publications

Rouxel, M., P. Mestre, A. Baudoin, O. Carisse, L. Delière, M.A. Ellis, D. Gadoury, J. Lu, M. Nita, S. Richard-Cervera, A. Schilder, A. Wise, and F. Delmotte. 2014. Geographic distribution of species of *Plasmopara viticola* causing downy mildew on wild and cultivated grapes in eastern North America. *Phytopathology* 104: 692-701.

Published cited reference:

Rouxel, M., Mestre, P., Comont, G., Lehman, B. L., Schilder, A., and Delmotte, F. 2013. Phylogenetic and experimental evidence for host-specialized cryptic species in a biotrophic oomycete. *New Phytologist* 197 (1):251-263. (described four of the five clades.)