Disease Susceptibility of Cold-Climate Grapes in Vermont, USA


University of Vermont, Burlington, VT, USA

ann.hazelrigg@uvm.edu

INTRODUCTION

- Cold-climate grape production continues to expand in Vermont.
- Development of several new grape cultivars able to survive -34° to -37°C winter temperatures offers growers more cultivar choices appropriate for northern climates.
- These new inter-specific cultivars are also bred to offer disease resistance.
- Evaluation of disease incidence and severity of selected cold-climate wine grape cultivars is necessary to select the best cultivars for Vermont.

METHODS

The vineyard was established in 2007 at the UVM Horticulture Research Center in South Burlington, VT (lat. 44.43162, long. -73.20186).

‘Corot Noir’, ‘Frontenac’, ‘St. Croix’, ‘Marquette’, ‘Prairie Star’ and ‘St. Croix’ were planted in a randomized complete block design of six blocks with four-plot vines of each cultivar per block at 1794 vines/ha density.

All vines received the same fungicide treatments and frequency of treatments based on environmental conditions and pathogen lifecycles, totaling five in 2014 and six in 2015.

Foliar and fruit cluster disease incidence and severity assessments were performed each growing season on twenty leaves per four-plot vine and ten randomly selected clusters per four-plot vine and included: powdery mildew (Erysiphe necator); downy mildew (Plasmopara viticola); black rot (Guignardia bidwellii); Phomopsis leaf spot and fruit rot (Phomopsis, Vitea (cota) angular leaf scorch (Pseudoperonospora xanthii); anthracnose (Elusine amentosa); and Botrytis bunch rot and blight (Botrytis cinerea).

Cultivar data were compared using analysis of variance (PROC GLM) and pairwise comparisons Tukey’s Honest Significant Difference (HSD) test.

RESULTS

- Powdery mildew was the most prevalent disease on foliage and clusters and was detected in all cultivars in both growing seasons.
- In 2014, ‘Corot Noir’ had significantly lower foliar powdery mildew incidence than any other cultivar. Severity (area infected) of powdery mildew was significantly higher in ‘Prairie Star’ foliage compared with all other cultivars except ‘La Crescent’. In 2015, ‘Corot Noir’ ranked the lowest numerically in foliar powdery mildew incidence and exhibited significantly less severe symptoms than all other cultivars except ‘La Crescent’.
- In both growing seasons, powdery mildew incidence in clusters was above 93% and there were no significant differences among cultivars. The severity of powdery mildew on ‘Prairie Star’ clusters was significantly higher than any other cultivar in 2014. In 2015, ‘La Crescent’ had the highest percent severity.

Table 1. Comparison of percent incidence and severity of powdery mildew and downy mildew symptoms on grape foliage and clusters in 2014 and 2015.

Table 2. Comparison of percent incidence and severity of black rot, Phomopsis fruit rot, anthracnose and Botrytis bunch rot symptoms on grape clusters in 2014 and 2015.

DISCUSSION

• Disease was higher in 2015 than 2014 perhaps as result of over 11 cm more rainfall during June 2015 compared with June 2014.
• Five (2014) or six (2015) fungicide applications were applied. On average, nine fungicide spray applications during each growing season are typical for wine grapes in the region.
• It is impossible to know whether disease incidence was higher due to ineffectiveness of fungicide protection during critical infection periods or whether disease was higher due to higher levels of inoculum since the design of the vineyard precluded the incorporation of non-sprayed plots for comparison.

CONCLUSION

Since innovative training systems may impact fungicide spray penetration and coverage and influence disease incidence, future research incorporating non-sprayed plots, multiple fungicide programs, innovative training systems and assessment of yield and marketability is necessary to critically evaluate and select suitable cultivars for northeast conditions.

ACKNOWLEDGEMENTS

The research was supported by the Vermont Agricultural Experiment Station, USDA Hatch funds, USDA NE-1052 Project; and the USDA NIFA SCRI Project #2013-51181-30850 (Northern Grapes Project). The authors thank Alan Howard for providing statistical support.