

Project: Interactions between nitrogen, sugar accumulation, wounding and susceptibility to botrytis bunch rot in Marlborough grapes

Background

Adequate nitrogen fertility is needed for satisfactory shoot growth, leaf function and fruit nutrition in the vineyard. Poor

nitrogen nutrition may lead to problems during winemaking. For example, low yeast available nitrogen (YAN) in berries has been associated with impaired fermentation. In contrast, too much nitrogen can contribute to excess shoot vigour, reduced fruit set and, reportedly, increased disease incidence. Some of these responses may directly result from changes in berry nutrition. Other responses may occur indirectly, for example because of increased shoot growth and canopy shading. This project investigates a number of components of the impact of nitrogen nutrition.

Anecdotally, berries with low YAN may have a lower incidence of botrytis bunch rot. Brix (sugars) and physical damage are also triggers for susceptibility to this disease. An understanding of how nitrogen levels influence susceptibility to disease is important in the overall management of botrytis bunch rot.

A field experiment in which 200g of urea per vine was applied to free-draining soil around nitrogen deficient vines, either at flowering, at veraison, or at both those times, resulted in a range of increased total YAN concentrations in berries compared with berries from vines in the untreated control.

Key results from this year

In a laboratory experiment involving

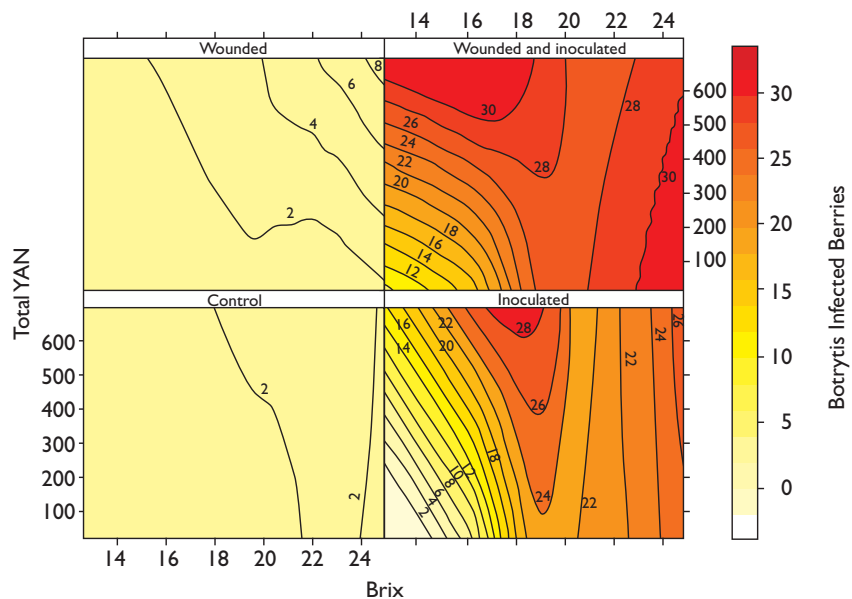


inoculation of detached grape berries with *botrytis cinerea*, with and without wounding, observed disease was linked to YAN and Brix concentrations (Figure 1). The data presented in the figure do not provide a simple relationship that can be described with an equation such as x Brix or higher gives y susceptibility. The research will require more data and further detailed analysis in order to develop a model that can predict susceptibility of berries to botrytis in relationship to Brix and YAN values.

The nitrogen data collected will be important to the Innovative Foods programme (8653-INNF-UOA), giving an indication of the differences in YAN that can be produced in the field and how the YAN components develop over time from veraison to harvest.

These 2005/06 season experiments have provided a starting point for understanding of the interaction between Brix, YAN and berry susceptibility to botrytis bunch rot. The literature review of the current

Figure 1: Four graphs showing the number of berries out of 30 that had visual symptoms of botrytis bunch rot following incubation for each of the four treatments used in the experiment (Control -no wounding or inoculation, inoculated only, wounded only and wounded and inoculated). All graphs are plotted on the same axis with yeast available nitrogen (YAN) against soluble sugars (Brix).



understanding of nitrogen involvement in producing wine grapes, carried out as part of this project (Mundy 2005), shows that there are still a number of aspects of the role of nitrogen in producing high quality wine grapes under New Zealand conditions that are poorly understood.

Publications

- Article written for *New Zealand WineGrower*.
- Review article written and available on New Zealand Winegrowers' website.
- Mundy D. 2005. Nitrogen/grape/pathogen interactions. Blenheim, HortResearch.

Key funding source

- New Zealand Winegrowers

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