

An evaluation of the efficacy of two *Bacillus subtilis* based products against Botrytis when used in a full season programme during 2010/2011 season

Introduction

The two products compared in this trial were Clarity[®] and Serenade Max[®], which are both formulations of the naturally occurring bacteria *Bacillus subtilis*. The mode of action of *Bacillus subtilis* is to control growth of *Botrytis cinerea* fungi by competing for nutrients, growth sites, as well as releasing toxins that are antagonistic to *Botrytis*, thereby preventing the spore germ tube from penetrating the grape berry cuticle. Both products have 'BioGro' registration for the 2010/2011 season, making them suitable for organic viticulture. They were trialed in one of Renwick Vineyard's Chardonnay blocks that is undergoing its first year of organic conversion.

Aim

To compare the efficacy of Clarity with Serenade Max against Botrytis when used as full season controls.

Location

Pernod Ricard NZ Renwick Vineyard CHDG block rows 495 to 526 Clone 15 on SO4 rootstock (VSP), with intended use of super premium table wine and a target Brix of 23.5.

Method

The trial was a randomized design of 2 treatments with 4 replicates each. There were 4 rows per replicate with 10 random assessment bays (plots)/rep. The rows used for assessment were the central rows of each treatment so the outside rows of each replicate acted as buffer rows between treatments.

Treatment A - Full season programme of Clarity[®] with 4 applications, at a rate of 265g/ha, beginning at 5% flowering, then at 80% flowering, pre-bunch closure and 7 weeks before harvest.

Treatment B – Full season programme of Serenade Max[®] with 4 applications, at a rate of 2.5kg/ha, beginning at 5% flowering followed by 80% flowering, pre-bunch closure and 7 weeks before harvest.

The dates of application for both treatments were 29 November 2010, 3 December 2010, 29 December 2010 and 9 February 2011.

Both treatments were applied with a Technoma sprayer using a water rate of 400L/ha, spraying to point of run-off. The first 2 sprays were targeted at the whole canopy, and from pre-bunch closure onwards the bunch line was targeted. No wetters or stickers were used.

Disease assessment/data collection

The block was assessed on 1st April for Botrytis incidence (% of bunches infected) and severity (% of bunch area affected) using the industry standard 'percentage of bunch infection key'. Harvest date was April 3rd.

Within each assessment bay, 5 bunches on the eastern side were examined and 5 bunches on the western side of the opposite bay were examined to ascertain if there were any differences in disease levels between the morning and afternoon sides of the canopy.

Total bunches assessed = 400 (5 bunches per plot x 80 plots).

A random 20 bunch sample from each treatment was collected for lab analysis of Brix, TA and pH at the time of eye assessment.

Results

There were no statistically significant differences between the use of Clarity[®] and Serenade Max[®] on incidence of botrytis ($P > 0.05$, *Figure 1*). There was also no significant difference between treatments for severity of botrytis ($P > 0.05$, *Figure 2*). No significant differences were observed between the eastern and western sides of the canopy for severity ($P > 0.05$) and incidence ($P > 0.05$). Crop loss* was calculated to be 0.11% and 0.14% for Clarity[®] and Serenade Max[®] respectively).

Figure 1: Clarity vs Serenade Max on Botrytis Incidence (%)

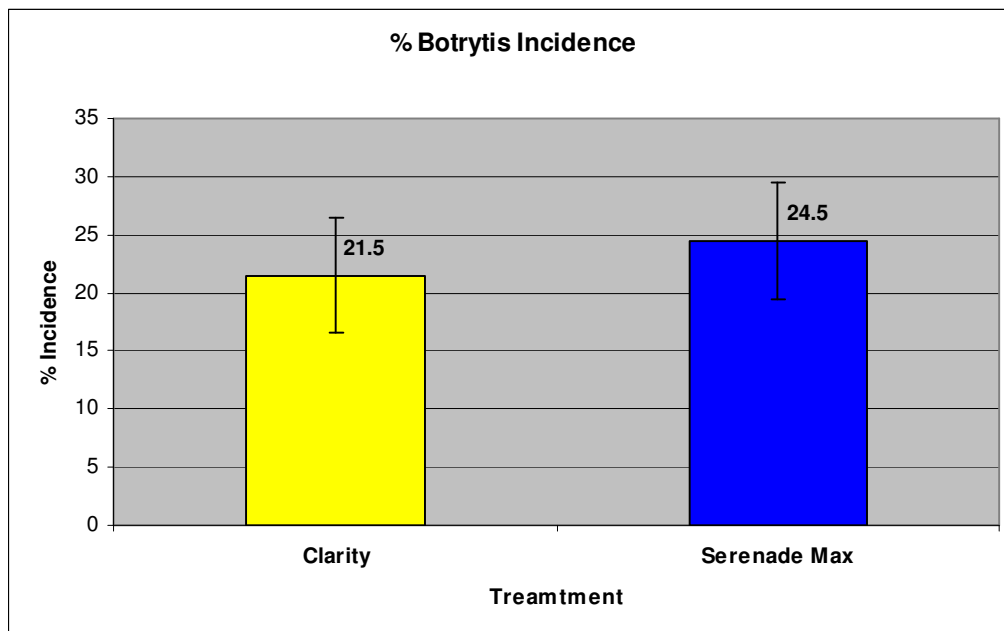


Figure 2: Clarity vs Serenade Max on Botrytis Severity (%)

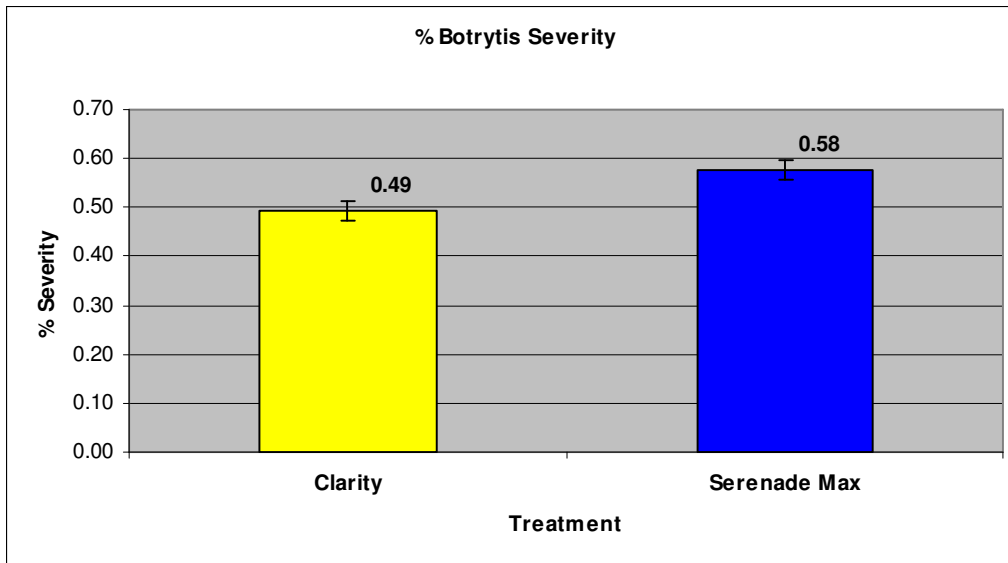
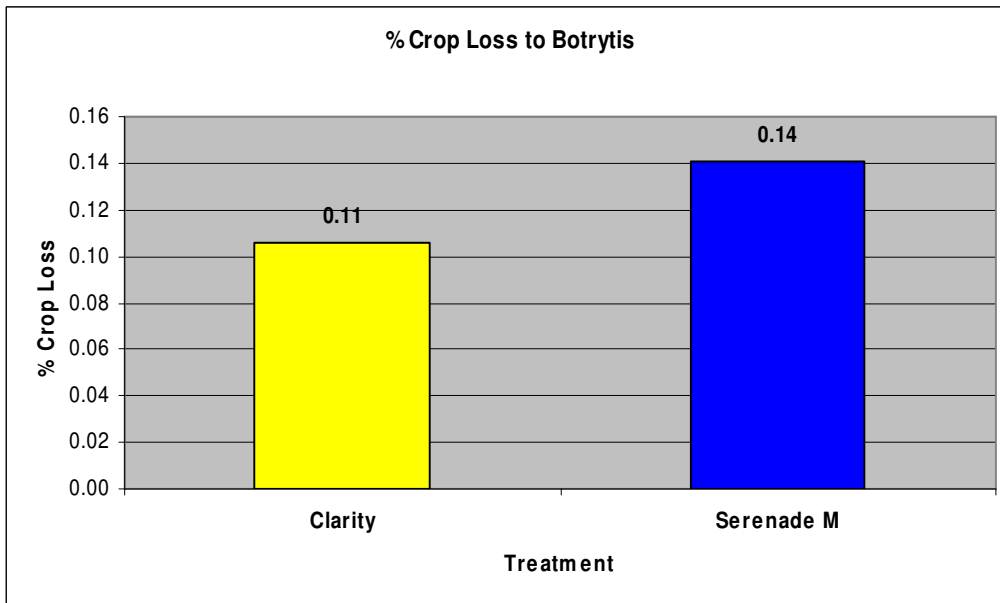


Figure 3: % Crop Loss to Botrytis



The block was harvested on 3rd April 2011, returning an average Brix of 23.1 and a yield of 9.47t/Ha.

Lab Analysis

	Brix	TA	pH
Treatment A - CLARITY	22.7	11.7	2.9
Treatment B - SERENADE MAX	22.7	11.0	2.9

There were no significant differences in Brix, TA and pH between treatments.

Discussion

The 2010/2011 season was one of high disease pressure, with eleven severe Botrytis infection periods between mid November 2010 and the end of March 2011 (Bachus model) and 13 severe infection periods using the Broome model.

Botrytis was evident in both treatments (incidence 21.5% & 24.5% respectively) suggesting one out of every four or five bunches was infected to some degree. However, the severity of botrytis infection in both treatments was very low, both less than 0.6%. Calculated crop loss was less than 0.2% for both treatments, so the theoretical loss of production through botrytis was negligible. The clean condition of the grapes in Renwick CHDG enabled grapes to be 'hung out' for longer, allowing lengthy ripening to achieve a higher average Brix level (23.1).

Conclusion

In a season of high disease pressure, there is no significant difference in botrytis infection level when using Clarity[®] or Serenade Max[®] as a prevention agent.

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Serenade Max[®] Registered trademark of AgraQuest Inc., USA