

Evaluation of Samurai® Absorption by Amino Boost Transit Max® Treated Grapevines

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One of the major pests which threatens vineyards are Mealybugs. Mealybugs are insects which invade plants and such on the sap. This sucking action results in sticky residue left behind by the Mealybug which acts as a vector or several other plant diseases and fungal issues such as Botrytis. One of the popular ways to combat Mealybug is with the use of an insecticide such as Samurai® is a systemic (Group 4A) insecticide which controls Mealybugs in table grapes. The effectiveness depends on regular monitoring of crops during the season at 3-5 days intervals. Dual Chelate Fertilizer produces a plant bio-stimulant known as Amino Boost Transit Max (ABTM) which can be applied with Samurai as a foliar application in order to accelerate the absorption. As a result, Mealybug population decreases in the plants and can be controlled throughout the season. This study concluded that with application of ABTM with Samurai®, there was considerably less Mealybugs remaining after the application in comparison to a spray with purely Samurai®.

Key Words: Mealybug, ABTM®, Samurai®, fungal diseases.

Introduction

Dual Chelate Fertilizer Pty Ltd has developed Amino Boost Transit Max® which is a premium liquid plant bio stimulant to assist in increasing root growth, improve stress tolerance and assist in transporting nutrients around the plant. Together, these qualities all improve potential yields through better plant health and increased plant nutrient status. Amino Boost Transit Max® (ABTM) contains Amino acids (10%), Kelp (6%), Fulvic acid (4%), Biologically Active Organic Molecules (BAOM) (1.5%) and amino acid derived nitrogen (1.4%). ABTM® also acts as a stimulant for absorption as it significantly improves plant health which in turn increases plant growth and translocation. This therefore increases the absorption rate of other foliar

applied products such as Samurai® causing the active ingredients to work faster. Samurai ® works by circulating Clothianidin (active ingredient) throughout the plant which is then ingested by sucking insects such as Mealybug.

Objectives

The objectives of this trial evaluating Samurai® and ABTM® on the eradication of Mealybug include:

1. To assess the number of deaths of Mealybug with the use of pure Samurai® and Samurai® mixed with ABTM®.
2. Measure the concentration of Clothianidin residue in leaves 2 weeks after application.

Materials and Methods

This trial was conducted on a table grape vineyard in Robinvale, VIC which had blocks of Thompson seedless and Red globe exposed to high levels of Mealybug. Both Thompson seedless and Red globe were tested with applications of Samurai® and Samurai® + ABTM® and analysed separately.

One application of Samurai® and Samurai® + ABTM® was applied just prior to flowering at the flowering stage E-L 23 in early October. Table 1 highlights the respective application rates for both Thompson seedless and Red globe blocks.

Table 1: Application rates and timing.

Treatment	Application rate	Application Date
Samurai®	Samurai® - 800 g/ha	8/10/2019 (Flowering stage – E-L 23)
Samurai® +	Samurai® - 800 g/ha	
ABTM®	ABTM® - 20 L/ha	

Observations

Mealybug Population

To assess the Mealybug population, 36 leaves were randomly selected closer to cane from 12 control and 12 treated vines separately and the Mealybug population was monitored by using magnifying glass and under the microscope at weekly intervals from end of December 2019 to mid-March 2020.

Residue Assessment

To assess the residue in the leaves after application of treatments, Clothianidin which is residual substance of Samurai® was assessed in control and treated Thompson Seedless and Red globe leaves. 200g of Samurai® treated leaves and Samurai® and ABTM® applied leaves were randomly selected separately and assessed residual content at laboratory standard 2 weeks after application.

Results



Figure 1: Samurai® and ABTM® applied at flowering stage.



Figure 2: Microscopic image of Red globe leaf with a Mealybug.

Table 2: Mealybug population in Samurai® only and Samurai® treated with ABTM® blocks during the trial period.

Date	Thompson seedless		Red globe	
	Samurai® only	Samurai® treated with ABTM®	Samurai® only	Samurai® treated with ABTM®
28/12/2019	3 live bugs	2 live bugs	4 live bugs	No bugs
03/01/2020	3 live bugs	No bugs	No bugs	No bugs
11/01/2020	5 live bugs	1 live bug	2 live bugs	No bugs
17/01/2020	10 live bugs	9 live bugs	No bugs	No bugs
25/01/2020	6 live bugs; 5 dead bugs;	No bugs	12 live bugs; 2 dead bugs;	8 dead bugs
03/02/2020	5 live bugs	1 live bug	2 live bugs	No bugs
08/02/2020	No bugs	No bugs	No bugs	No bugs
15/02/2020	3 live bugs	2 live bugs	No bugs	No bugs
22/02/2020	13 live bugs	4 live bugs	4 live bugs; 4 dead bugs;	1 live bug
01/03/2020	11 live bugs	3 live bugs	1 live bug	No bugs
08/03/2020	20 live bugs	5 live bugs	1 live bug	1 live bug
Total	79-live bugs; 5-dead bugs;	27-live bugs	26-live bugs; 6-dead bugs;	2-live bugs; 8-dead bugs;

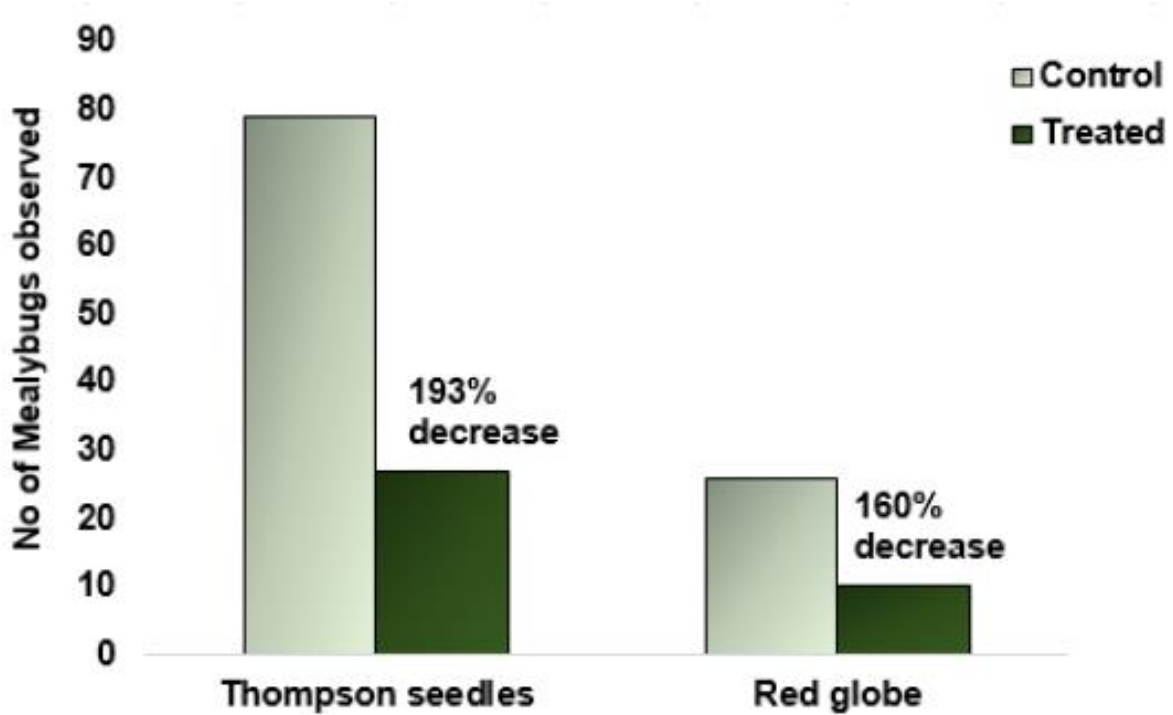


Figure 3: Mealybug population in control and treated blocks of Thompson seedless and red globe varieties.

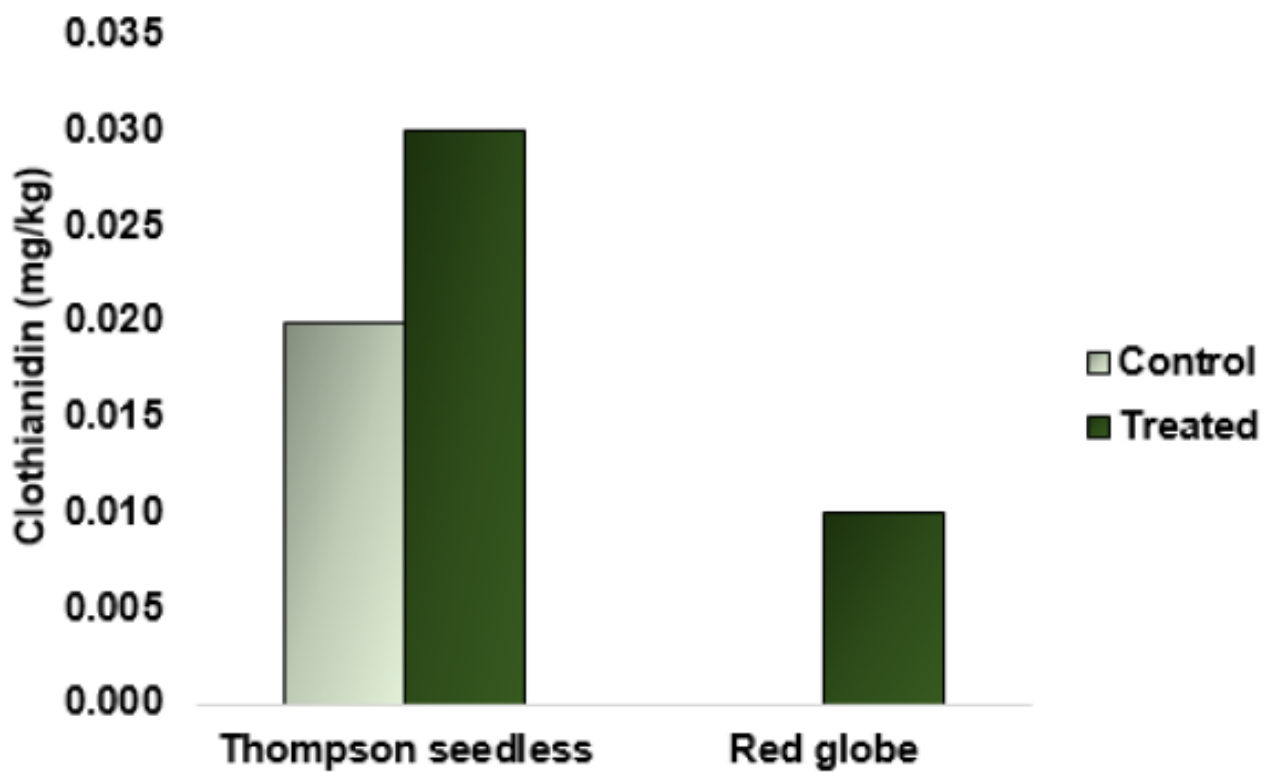


Figure 4: Residual concentration (Clothianidin) of 200 grams of control and treated leaves from Thompson seedless and Red globe vines after 2 weeks from application.

Discussion

When looking at table 2 it can be seen from the total Mealybug count, that Thompson seedless and Red globe had less live Mealybugs on grape vines were treated with Samurai® and ABTM® compared to grape vines treated with only Samurai®. This difference was quite substantial and significant.

Figure 3 shows the mealybug population reduction in treated blocks (Samurai® and ABTM® mixture) of Thompson seedless and Red globe vines compare to control (Samurai® only). The Mealybug population was reduced by 193% in treated Thompson seedless while 160% in treated Red globe vines relative to control.

Figure 4 shows the residual concentration in tissues of treated Thompson seedless and Red globe vines, 2 weeks after application. The Clothianidin content of Samurai® only application and Samurai® and ABTM® mixture were 0.02 mg/kg and 0.03 mg/kg in Thompson seedless leaves respectively. In Red globe, the Clothianidin content in Samurai® only application was not quantifiable at low level however, the Clothianidin content in Samurai® and ABTM® was 0.01 mg/kg. The residue left over in the leaves suggests that the ABTM® assisted in the rapid uptake of Samurai®.

The Mealybug population was higher in the Thompson seedless plot compare to Red globe in the trial site. This is may be due to several factors such as shade, variety characters, soil and other external factors. However, higher reduction of Mealybug population was seen in the Thomson seedless block with the application of Samurai® and ABTM® mixture.

The higher concentration of Clothianidin in treatment vines due to stimulation of the Samurai® uptake into the plants by 17 different amino acids and biologically active organic molecules. As a result, the active ingredient of Samurai® was higher in the tissues of treatment plants.

Conclusion

In conclusion, using ABTM® with Samurai® as a method of controlling Mealybug in grapes vines is an extremely effective way in lowering Mealybug population. Lowering the Mealybug population untimely reduces more damage from other diseases and pests which can increase yields and profit made.

In summary, ABTM® accelerated the absorption of Samurai® into the plants system due to the amino acids and Biologically Active Organic Molecules improving the function of these systems