Evaluation of yield of grapevines treated with Amino Boost Transit Max (ABTM®)

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Yield is one of the main parameters considered when evaluating crop productivity as it relates directly to the Return on Investment (ROI) of the organisation. In order to achieve maximum yields, plants need to be healthy with optimal macro and micro nutrients available to enhance production and outputs. Amino acids, kelp, fulvic acid and Biologically Active Organic Molecules have been proven to be very beneficial to the plant system by stimulating root and shoot growth and increasing the stress tolerance or plants. This study shows that applications of Amino Boost Transit Max increases yields in wine grapes (Pinot gris) by significantly increasing average bunch weights.

Key Words: Yield, amino acids, wine grapes, Pinot gris, root and shoot growth, stress tolerance.

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%).

Amino acids are used all throughout the plant for hundreds of different processes such as protein biosynthesis, photosynthesis, stomata activity, chelation and also have an influence on soil microbe activity. Applications of amino acids though ABTM reduces the energy consumption used to make amino acids and focuses the plants energy on growth and development which directly influences the yield. Kelp has many beneficial effects on plants due to the natural growth promoting hormones, polysaccharides and micro-nutrients. Kelp is high in the plant growth hormone Cytokinin which boosts cell division in new shoots and roots for increased growth and root exploration. This increases nutrient uptake, and hence maximises plant growth development. Polysaccharides such as alginic acids assist in promoting a healthier soil by acting as a gel type substance which increases water retention and aeration in the soil. Other plant growth hormones such as auxin and gibberellins also can significantly improve plants stress coping mechanisms to biotic and abiotic stresses. Fulvic acid in ABTM benefits plants by converting minerals in soil into a plant available form which can be easily up taken by plants. Fulvic acid acts as a natural chelator and also promotes the colonisation of microbes in the soil

which in turn creates a healthier soil which can increase not only nutrient availability, but can also increase the soil structure promoting the formation of aggregates and increasing water infiltration and water holding capacity. BAOM are organically derived and are the patented technology used by Dual Chelate Fertilizer. These organic molecules contain highly plant-active compounds which are able to significantly increase the movement of nutrients within the plant, enhance root and shoot growth and helps plants increase their tolerance against abiotic stresses through increased gene expression and hormone activity.

In this study, the effect of a soil application of ABTM on Pinot gris wine grapes is evaluated to observe the yield difference between control and treated grapes, specifically looking at the average bunch weight.

Objectives

1. To evaluate the effect of ABTM on the final bunch weight of Pinot gris wine grapes.
2. Determine if ABTM should be incorporated into fertiliser regimes in an effort to increase yields.

Materials and Methods

This trial was conducted on a Pinot gris wine grape block located in Euston, NSW. A control and treated area were marked with samples and photos being taken from these areas separately.

One application of ABTM was applied during late October (before flowering) at a rate of 10L/ha using drip irrigation. Table 1 highlights the application details.

Table 1: Application rate and timing of ABTM on Pinot gris wine grapes

Treatment	Application Rate	Application date
ABTM	10 L/a	31st October 2019
Control	0 L/ha	31st October 2019

Observations

Bunch Weight Sampling

In order to evaluate yields, average bunch weights were recorded for ABTM treated Pinot gris vines and control Pinot gris vines. At harvest time, 80 bunches were randomly harvested from 80 vines from the ABTM treated area and the control areas separately. Each bunch from the treated and control vines were then subsequently weighed separately and then averages to achieve the average bunch weight.

A graph was made using Graph Pad Prism 7 to evaluate the percentage differences between the ABTM treated vines and the control vines.

Results

Figure 1: Pinot gris vines in Euston, NSW. Pink tags highlighted bunches to be collected.

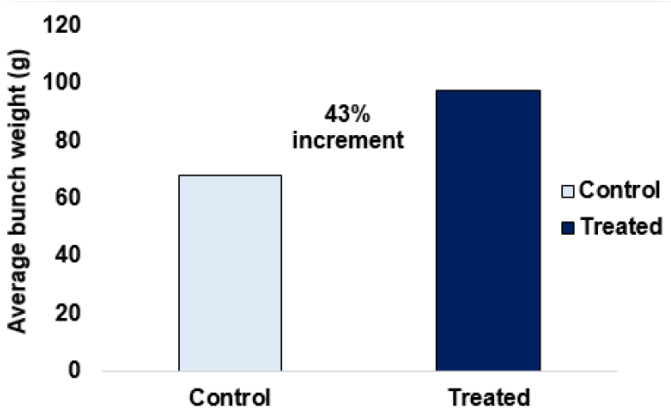

Figure 2: Average bunch weights of bunches collected off ABTM treated Pinot gris vines and control Pinot gris vines.

Discussion

When looking at the graph presented in figure 2, it can be seen that there is a significant difference between the average bunch weight of Pinot gris bunches from vines treated with ABTM compared to the control vines which followed the farmers annual fertiliser program. ABTM vines produced bunches which weighed on average 97.4g and control bunches produced bunches which weighted on average 68.0g. This produced a significant percentage increase of approximately 43%. This concludes that grape vines treated with 10 L/ha of ABTM just before flowering on average increased the average bunch weight by 43% when comparing this to the farmers standard fertiliser regime. This increase in average bunch has a direct correlation to an increase on the return on investment received.

This significant increase in average bunch weight seen in vines treated with ABTM is a result of a number of factors related to the beneficial plant bio-stimulant blend of organically derived amino acids, kelp, fulvic acid and Biologically Active Organic Molecules. When Amino Acids are supplied to plants, processes such as photosynthesis and stomata activity are greatly increased as the plants do not need to spend time and energy on creating these amino acids to be used in proteins and other reaction. With more readily available amino acids, plant processes such as the photosynthetic reaction and stomata regulation are working more efficiently which results in the production of more available energy which the plant can use to promote the growth of larger bunches and more berries. These organically derived amino acids are also precursors to a number of key plant regulating hormones (such as auxin) and speed up enzymatic reactions which also provide an increase in plant growth.

Added kelp assists in increasing average bunch weight by stimulating plant root growth. The kelp used in ABTM is highly refined and contains a high percentage of the natural plant hormone, Cytokinin. When applied at the root zone, cell division is heightened which increases the root mass and encourages the production of new explorative roots. With an increase in root biomass, more roots are able to actively uptake nutrients and also explore pockets of nutrients in the soil. Kelp also increases the soil health status by promoting a more favorable environment for micro-organism colonies which can assist in the conversion of unavailable nutrients to plant available forms for enhanced uptake. Kelp is also able to increase the water holding capacity in soil due to alginic acids which prevent any water stress which may occur and also keeps the nutrients available for uptake. Kelp is also high in potassium which is necessary for larger bunch growth as it is a regulatory element needed for many processes such as energy production and photosynthesis which promote larger bunches.

Fulvic acid acts as a natural chelator by assisting in the conversion of unavailable minerals in soil to more plant available forms. Fulvic also boosts the health of micro-organism colonies in soil which provide a healthy environment for excellent root growth.

Biologically Active Organic Molecules (BAOM) are the patented technology used in Dual Chelate Fertilizer bio stimulants and fertilizers. These molecules have a number of important benefits in plants such as increasing the movement of nutrients within the plant, enhancing root and shoot growth and assist in increasing tolerance against abiotic stresses through increased gene expression and hormone activity. BAOM are able to significantly increase the productiveness of plants which in turn promotes the growth of larger bunches.

Conclusion

In conclusion, using ABTM will increase bunch weights in wine grapes significantly through promoting a healthy soil for roots and microbes, increasing the plant energy efficiency usage through added amino acids, promoting abiotic stress tolerance, naturally chelating nutrients in the soil through fulvic acid and BAOM and also increasing the mobility of nutrients through the plant system and directing nutrients to where they are in highest demand.