# Evaluation of Bunch Stretching of Grapevines Treated with Amino Boost Transit Max (ABTM®)

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Compact bunches create various problems in Pinot gris which results in small berries and high disease risks, especially diseases such as Botrytis, Powdery mildew and other bunch rots, etc. As a result, the yield and marketability of grapes reduce which correlates with a negative affect for the wine quality. Therefore, it is important to find specific agents which promote bunch stretch and also facilitate the formation of larger berries and promote air circulation within the bunches which result high quality and larger quantity of grapes. Hence, Amino Boost Transit Max (ABTM®) was sprayed and the effects were assessed on bunch stretching. 2 different application rates (10 L/ha and 30 L/ha) of ABTM® was applied through fertigation and bunch stretch was analysed. Bunch length was measured 28 days and 69 days after application of ABTM®. After 28 days there was a 16% increase in bunch length on Pinot gris vines treated with 10 L/ha of ABTM and a further 3% increase after 69 days after initial application. Pinot gris vines treated with 30 L/ha had a 20% increase in bunch length after 28 days and a further 2% increase after 69 days after initial application. Control bunches had a 12% increase in bunch length after 28 days and a further 7% increase after 69 days.

**Key Words**: Grapevines, Pinot gris, bunch stretch, Amino Boost Transit Max, Botrytis, Powdery mildew,

## Introduction

Dual Chelate Fertilizer Pty Ltd has developed a premium bio-stimulant product called Amino Boost Transit Max (ABTM®). ABTM® acts as a soil lubricant, facilitates absorption of stress, acts as a solvent for insoluble plants nutrients, stimulates plant growth and assists in the uptake and translocation of nutrients in plants.

ABTM® is a plant biological stimulant which boosts the synthesis of plant growth regulators. ABTM® is applied with the aim of heightening the growth performance of plants in stressful situations and increasing plant nutrient transport. It contains 17 organically derived 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 different rates of soil applications of ABTM on Pinot gris wine grapes is evaluated to observe the differences in bunch length between different applications of ABTM and the control Pinot gris grape bunches.

## Objectives

1. To evaluate the effect of ABTM on bunch length of Pinot gris wine grapes.
2. Determine which rate of ABTM is best for achieving longer bunches.

## Materials and Methods

This trial was conducted on a Pinot gris wine grape block in Euston, NSW. A control and treatment areas were marked with flagging tape and photos were taken in each of the areas.

Two areas of the vineyard were subjected to a single soil application of either 10 L/ha or 30 L/ha of ABTM® mid-way though berry development. Table 1 highlights the application details.

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

| Treatment | Application Rate | Application date |
|---|---|---|
| Control | 0 L/a | 2nd December 2019 |
| ABTM (10 L/ha) | 10 L/ha | |
| ABTM (30 L/ha) | 30 L/ha | |

## Observations

### Bunch Length

Bunch length is measured before application of ABTM and then again 28 and 69 days after application of ABTM. Bunch length was measued using a ruler and identical bunches were measured each time for consistancy.

For each treatment, 5 bunches were randomly slected from 5 vines in the areas terated with soil applications of 10 L/ha and 30 L/ha each. This was also continued for the control area where no ABTM was applied.

Following measured bunch lengths, graphs were made with percenatge increase calculated for the increase in bunch length for all 3 treatments.

## Results

Figure 1: ABTM treated vines in the bunch stretching trial in Euston, NSW

Figure 2: Measuring bunch length of an ABTM treated bunch in the trial site, Euston, NSW.

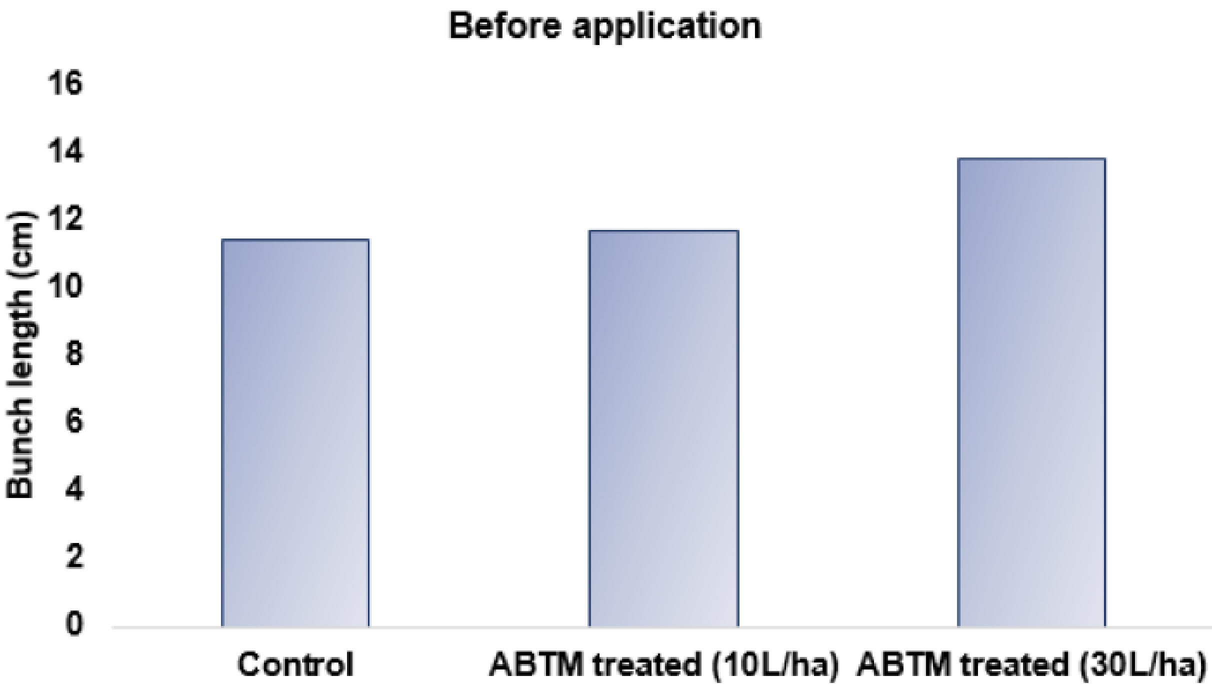


Figure 3: Average bunch length of Pinot gris wine grape bunches before applications of ABTM®.

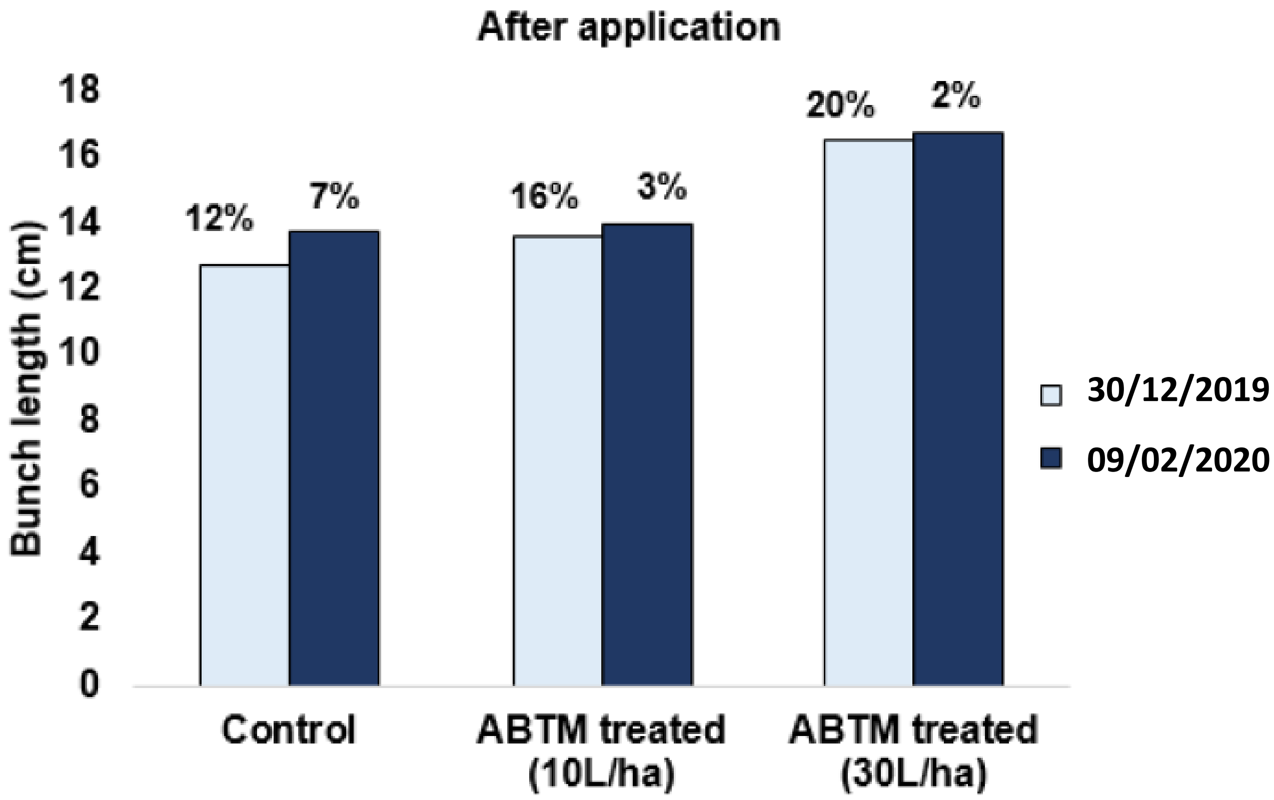


Figure 4: The increment increase om bunch length of ABTM® treated and control bunches during the trial period. The growth percentages are relative to the previous data point (bunch length before application of treatments).

## Discussion

When looking at figure 4, it shows that after the application of treatments (10 L/ha and 30 L/ha), Pinot gris vines treated with 30 L/ha had a 20% increase in bunch length. This was the highest percentage increase seen between the other 2 treatments (10 L/ha and control). It was also determined that there was a 16% increase in bunch length from vines treated with an application of 10 L/ha of ABTM®. Overall, it was determined that vines treated with ABTM had an increase in bunch length compared to the control 28 days after treatment application. 69 days after treatment there was also slight increase in bunch length in all treatments, however, Pinot gris vines treated with ABTM® still displayed higher average bunch lengths compared to the control vines.

Bunch stretch is an important physiological change which occurs and causes the stem of the bunches to increase which prevents bunches from being too tight. When bunches are tight, the incidence of a fungal infection such a Botrytis is largely increased due to limited air movement between berries. Bunch elongation prevents this occurrence by increasing the stem length which subsequently increases the space between berries thus promoting air flow and preventing disease and fungal issues.

Bunch elongation occurs naturally through the production of the plant growth regulator Gibberellic acid, however it is common practice to apply a foliar application of Gibberellic acid directly to the bunches before flowering to ensure that bunch stretch is optimal to prevent any yield losses through disease and fungal damage. Gibberellic acid is formed within new cells of plants and consists of 8 of different forms which not only helps with bunch elongation in grapes, it also assists in the elongation of new plant tissues cells found in shoots, young leaves and flowers. It is also found in seeds and promotes the gemination of the first shoots and roots through weakening the seed coats as a result of gene expression which regulated the production of Gibberellic acids.

The pathways, signals and receptors associated with Gibberellic acid production and movement has not been fully research yet. However, recent research shows that a growth receptor called DELLA along with other various proteins are involved in the production of Gibberellic acids naturally. DELLA is a growth inhibiting protein which is often seen in new cells. Gibberellic acid has now been proven to have an integral role in binding and destruction of these DELLA growth repressors by actively binding and destroying the compound and thus promoting the elongation and development of new cells. When there are more DELLA growth repressor proteins, production of Gibberellic acid increased by the plant as it is a pathway for increased growth (Harberd, Belfield and Yasumura, 2009). This mechanism is known as the GA-GID1-DELLA mechanism and untimely induces the breakdown of DELLA growth repressors through an upregulation of Gibberellic acids.

ABTM assists in promoting the production of DELLA proteins which in turn increases the concentration of Gibberellic acids. ABTM contains 10% amino acids which are naturally derived and consist of 17 different forms of amino acids. These amino acids can be used to make proteins which promote the influx of Gibberellic acids.

ABTM also contains highly refined kelp which contains a number of naturally derived plant growth regulators such as auxin and cytokinin along with trace amounts growth regulators such as Gibberellic acids. Auxin is another growth promoting regulator which assists in stem elongation by promoting cell wall loosening via cleavage of these bonds (Rayle and Cleland, 1992). Therefore, the Auxin in ABTM also promotes the elongation of stems on grape bunches. Auxin is also commonly known to cause stem elongation in response to shade as when the plant is shaded, new shoots and stems will be actively exploring for light which also increases the stem length.

ABTM also contains multiple chelation mechanism such as the amino acids, fulvic acid and the Dual Chelate Fertilizer patented BAOM which greatly assist in the movement of nutrients throughout the plant. 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 through a more nutrient rich environment.

## Conclusion

In conclusion, using ABTM can increase the bunch length of Pinot gris grape bunches at an application rate of 10 L/ha or 30 L/ha. This is achieved through promoting growth repressor proteins (DELLA) which in turn increase the production of Gibberellic acids as a reaction. ABTM also contains kelp which is high in other growth promoting regulators such as Auxin and Cytokinin. Bunch elongation is also achieved though maintaining good plant health through increased 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.

## References

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