

Boron is naturally present in all soil. It is one of the 114 elements that make up the earth, and every member of the plant world relies on it to grow. Boron not only plays an essential role in a plants reproductive cycle, controlling flowering, pollen production, and seed development, but also works in the primary cell structure of the plant and so affects almost every area of plant health and growth including root growth, nutrient uptake, fibre density and disease resistance. Unfortunately, many New Zealand soils are on the most part, extremely deficient in boron.

OrganiBOR® is a naturally occurring, certified for organic use, magnesium/calcium borate that replenishes the boron levels in the soil in a controlled and natural way.

Boron is always found naturally bound to either sodium, magnesium or calcium. Sodium is the most soluble form of boron and calcium is the least soluble with magnesium falling somewhere in the middle. Because of boron's role in the primary cell structure most plants need a continual supply of boron right through all phases of their growth and development. However most boron fertilisers are based on sodium borate (Ulexite, Boric Acid, Borax Pentahydrate or Di Sodium Octoborate Tetrahydrate) which is extremely soluble. Because of this high solubility it is extremely difficult to consistently achieve the correct boron level in the soil or plant. If too little boron is applied then the plant does not get enough boron before it leaches away and if too much boron is applied then the plant gets boron toxicity. This is why it is necessary to apply most traditional boron based fertilisers in small amounts several times a year or at least annually.

OrganiBOR® is designed to be applied once every 2-5 years depending on the crop, climatic and soil conditions, and will continually release boron over that period of time so the plants, vines or trees will have a continual supply of boron right through all of their growing phases. The effect on the tree is the same as if it was grown in boron rich soils.

Basic specification

| | |
|------------------------------|---------------------------------|
| Chemical Formula | CaO Mg0.3B2O3.6H2O |
| Appearance | Whitish chip |
| Boron content | 10% min |
| MgO | 4.6% - 6.2% |
| CaO | 13% - 16% |
| Particle Size | 95% between 2-4mm |
| Packing | 25kg bags or 1000kg bulk bags |
| Organic Certification | Biogro registration number 5063 |

Application Rates

Because **OrganiBOR®** is a controlled release fertiliser designed to release over several years, the timing of application is not critical, however, mid winter to late spring is the preferred time of application for most annual crops.

Below is a guide to the expected application rates for selected crops.

| | |
|------------------------|---------------------------|
| Apples | 75kg - 200kg per hectare |
| Grapes | 60kg - 125kg per hectare |
| Avocados | 100kg - 300kg per hectare |
| Vegetable crops | 75kg - 150kg per hectare |

For more specific application rates please talk to Jabez Trading Ltd or your local horticultural sales representative.

Reapplication

Reapplication will be necessary once the leaf and soil boron levels begin to fall back towards the lower end of the recommended range. The rate of this fall will depend on several factors including the rate of initial dosage, the rate in which the boron is removed from the plant through harvesting, rain fall, soil acidity and soil type. However as a general guide reapplication should be occurring between 2 and 5 years.

Release Time

As **OrganiBOR®** is a slow release fertiliser it is not uncommon for only small movements in the leaf boron levels to occur in the first year, especially in heavy soils with low rainfall. The desired ppm range is more likely to be occurring in the second and third growing seasons, especially in crops such as grapes that do much of their new growth from the previous years root stock reserves.

Toxicity

Due to **OrganiBOR®**'s gradual release patterns the chance of inducing boron toxicity is low. Because of boron's interactions in the soil the application rate to reach the desired soil level may be affected by the type of soil, its pH, nutrient components, and the prevailing climatic conditions. For specific soil application recommendations please speak to Jabez Trading Ltd or your local horticultural sales representative.

Application Conditions

OrganiBOR® can be applied at any time of year. **OrganiBOR®** should be applied evenly either with a mechanical spreader or by hand. If **OrganiBOR®** is being applied to orchards, vineyards or crops where there is grass or other foliage between the rows of crops it is important that the grass or foliage is cut low just prior to application of **OrganiBOR®**.



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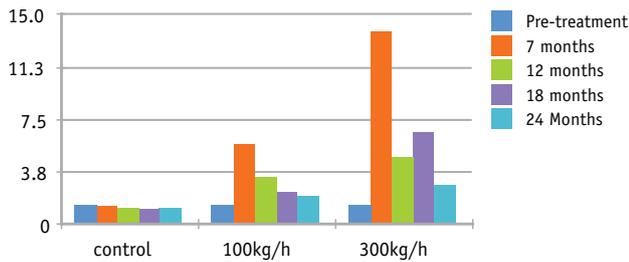


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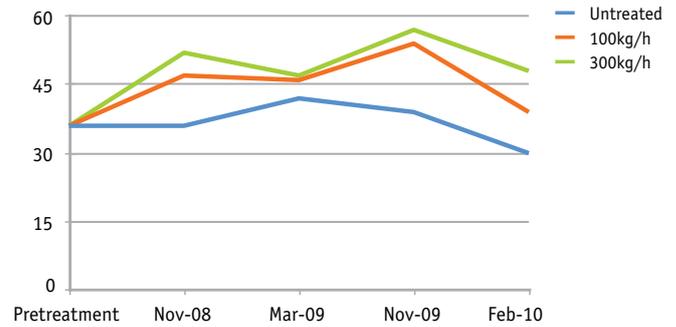


Apples

Soil Boron Levels (ppm)



Foliage Boron Levels (ppm)



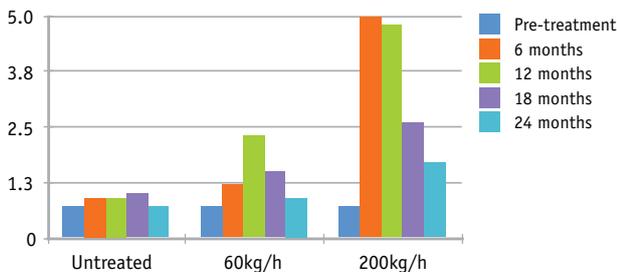
This trial is on an Organic apple block with silt loam soils and is performing as would be expected. There was an accidental application of foliar boron in March 2009 which has created an interesting trend in the foliage boron levels around this time. The boron levels in the soil have peaked as

expected in the first 12 months and then dropped off over time. It would be expected that there would be another application of OrganiBOR on this site next year (3 years after initial application) or the following year depending on how the soil results look in early 2011. The soil levels in this trial

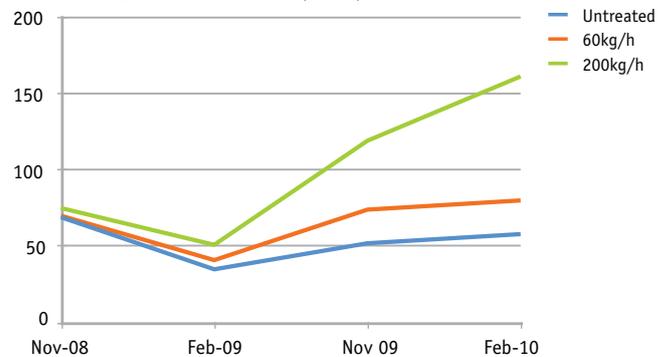
are especially impressive given the amount of rain that this site has experienced over the last 12 months. Fruit testing on this trial showed an 8% increase in magnesium levels, a 14% increase in calcium levels and a 76% increase in boron levels in the fruit at the recommended 100kg/h rate.

Grapes

Soil Boron Levels (ppm)



Foliage Boron Levels (ppm)



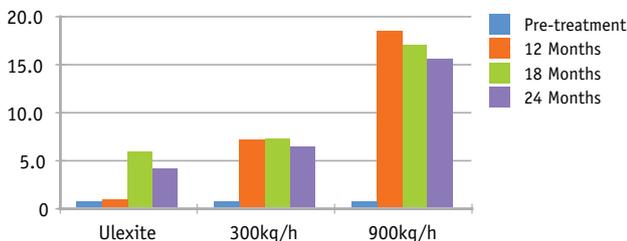
This trial is run on extremely light alluvial soils on the Gimblet Gravels area in Hawkes Bay. As expected the soil boron levels have gone up quite high for this type of soil at the 200kg/h rate and has produced a correspondingly high boron level in the

vines at this level. However there have been no signs of toxicity at this time in the trial even after having pushed the foliage boron levels up to in excess of 160ppm in the toxicity study.

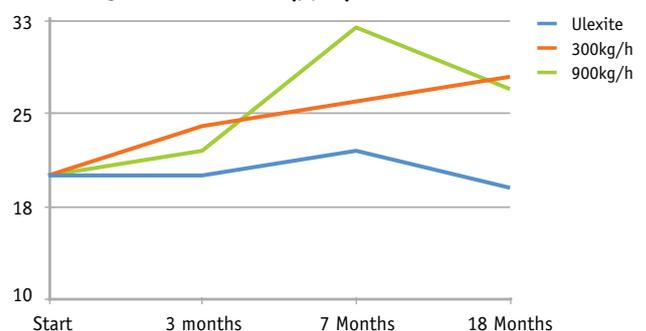
The 60kg/h rate is performing perfectly and it would be expected there would be another application in year three.

Avocados

Soil Boron Levels (ppm)



Foliage Boron Levels (ppm)



This trial is extremely interesting as the control in this case is treated with 15kg/h of elemental boron in the form of Ulexite every 6 months. As can be seen in the graphs most of this boron is leaching out of the soil at an extremely fast rate with the exception of the 18 month test. This was due to extremely dry conditions which

did not allow for leaching. At 24 months however the boron was applied only 2 weeks before soil testing was completed. At 24 months there has been over twice the elemental boron applied to the Ulexite trial block as opposed to the 300kg/h OrganiBOR trial block, however the OrganiBOR is significantly outperforming the Ulexite in

soil, foliage and flower testing for boron levels. There has been a drop off in foliage levels in the 900kg/h rate (toxicity trial). This is due to the dry conditions and the excessive boron levels in the soil affecting the soil microbiology.