

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 is utilised in the primary cell structure of a plant and therefore affects nearly every area of plant growth and development.

Unfortunately, Australian 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, Calcium is the least soluble, with Magnesium falling somewhere in the middle.

Most plants need a continual supply of boron right through all phases of their growth and development. Most boron fertilisers however, are based on sodium borate (Ulexite, Boric Acid, Borax Pentahydrate or Di Sodium Octoborate Tetrahydrate) which is extremely soluble. Due to 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 can develop boron toxicity. This is why it is necessary to apply most traditional boron based fertilisers in small amounts several times a year to achieve a constant supply of boron.

OrganiBOR[®] is designed to be applied to pasture once every 12 to 24 months depending on the desired outcome, climatic and soil conditions, and will continue to release boron over that period of time so the pasture will have an ongoing supply of boron - right through all seasons. The effect on the pasture is the same as if it was grown in boron rich soils. Having a constant supply of boron means that low boron levels cease to be a limiting factor to pasture growth through the season, allowing higher dry matter yields and better quality pasture. **OrganiBOR[®]** contains no sodium borate and therefore will not destroy soil biology or leach into underground waterways or streams.

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 or 1000kg bags
Organic Certification	BFA Allowed Input 10982AI

Application Rates

Crop	Rate per hectare
Mixed Pasture	30kg
Lucerne	60kg
Brassica fodder crops	60kg

Application Timing

For mixed pastures **OrganiBOR[®]** should be applied annually in spring or autumn for the first 2-3 years. With repeated applications, the boron levels will begin to build in the soil and the frequency of application can be reduced to once every two or three years. The long term frequency of application and the performance of **OrganiBOR[®]** in the soil and pasture will depend on several factors, including: rain fall, soil acidity, soil organic matter, soil biology and soil type.

For Brassica and Lucerne fodder crops apply **OrganiBOR[®]** at planting.

Release Time

OrganiBOR[®] is a slow release fertiliser but will begin to release boron in the first 4-8 weeks with peak boron supply arriving in the first 6 months as a general rule. Release time will depend heavily on moisture levels, soil acidity, organic matter, soil biology and soil type.

Toxicity

Due to **OrganiBOR[®]**'s gradual release patterns the chance of inducing boron toxicity is low. However as with all borate fertilisers caution needs to be taken when the product is applied to ensure an even application at the recommended rate.

Application Methods

OrganiBOR[®] can be applied as a separate application or as part of a fertiliser mix. If **OrganiBOR[®]** is being mixed with other fertilisers it is important that particle size is similar to ensure an even mix and distribution.

OrganiBOR[®] can be applied by truck, helicopter, plane, small towed spreaders or by hand.



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Trial results

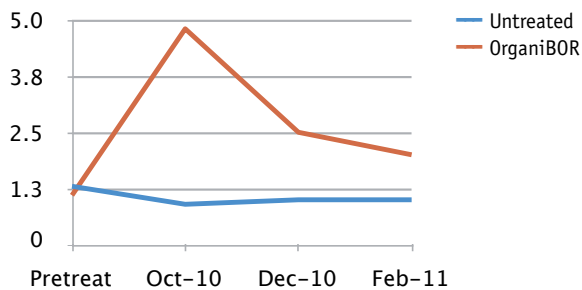
Results from a pasture trial run by Agrivet Services to determine the effectiveness of applying **OrganiBOR®** to pasture.

The trial was laid down in early September 2010 on a dairy farm in Makaroro Road, Central Hawke's Bay.

OrganiBOR® has been applied at the recommended rate of 30kg/h.

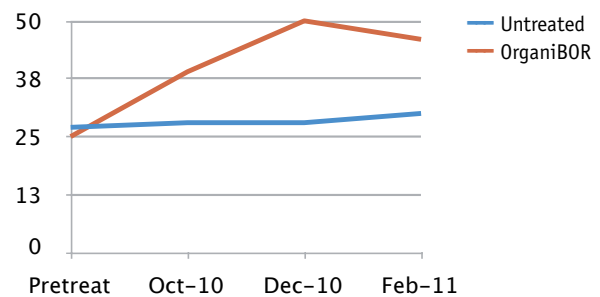
Soil boron levels

As can be seen in the graph the available boron levels in the soil peak at around 8 weeks as the small amount of fine material in the **OrganiBOR®** is utilised by the soil. The boron levels then taper off and stabilise as the boron becomes available as the larger rock particles continue to break down. Because of the low solubility of **OrganiBOR®** not all of the boron is available at once. It is worth pointing out that the starting soil boron level in this trial would not be generally considered deficient, and the peak level of just under 5ppm of boron in the soil would generally be considered toxic, however because of the low impact nature of **OrganiBOR®** there is no sign of toxicity and the pasture has responded positively.



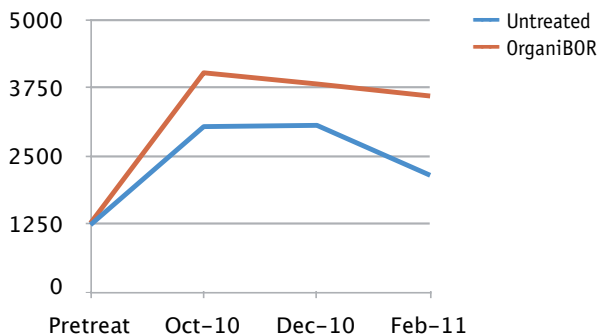
Foliage boron levels – Clover only

Once again the boron foliage levels in the clover at the start of the trial are not considered deficient (Hills recommendations are 18-30ppm) and the clover boron levels are at the top end of this range before application. The **OrganiBOR®** has taken the boron levels in the clover up to a peak of 50ppm with no signs of toxicity at all. As expected the boron level in the clover is now beginning to drop and we expect a steady decline over the next 6 months of the trial.



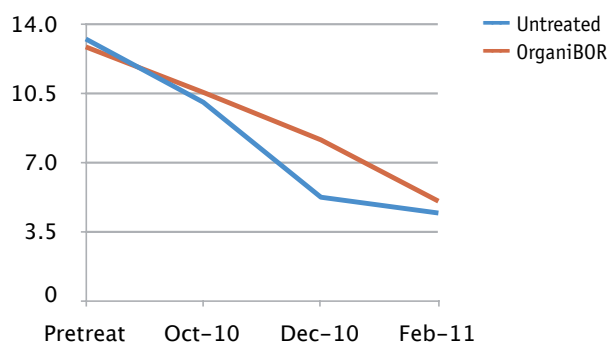
Dry matter

Due to the increase in available boron the dry matter has increased significantly. Unexpectedly this increase in growth is evident across all species of pasture including the monocotyledons like rye grass. It was expected that the excess of boron would promote the growth of the dicotyledons like clover, but monocots generally have a much lower boron requirement unless they have very high pectin levels like an onion. So the increase in growth in the monocots shows that the **OrganiBOR®** is doing more than just supplying more boron to the plants directly. It is also promoting the release of other minerals and elements especially calcium, magnesium and silica. The more balanced boron level in the soil will also promote soil biology which further helps with the nutrient release process.



Soluble sugars

We have also noted a strong increase in soluble sugars in mixed pasture over the course of the trial. This once again follows on from the strong increase dry matter. Boron also plays a role in the photosynthesis process, as soluble sugars are directly related to sunlight. The better the boron levels in the pasture, the better the pasture is able to utilise the available sunlight.



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