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GARDENS NEED BORON

Boron is a semi-metallic trace element which is essential for plant growth and the availability of this micro nutrient in the soil and irrigation water is an important determinant of crop yield and quality. Boron does not appear on Earth in its elemental form but is typically found as boric acid or as borate (boron oxide) minerals. In these forms, boron is widely distributed in nature and is released into the environment (soil, water, air) mainly via geothermal activity and the natural weathering of clay-rich sedimentary rocks.

Boron deficiency has been recognized as one of the most common micro nutrient problems in agriculture with large areas of the world (including New Zealand) being boron deficient. Such deficiencies can be corrected with the use of borate fertilizers and in areas of acute deficiency borates can increase crop yields by 30 to 40 percent. However, the management of boron concentrations in soils can be difficult as a narrow range exists between plant deficiency and toxicity.

Traditionally, the most commonly used boron fertilizers are sodium borates (eg borax, ulexite) and they range from 11.3 to 20.5 % boron. However, due to the high solubility of sodium borates it is difficult to maintain consistent boron concentrations in soil. Thus, sodium borate fertilizers are typically applied frequently and in small quantities to avoid boron toxicity.

A new product; OrganiBOR® is a naturally occurring borate mineral (hydroboracite) mined in the Santa Rosa de Los Pastos Grandes valley in Argentina and is made up of a rare mixture of magnesium and calcium borate. Unlike, sodium borates, hydroboracite is not highly soluble and therefore OrganiBOR® releases boron slowly into the soil, at a rate similar to which most plants uptake boron. OrganiBOR® can, therefore be applied in larger quantities than traditional boron fertilizers and will persist in the soil without the risk of boron toxicity. One application of OrganiBOR® will last anywhere between 3 and 10 years depending on the crop, soil type and climatic conditions. Thus application of OrganiBOR® is simpler for most growers and gardeners and more cost effective, especially when combined with soil and foliage testing to determine exactly when the next application is required. OrganiBOR® is certified for organic use and is suitable for grapes, apples, kiwifruit, avocados, potatoes, tomatoes and almost all other crops grown commercially or in home gardens in New Zealand.

As OrganiBOR® releases boron into the soil it combines with water and forms boric acid and plants take up boron from the soil in this form. Boron plays an essential role in a plant's life cycle. In vascular plants, boron deficiency inhibits leaf expansion, root elongation, apical dominance, flower development, pollen tube growth and, in turn, fruit and seed set. Boron toxicity also results reduced shoot and root growth, with marginal and tip chlorosis and necrosis typically occurring.

While the effects of boron deficiency and toxicity are well documented, the biological mechanisms involving boron which lead to these symptoms are not well understood. Recently, it was shown that boron cross-links pectins in plant cell walls a process that is essential for cell wall synthesis, structure and function. But in addition to this, boron involvement has been implicated in a diverse range of cellular processes including

regulation of gene expression, nucleic acid metabolism, carbohydrate and protein metabolism, indole acetic acid metabolism, membrane integrity and function, phenol metabolism, nitrogen fixation and nitrogen assimilation.

Accumulating evidence also points to boron being important to animals and humans. Boron has been shown to be necessary to complete the life cycles of some higher animals (eg zebra fish and frogs) and boron deprivation has been linked to impaired growth, bone health, brain function and immune response various animal models including humans.

The daily intake of boron by humans can vary widely depending on the proportions of various food groups in their diet. Fruits, leafy vegetables, nuts and legumes are rich in boron, as are wine, cider and beer. For humans, boron intakes of 1-3 mg/day compared to intakes of 0.25-0.5 mg/day reportedly have beneficial effects on bone and brain health. The recent release of OrganiBOR® to the home garden market in one kilo gram containers through some garden centres will allow gardeners to safely apply this essential element to the crops.

It is applied at the rate of 100 grams per ten square metres which means the 1Kg container will do 100 square metres for a 3 to 5 year treatment before the need to apply again.

This will be an absolute boon for home or part time growers that in the past have not been able to easily apply boron, unless they really know their stuff. Sprinkle it about every 3-5 years and forget about it in the knowledge that the plants will be getting the correct amount of boron without risking any sort of toxicity. The boron is of course taken up by the plants and distributed into the fruit or vegetables (or flowers for that matter) which are of course in turn eaten by you and me, so not only will your plants be healthier but you will be too.

The following is a few examples of what happens when plants do not have adequate boron:

Boron deficiency in roses can cause small, thickened, curled, scorched leaves and death to the terminal bud. Death of the terminal bud causes lateral buds to develop contributing to witches broom effect. Boron deficiency can cause "bullheads" (flowers with shortened petals, that are abnormally thick and have the margins roll in). Treat your roses with OrganiBOR® for healthier plants and better flowers.

Boron deficiencies in cauliflowers cause browning of the heads.

In celery, the first symptoms are brownish mottling along the margins of the bud leaves and brittle stems with brown stripes along the ribs. Later, crosswise cracks appear on the stems.

Acute deficiency in corn appears on the newly formed leaves as elongated, watery or transparent stripes; later, the leaves turn white and die. Growing points also die and, in severe cases, sterility is common. If ears develop, they may show corky brown bands at the bases of the kernels.

The term "cork" as used here applies to boron-deficiency symptoms on apples. There are two phases of the disease on the fruits: namely, external cork, characterized by surface spots, and internal cork, characterized by lesions in the core or core and flesh.

To sum up all plants require a certain amount of boron.

Some plants are very sensitive to boron deficiencies and will not produce as they should unless boron is applied.

In a generalization, if you apply OrganiBOR® to your gardens you can expect healthier

plants that grow better and produce bigger crops and better flowers.

If there is adequate supplies of boron all ready present in your gardens then a application of the product will not make any difference. It is very expensive to do the tests in a lab but if you apply OrganiBOR® and then see a difference; then the test is free as you have done it all yourself with the help of your plants who will love you for it. Then forget it for 3 plus years before re-applying.