

Technical Bulletin

RSA Gluco-Bor™

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Introduction

It is widely accepted that there is a synergistic or mutually beneficial relationship between Calcium (Ca) and Boron (B) in plant nutrition. Disorders such as internal brown spot (IBS) in potatoes, blossom end rot in tomatoes, Ca storage disorders in apples and hollow tops in sugar beets are dependent on Ca and B nutrition.

Research has found the relationship between Ca and B is essential for optimum cell structure, especially as it relates to the integrity and quality of plant cells. This is a vital concern in fruiting plants. Tissue analysis data has shown that the level of one of these nutrients affects the level and performance of the other in the plant.

Importance of Ca and B in the Plant

Legumes: Research has shown that Ca and B have a strong effect on legume nodulation and nitrogen fixing capacity. Both nod numbers and adsorption of bacteria to root service were affected by Ca and B nutrition. Both phenomena were inhibited by B deficiency and increased by the addition of Ca. High Ca levels enhanced cell and tissue invasion by *Rhizobium*. The research concluded that that the development of the symbiosis depended on the concentration of Ca and B, and that both nutrients are essential for nodule structure and function.¹

Pollen Tubes: Tip-growing pollen tubes depend on the strength of their apical cell walls. This strength is due to high pectin levels of these apical cells and cross linking

pectin with B and Ca. Under boron deficiency, tip growing pollen tubes burst at their apices². This can result in poor pollination and reduced quality.

Cell Walls: Calcium is found in significant quantities in the middle lamella of plant cells. For a long time, it was thought to be the glue or concrete that held plant cells together. More recent work found that a very complex carbohydrate named rhamogalacturan II (RG-II) cross links with boron to form a fish net like structure that holds all other components of the cell wall in place.

The cell wall can be described as reinforced concrete. Tiny cellulose fibers (RG-II) are the steel rods and the matrix is the concrete. These fibers (RG-II) must be linked together for strength and this is the role of boron³. This has a practical implication when we look at disorders such as hollow heart, internal brown spot, low temperature breakdown and shelf life.

RSA Gluco-Bor

RSA Gluco-Bor was designed to provide the correct amounts of calcium and boron to maximize quality cell development during pollination and early fruit development. In addition, it provides both nutrients to optimize nodulation in legume crops. Gluco-Bor is designed for foliar applications and is rapidly absorbed into the plant. RSA Gluco-Bor offers the highest analysis of boron and calcium in a stable formulation.



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Use Rates and Timing

RSA Gluco-Bor is most often recommended at 1 to 3 quarts per acre. Timing should coincide with pre-bloom and early fruit development.

Precautions

Do not apply with any copper fungicide or other nutritionals that are flowable formulations. Do not apply with any agricultural chemical that is affected by a low pH spray solution.

Contents

Guaranteed Analysis 0-0-0
Calcium (Ca).....6%
Boron (B).....2%
(chloride content less than 11%)
Derived from calcium glucoheptonate and boric acid.

Technical Specifications

Product class	fertilizer
Formulation	liquid
Weight/ gallon	10.8 pounds
Specific gravity	1.29
pH	5-6
Solubility in water	miscible
Appearance	clear to amber
Odor	odorless
Min. storage temp.	32°F
Container size	2 x 2.5 gallons or 250 gallons

Literature Cited

1. M. Redondo-Nieto, A.R. Wilmont, A. El-Hamdaoui, I. Bonilla, L. Bolanos. Relationship between boron and calcium in the N₂ fixing legume-rhizobia symbioses. *Plant, Cell and Environment*. Vol 26, Issue 11, page 1005, 2003.
2. Geitmann A. (1997). Growth and formation of the cell wall in pollen tubes of *Nicotiana tabacum* and *Petunia hybrida*. PhD thesis. Hansel-Hohenhausen Verlag, Egelsbach, Frankfurt.
3. O'Neill, Darvill, Eberhard. Albersheim. Science.

This bulletin provides some technical information and is not intended to give complete information for all applications. Always read and follow label directions.

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