Technical Brochure

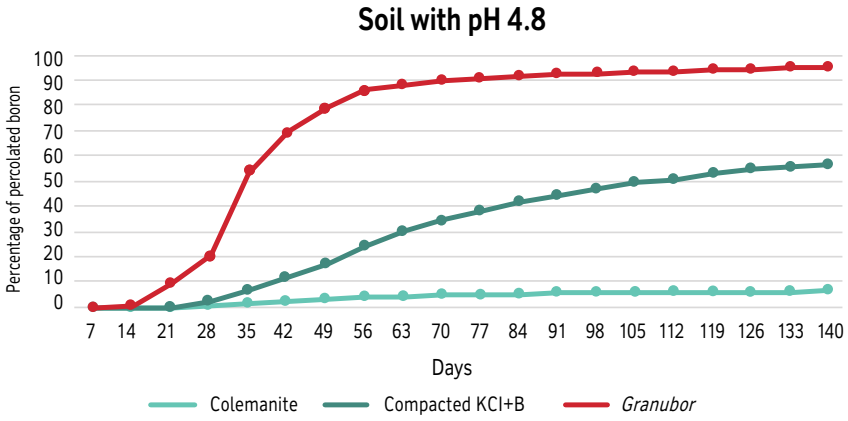
Learn more about borate fertilizers

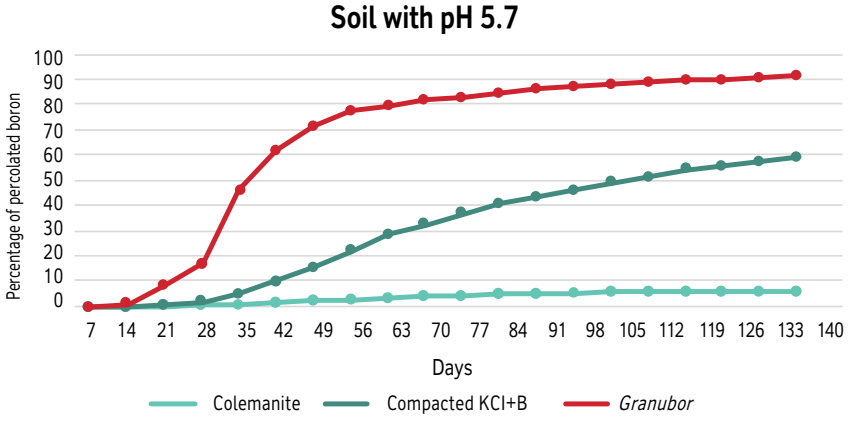
The use of the micronutrient boron (B) in agriculture is already widespread. However, there are several sources on the market that can confuse farmers and agronomists. Depending on the source of boron, its solubility may vary, affecting the recommended rate and management of boron in the field. With the intention of clearing up doubts about different products on the market, Barth & Haliski (2020) conducted a percolation study to compare the release rate of boron from various sources.

The work was conducted in Castro, PR, Brazil, at the laboratory of the Fundação ABC. The soil used had a clay texture. The experiment was conducted under two conditions: Soil without limestone application (pH 4.8) and with soil with limestone applied (pH 5.7). Among the sources tested were the refined boron fertilizer *Granubor*® (15% B), colemanite (12.5% B), and a potassium chloride (KCl)-based technology + two sources of boron in the same granule (58% K_2O and 0.5% B). *Granubor* is a water-soluble sodium tetraborate pentahydrate fertilizer, while colemanite (calcium borate) is a mineral with low water solubility. The two sources of boron present in the compacted KCl+B product are based on anhydrous sodium tetraborate (50%) and colemanite (50%).

The results showed that the mineral colemanite only released 6.9% of boron after 140 days in the soil with pH 4.8 and 6.4% in the soil with pH 5.7. The compacted KCl+B product released 57.5% and 60.1% of boron after 140 days in soils with pH 4.8 and 5.7, respectively. The fertilizer *Granubor* released 95.5% and 92.9% after 140 days, respectively. These results show that the release rate of boron from *Granubor* is best matched to the absorption of boron in annual crops such as cotton.

Percentage of percolated boron in soil under different pH conditions





GRANUBOR®

Technical Brochure

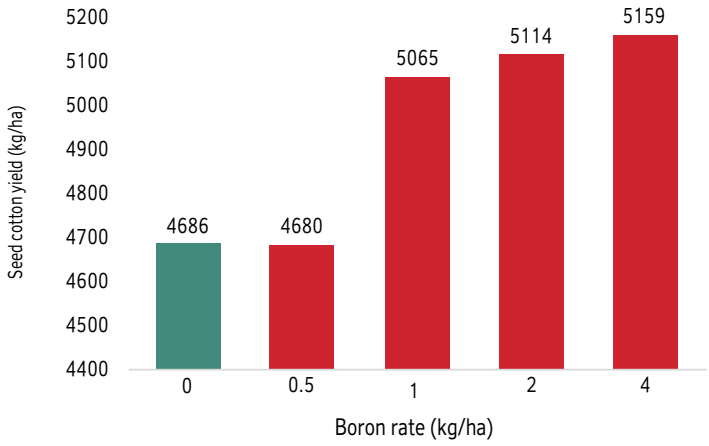
Response of cotton to fertilization with boron

Cotton is a crop that is very sensitive to boron deficiency. The recommended boron rate for cotton is between 2-3 kg B/ha/year. A field study was conducted by Fundação Chapadão on the 2018/2019 crop in the city of Chapadão do Sul – MS, Brazil in order to evaluate the response of the cotton crop to increasing rates of boron. The soil used was Red Dystrophic Latosol with boron content of 0.36 $mg.dm^{-3}$ in the layer from 0 to 20 cm and pH of 5.0.

The rates of boron were 0, 0.5, 1, 2, and 4 kg of B/ha applied at planting with 230 kg of MAP/ha. The experimental design used randomized blocks with five repetitions. The source of boron was *Granubor*. Other fertilizers were applied following the recommendation of the Fundação Chapadão.

The results showed an increase in cotton seed yield of 379 kg/ha with a rate of 1 kg B/ha, while the dose of 2 kg B/ha increased the yield by 428 kg/ha. These findings demonstrate a good response of the cotton crop to boron as well as the performance of *Granubor* for efficiently providing this nutrient to meet the needs of the crop.

Response of the cotton crop to boron fertilization using *Granubor* fertilizer



Granubor is a refined boron fertilizer with 15% B. It is water soluble, making boron available at the time when the cotton crop really needs it.

Sales Contacts

Roger Gunning – North America
roger.gunning@riotinto.com

Lucy Meng – China
lucy.meng@riotinto.com

Weng Kee Ch'ng - SE Asia
wengkee.ch'ng@riotinto.com

Jaime Gonzalez – Latin America
jaime.gonzalez2@riotinto.com

Punit Antal - India
punit.antal@riotinto.com

Agronomy Contacts

Abigail Jiang – China
abigail.jiang@riotinto.com

Weng Kee Ch'ng - SE Asia
wengkee.ch'ng@riotinto.com

Fabiano Silvestrin - Global
fabiano.silvestrin@riotinto.com

Photos of boron deficiency in cotton

Source: Fundação MT, 2020

References

Gabriel Barth and Adriano Haliski, 2020. Fundacão ABC.
Claudinei Kappes, 2019. Fundação Chapadão.