



# Boron for Profitable Alfalfa

- Alfalfa has a higher boron requirement than most crops.
- Results of soil tests and/or plant analyses can be used to assess the available boron status for this crop.
- For optimum yields of high quality alfalfa, it is essential to maintain adequate supplies of available boron throughout the growing season.
- Boron fertilizers can be topdressed with potassium and/or phosphate fertilizers in the spring, or after the first harvest of established alfalfa, or as foliar sprays.

The right amount of boron (B) is crucial to producing high yields of lush, highly digestible alfalfa, says University of Wisconsin Soil Science Professor Emeritus Dr. Emmet Schulte. When a plant is deficient in B, its growing points shut down, and it will eventually die if the deficiency persists. On alfalfa, the symptoms include death of the growing tip, a bushy appearance of the plant, and yellowing of the top leaves.

Alfalfa has a relatively high B requirement.

Schulte notes that B deficiencies in Wisconsin and elsewhere are more widespread than other micronutrient deficiencies today. University of Wisconsin Professor Emeritus of Agronomy Dr. Dwayne Rohweder agrees. "Even though many fields have had long-term manure applications, soil test data show that 97% of Wisconsin's soils are below the recommended B level of 1.5 ppm," he says.

So how do you get just the right amount of B to your plants? Texas A&M researcher Dr. Vincent Haby notes that in addition to testing, growers should take extra care to make sure that B is applied uniformly. "While B could be applied in a band, the best and easiest way to get B to alfalfa is to broadcast it in a blend with the potassium and/or phosphorus that growers need to apply anyway."

As growers use higher-yielding alfalfa varieties and increase their use of potassium and phosphorus, the potential for B deficiency increases. The faster a plant grows and the more it yields, the more B it requires.

## **Boron May Be Present, But Not Available**

Of the total B in the soil, only 0.5%-2.5% is available to plants. Soil organic matter is the storehouse for most of the B in soils. As a result, notes Schulte, most of the available B is in the plow layer, where organic matter content is highest. When the soil surface dries out, plants are unable to feed in the zone where most of the available B is present because of decreased root activity. This can lead to B deficiency in times of drought.

Boron availability is also sensitive to soil pH levels. Crops grown on soils with a pH of 7.0 or higher often show signs of B deficiency. Liming acid soils can decrease B availability and increase a plant's response to added B.

Leaving the soil acid is not an option for alfalfa growers, and it wouldn't help the B situation much anyway. "When soil is left acid, it is more susceptible to B leaching," says Haby.

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### **Manure May Not Be Enough**

Since organic matter is the primary natural source of B, some dairy farmers reason that they can apply all the B their fields need by spreading manure. "Adding organic matter certainly helps," says Haby. "But most alfalfa growers don't have enough manure available at a reasonable cost to get sufficient B into the soil this way." If you are buying manure to put on your fields, Haby recommends that you have it tested for B content. And if your aim is to raise B levels, the most economical way is still to blend *Granubor*® in with your other fertilizer applications.

### **Testing For Boron Deficiency**

A standard soil test is good, but it should be augmented with plant analysis and watching for B-deficiency symptoms.

Boron availability can fluctuate with soil conditions, and levels found in plant tissue will vary with growth stage. According to Schulte, how you interpret a soil test for B depends on soil texture and plant B requirements. Where the crop requirement is high, as in the case of alfalfa, and soil tests low or very low, apply 2 or 3 pounds of B per acre, respectively. If the soil tests excessively high in B, Schulte recommends discontinuing application.

Note the stage of plant development when tissue sampling. If there is any B deficiency, it will occur in the younger tissue, so it is a good practice to sample the top six inches of growth on alfalfa. According to Haby, in seriously B-deficient alfalfa plants, the undersides of young leaves have a rosy red color, whereas the top sides are yellow. Under extreme B deficiency, the young leaves will turn brown and the plant will die.

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