

# Boron in wheat and soybeans

## Wheat

Boron deficiency causes similar symptoms on wheat, barley, oats, and rye.

Symptoms include:

- Small chlorotic spots form between the veins of the youngest, unfolded leaves
- Spots enlarge and coalesce to form white stripes
- Leaf unfolding may be delayed and abnormal
- Ear sterility
- Increased tillering and short internodes
- Better water use efficiency and drought tolerance

Boron deficient wheat is more susceptible to mildew than healthy plants.

## Soybeans

Boron fertilization of soybeans has been shown to increase grain yield at many locations in several states.

Boron is necessary for:

- Stimulation of root growth
- Increased root nodule development for nitrogen fixation
- Increased branching and flowering
- Increased bloom retention
- Increased number of pods
- Better seed development and grain yield

## Timing your boron application

- Boron may be applied in dry or fluid blends. With dry bulk blend fertilizer, broadcasting before planting is recommended using *Granubor*<sup>®</sup>.
- Boron in liquid suspensions may be applied broadcast before planting, banded at planting, or sidedressed using *Fertibor*<sup>®</sup> in suspensions.
- Boron in liquid fertilizers may be broadcast before planting, banded at planting, sidedressed, or fertigated using *Solubor*<sup>®</sup>. Liquid boron fertilizer can be foliarly applied alone or tank mixed with pesticides.\*

\*Foliar sprays should not exceed 0.5 lbs/acre boron per application. Fertigation allows timely split applications of boron when it is needed by the crop and minimizes leaching. Drip irrigation allows incremental applications of 0.1 to 0.25 lbs/acre boron through the drip system. The total amount of boron added in foliar sprays or split applications should not exceed the total broadcast recommendations.

# BROCHURE: BORON IN WHEAT AND SOYBEANS

## Quality is more important than quantity

Boron is a naturally occurring mineral. But refinement and quality control are necessary to provide a source that can:

- Mix well with other nutrients
- Dissolve completely in liquid applications
- Enable uniform application
- Provide maximum availability to crops

Subpar products might cost less up front, but high-quality refined boron is cost competitive when evaluated on a price-per-useable-kilogram basis.

## Low-quality boron can do more harm than good

Not all borate products produce the same quality or level of useable boron. When it comes to boron, product price is not always the best measure of true return on investment (ROI). A less expensive product can end up costing more over the long term if you need to purchase and apply more of it.

## Wheat fertilization

Recommended rates of application

Soil application: Suggested application rates		
	<i>Granubor</i>	<i>Fertibor</i>
lbs/acre	4-13	4-13
kg/ha	4.50 - 14.63	4.50 - 14.63

Foliar application: Suggested application rates	
	<i>Solubor</i>
lbs/acre	3-9
kg/ha	3.375 - 10.125

## Soybean fertilization

Recommended pounds of boron per acre per year

Yield goal bu/acre	Application methods <sup>3</sup>	Boron soil test rating		
		Low	Medium	High
< 30	Broadcast preplant <sup>2</sup>	1.0	0	0
	Band at planting <sup>1</sup>	0.25	0	0
	Sidedress	0.25	0	0
	Foliar <sup>3</sup>	0.25	0	0
30 - 45	Broadcast preplant <sup>2</sup>	1.0	0	0
	Band at planting	0.25	0.25	0
	Sidedress	0.50	0.50	0
	Foliar <sup>3</sup>	0.25	0.25	0
> 45	Broadcast preplant <sup>2</sup>	1.0	1.0	0
	Band at planting <sup>1</sup>	0.25	0.25	0
	Sidedress or fertigate <sup>2</sup>	0.50	0.50	0
	Foliar <sup>3</sup>	0.25	0.25	0.25

<sup>1</sup>Boron banded 2 in. beside and 2 in. below seed row at planting, foliar, and sidedressed boron are all more efficient methods than broadcast before planting.

<sup>2</sup>If soil is limed just before planting, increase preplant broadcast boron to 2 lbs per acre.

<sup>3</sup>Foliar applications may be repeated up to a total of 0.5 lbs per acre boron. Do not exceed 1 lb per acre total boron application by any combination of methods unless lime is applied just before planting.

## About U.S. Borax

U.S. Borax, part of Rio Tinto, is a global leader in the supply and science of borates—naturally-occurring minerals containing boron and other elements. We are 1,000 people serving 650 customers with more than 1,800 delivery locations globally. We supply around 30% of the world's need for refined borates from our worldclass mine in Boron, California, about 100 miles northeast of Los Angeles.

Our local agriculture experts understand the uses and benefits of boron on crops. In addition to a global sales team, we have a number of agronomists on staff to help fertilizer distributors maximize the benefits of borates in agriculture applications. Our ag team can answer individual growers' questions and concerns about their particular crop.

High quality, high reliability, high performance borate products. It's what we're known for.



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