AGRONOMY NOTE

Amount of SOLUBOR® to mix into spray tanks to supply desired boron rates

Overview

- Foliar applications of boron generally are more effective than soil applications in supplying sufficient boron for flowering and reproductive development in crops
- Solubor is highly water soluble, and is commonly applied in foliar sprays. It is also compatible with most pesticides, so it also can be applied in these sprays
- Because the season for the most effective foliar application of boron is short, foliar sprays must be prepared quickly and accurately
- Includes tables listing the amounts of Solubor to mix in spray tanks to supply several commonly used boron application rates

Foliar spray applications generally are more effective per unit of boron than soil applications for most crops. The applied boron is quickly absorbed by the leaves and other tissues and is immediately available for vegetative and reproductive growth.

Foliar sprays are especially important for those plant species in which boron is immobile; boron uptake from the soil is insufficient to supply these plant's needs at critical periods of growth and reproductive development.

Research results have shown that foliar sprays of boron applied just prior to and during bud formation and flowering have increased yields of numerous fruit and grain crops. Boron does not readily move from other parts of the plants to buds and flowers when it is needed for pollen tube growth, pollen production, bloom retention, and seed development.

Responses to foliar boron sprays may occur even when soil and leaf tissue analyses show adequate boron levels, especially in those plant species in which boron is immobile.

Proper timing of foliar sprays is essential to ensure that boron is applied when the need is most critical. The boron fertilizer must be on site, the sprayer must be ready to go and procedures should be in place to keep the sprayer operating during the busy season. Applying the recommended boron rate is critical to obtaining optimum crop yields.

Solubor is highly water soluble and commonly applied in foliar sprays. It is also compatible with most herbicides and insecticides, so they also can be applied in these sprays. This saves separate application costs.

Buffering agents may be needed when *Solubor* is applied with some pesticides whose effectiveness is pH-sensitive. However, the cost per acre of buffers is minor relative to the cost of the pesticides.

Suggested mixing order	
***Solubor* sprays**	***Solubor* with pesticide sprays**
1. Fill the tank about half full with water.	1. Fill the tank about half full with water.
2. Slowly add *Solubor* with agitation.	2. Slowly add *Solubor* with agitation.
3. Top off the tank with water and agitate for 3 - 5 minutes before spraying.	3. Slowly add the pesticide with continued agitation.
	4. Add a buffering agent if the efficacy of the given pesticide is pH-sensitive.
	5. Top off the tank with water and agitate for 3 - 5 minutes before spraying.

Calculations

The amount of *Solubor* to mix in the tank to supply a desired boron rate requires knowledge of the spray rate, the tank size of the sprayer, and the boron concentration in the fertilizer. This calculation is:

Amount of *Solubor* to mix in the spray tank = [(tank size ÷ spray rate) x desired B rate] ÷ B concentration in *Solubor*

Example

How much *Solubor* (20.5% B) should be mixed in a 400-gallon tank with a spray rate of 20 gallons/acre to supply 0.25 lbs of B/acre?

- Spray coverage of a full tank: 400 gallons ÷ 20 gallons/acre = 20 acres
- Amount of boron needed in the spray tank: 20 acres x 0.25 lbs of B/acre = 5.0 lbs of B
- Amount of *Solubor* required: 5.0 lb ÷ 0.205 = 24.4 lbs of *Solubor*

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AGRONOMY NOTE: SOLUBOR MIX IN SPRAY TANKS

Tables 1-3 give the amounts of *Solubor* (20.5% B) to mix in sprayers with various tank sizes and spray rates to supply three commonly used boron application rates. The data in these tables has been rounded to the nearest pound of *Solubor*.

Mixing more precise amounts requires a recalculation using the equation given on the previous page.

Table 1: Amounts of *Solubor* (20.5% B) to mix in spray tanks to supply 0.1 lb of B/acre at various spray rates*								
Size of tank, gallons								
	100	250	400	500	600	800	1000	1200
***Solubor* required, pounds**								
10	4.9	12.2	19.5	24.4	29.3	39.0	48.8	58.5
15	3.3	8.1	13.0	16.3	19.5	26.0	32.5	39.0
20	2.4	6.1	9.8	12.2	14.6	19.5	24.4	29.3
25	2.0	4.9	7.8	9.8	11.7	15.6	19.5	23.4
30	1.6	4.1	6.5	8.1	9.8	13.0	16.3	19.5
40	1.2	3.0	4.9	6.1	7.3	9.8	12.2	14.6
50	1.0	2.4	3.9	4.9	5.9	7.8	9.8	11.7

Table 2: Amounts of *Solubor* (20.5% B) to mix in spray tanks to supply 0.25 lb of B/acre at various spray rates*								
Size of tank, gallons								
	100	250	400	500	600	800	1000	1200
***Solubor* required, pounds**								
10	12.2	30.5	48.8	61.0	73.2	97.6	122.0	146.3
15	8.1	20.3	32.5	40.7	48.8	65.0	82.3	97.6
20	6.1	15.2	24.4	30.5	36.6	48.8	61.0	73.2
25	4.9	12.2	19.5	24.4	29.3	39.0	48.8	58.5
30	4.1	10.2	16.3	20.3	24.4	32.5	40.7	48.8
40	3.0	7.6	12.2	15.2	18.3	24.4	30.5	36.6
50	2.4	6.1	9.8	12.2	14.6	19.5	24.4	29.3

*For tank sizes greater than 400 gallons, add the amounts of Solubor for the desired spray rate from those columns which will add up to the size of a larger spray tank.

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Table 3: Amounts of *Solubor* (20.5% B) to mix in spray tanks to supply 0.5 lb of B/acre at various spray rates*								
Size of tank, gallons								
	100	250	400	500	600	800	1000	1200
***Solubor* required, pounds**								
10	24.4	61.0	97.6	122.0	146.3	198.1	243.9	292.7
15	16.3	40.7	65.0	81.3	97.6	130.1	162.6	195.1
20	12.2	30.5	48.8	61.0	73.2	97.6	122.0	146.3
25	9.8	24.4	39.0	48.8	58.5	78.0	97.6	117.1
30	8.1	20.3	32.5	40.7	48.8	65.0	81.3	97.6
40	6.1	15.2	24.4	30.5	36.6	48.8	61.0	73.2
50	4.9	12.2	19.5	24.4	29.3	39.0	48.8	58.5

*For tank sizes greater than 400 gallons, add the amounts of Solubor for the desired spray rate from those columns which will add up to the size of a larger spray tank.

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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