

# **BORON DEFICIENCY IN TOBACCO**

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Andy Bailey, Professor and Extension Tobacco Specialist, University of Tennessee and University of Kentucky Boron is a micronutrient used by plants to develop and maintain strong cell walls, produce fruits and seeds, and transport sugars.

Boron deficiency in tobacco is a relatively uncommon occurrence. However, instances of boron deficiency in tobacco occur every season, and if not addressed, can significantly reduce tobacco yields and quality. Boron deficiency can be prevented easily in most situations through routine soil monitoring. In fields where boron deficiency is present, foliar treatments are available to minimize yield loss in plants showing deficiency symptoms and to prevent presentation of symptoms in other plants.





Figure 1.



Figure 2.



Figure 3.



Figure 4.

#### **BORON DEFICIENCY SYMPTOMS**

## Several symptoms of boron deficiency in tobacco include:

- Bud twisting (Figure 1).
- Bud termination resembling fatty alcohol damage on a small young bud and resulting in a short plant with reduced leaf number. Leaves begin to mature faster than those of unaffected plants, and lateral buds rapidly develop into suckers (*Figures 2, 3, 4*).
- Callouses or scabbing on the back of leaf midveins of the affected tobacco plant (*Figure 5*).
- Discolored or hollow pith in the stalk near the affected terminal or leaves, which is evident upon splitting the stalk (*Figure 6*).
- Leaf breakage approximately 2 inches from the leaf axil where the leaf attaches to the stalk. This is one of the most common symptoms of boron deficiency in tobacco. It differs from injury caused by skunks in which leaf breakage typically occurs at the leaf base at the point of attachment to the stalk (*Figures 7, 8*).







Figure 6.



Figure 7.



Figure 8.



Figure 9.

#### **BORON TOXICITY**

While plants only need small amounts of boron, there is a risk of boron toxicity in most crops including tobacco. Toxicity symptoms include severe burning and even plant death. Crop damage from boron toxicity can be much worse than damage due to boron deficiency. For this reason, tobacco should not receive more than 1 to 1.5 pounds of boron per acre in a single season, and not more than 1 pound of boron per acre in any single application (*Figure 9*).

#### PREVENTION AND MANAGEMENT OF BORON DEFICIENCY

#### Prevention

Timely soil testing with analysis of soil boron levels – and amending the soil according to soil test results – is a fundamental agronomic practice that should be performed in the production of tobacco. Avoid over-liming soils used for tobacco. The target soil pH range for tobacco production is 6.2 to 6.6. Boron deficiency is most often associated with a soil pH above 7, as boron becomes less available for plant uptake at high pH. Therefore, if the soil test results indicate a pH above 7, or if the site has a history of tobacco plants exhibiting boron deficiency symptoms, a broadcast application of 1 pound of boron per acre either alone or along with other essential mineral nutrients is an option. Boron also can be applied at rates from 0.25 to 1 pound boron per acre as a broadcast spray before transplanting, and it even can be tank-mixed with standard preplant tobacco herbicides. Boron also can be included in transplant water applications. However, tobacco plants are much more sensitive to boron toxicity in transplant water applications than any other application method (Figure 9). For this reason, no more than 0.25 pounds boron per acre should be used in transplant water applications.

#### **Managing Existing Boron Deficiency**

In fields in which plants have existing boron deficiency symptoms, a foliar application of 0.25 to 0.5 pounds of boron per acre will help stop further development of symptoms and allow tobacco to resume normal growth and development. However, boron deficiency symptoms existing prior to foliar boron application will remain. When making a foliar boron application, use a product that is at least 10 percent boron. Examples include Solubor and Borosol. Many readily available foliar nutritional products contain less — and sometimes much less — than 10 percent boron. In order to apply 0.25 to 0.5 pounds of boron per acre, an excessive and often cost-prohibitive amount of these low-boron products must be used. If a product containing at least 10 percent boron is not available at a farm supply retail center or from a local distributor, then such a product may be ordered online.

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