

TOBACCO

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“Tobacco (*Nicotiana tabacum* L.) is a significant agricultural product worldwide due to its economic value. According to data from the Food and Agriculture Organization [FAO], it is cultivated in over 100 countries across 3.2 million hectares, yielding more than 6 million tons. Like all plants, tobacco needs balanced nutrition for optimal growth, development, and resistance to environmental stresses and diseases. Micronutrients (including Boron) often play a crucial yet overlooked role in maintaining plant health and maximizing yield.

Boron [B] contributes to disease reduction by strengthening physiological defense mechanisms and directly interacting with pathogens. Boron is especially vital for cell wall synthesis and integrity, including lignification, and it plays a role in RNA metabolism, respiration, sugar transport, and the improvement of overall crop quality and yield. Furthermore, it promotes pollen germination and pollen tube elongation, which are critical for successful fruit set, and it is effective in pollination.

Boron’s contribution to disease resistance in plants is multifaceted. It strengthens the cell wall structure by forming carbohydrate-borate complexes; these complexes regulate carbohydrate transport and protein metabolism within the cell wall. Boron also affects the permeability, stability, and function of cell membranes and plays a role in phenol and lignin metabolism. Boron can increase resistance to fungal diseases in various plant species.

Soil Application:

0.5-1.0 kg ha⁻¹ of B can be applied before or during sowing.

Foil Application:

30 grams of B dissolved in 100 liters of water can be applied 10-15 days before blossoming.

Boron deficiency is a significant problem in tobacco plants, which have a high boron requirement. Boron deficiency is relatively rare in tobacco but its effects can be mitigated through foliar applications of boron-containing fertilizers. A solution containing 300 ppm of Boron is recommended for foliar fertilization. This solution can be prepared by dissolving 30 grams of Boron in 100 liters of water.

Boron deficiency reduces shoot and root weights, causes a drop in leaf nitrate content, and leads to an undesirably high starch content in leaves. This situation results in financial losses by decreasing both yield and crop quality.

Furthermore, similar to the tea plant, boron deficiency negatively affects many phenolic compounds and the enzyme activities involved in their biosynthesis. These negative effects directly decrease tobacco quality.

Symptoms of boron deficiency in tobacco include the distortion, curling, and yellowish-green color of young leaves; thickening of the stem; and the emergence and rapid death of lateral shoots due to the death of the growth point.



It has been shown that boron nutrition can increase the nitrogen content in tobacco, and improve both yield and crop quality. The optimal provision of boron can significantly improve the yield and quality performance of tobacco.

A dose of 1 kg of B per hectare has been recommended for tobacco plants. Soil analysis must be done before boron fertilization to determine the boron needs of the soil.

Boron is an indispensable micronutrient for tobacco plants, affecting not only growth and yield but also the plant's ability to withstand disease. Properly monitoring boron levels, avoiding both deficiency and toxicity, and ensuring correct boron nutrition are critical for sustainable tobacco production.

