

COLZA

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Colza is known as one of the plants that need the most boron. Thus, it has very high sensitivity to boron deficiency. The most obvious deficiency symptoms appear as slowing/stopping of root, shoot and flower development and low yield.

B [Boron] nutrition of colza plant is of great importance due to its hypersensitivity to boron deficiency. When colza fed below the optimum boron requirement, typical boron deficiency symptoms are seen primarily in the roots, actively growing meristematic organs of the green parts (youngest leaves, growth tips, etc.) and generative organs. In case of boron deficiency, elongation and division of cells is limited and negative effects on the formation and function of cell walls occur. This situation strongly slows down the growth of fast growing and developing roots and shoots and causes inhibitory effects on pollen tube growth and elongation.

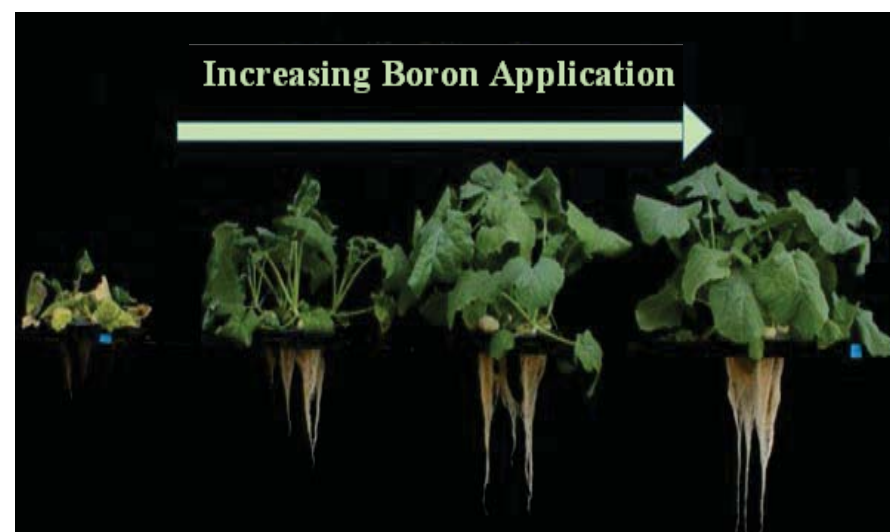


Figure 1. Effect of increasing doses of boron [from left to right: very low, marginal, moderate and sufficient] on green parts and root growth of colza seed [Çakmak et al. 2022; unpublished results].

In the case of a very low level of boron in the feeding medium, both root and green part growth completely stop. These observations show that colza is indeed very sensitive to B deficiency [Figure 1].

Soil Application:

1.4-2 kg ha⁻¹ B can be applied before or during sowing.

Foliar Application:

30 grams of B dissolved in 100 liters of water can be applied 10-15 days before blossoming, at the beginning of grain formation.



In cases where boron application is at marginal and moderate levels, if the boron deficiency in colza occurs in the generative period, when root growth is significantly more sensitive than the green part growth, significant decreases and even stops were found in the development of flower organs and seed formation [Çakmak et al, 2022, unpublished study, Figure 1]

In case of boron deficiency, disruption of flower formation in colza, irregular development of flowers, shedding of formed flowers, inhibition of fertilization and seed formation are frequently observed symptoms. After applying 2 μM of the nutrient solution to the colza plant until the rosette formation (bolting) period, boron was not applied again to the plants on the left and 2 μM boron continued to be applied to the plants on the right (Figure 2).



Figure 2. Effect of boron after rosette formation [Çakmak et al. 2022, unpublished results].

The leaf to be selected for analysis is very important in understanding the boron nutrition level of colza plant by leaf analysis. Critical boron concentrations vary greatly according to the age of the leaves sampled. Most of the boron taken up by the roots accumulates in the older leaves due to its inactivity in the phloem of the colza plant. Therefore, such old leaves are insufficient to understand the level of B nutrition of plants. In contrast, immature leaves that are still in the growth phase and the youngest leaves that have completed their growth are the most reliable leaves in determining the level of boron deficiency. In boron deficiency, there are severe pauses and deformations in growth at the growth point with the youngest leaves. This result occurs even though there is sufficient B on the more mature leaves immediately below these youngest leaves. In other words, the boron present in the mature leaves cannot be transported to these young parts of the plant with high boron requirement. Therefore, it shows that in colza and many other plants, it is important to preferably sample young leaves in leaf sampling to understand the boron nutritional status of plants.

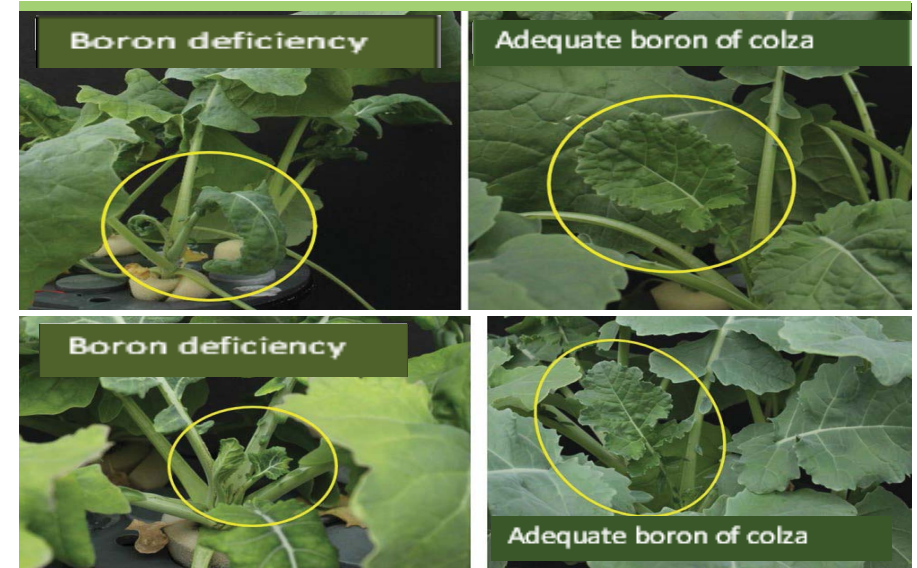


Figure 3. Colza plant in boron deficiency, Colza plant fed with adequate boron, Colza plant in boron deficiency, Colza plant fed with adequate boron [Çakmak et al. 2022; unpublished results].

Depending on the growth rate of the colza plant under boron deficiency conditions, the appearance of cracks on the stem is one of the important symptoms. Due to boron deficiency, cracks and undesired openings occur in fruits as well as in the stem. These physical symptoms coincide with the functions of boron as it is a structural element in the plant and is determinant on the stability of the cell walls. Soil analysis must be done before boron fertilization to determine the boron needs of the soil.