

Zinc

Micronutrient Profile



Zinc (Zn) is essential for high crop yields and quality. It is the most commonly deficient micronutrient in crop production. This important micronutrient impacts growth regulation and metabolism. However, factors like soil pH, texture, temperature, and phosphorus levels can impact Zn availability.

Zinc's Function in Supporting Plant Growth

Zinc helps plants produce vital enzymes that support photosynthesis, regulate protein synthesis, and support growth regulation. The most distinct zinc deficiency symptom is shortening of internodes and "little leaf", which is related to a lack of production of the plant growth hormone indole acetic acid (IAA). Indole acetic acid induces cell elongation and division. Zinc also impacts the following:



Chlorophyll
Formation



Carbohydrate
Synthesis



Protein
Synthesis



Pollen
Development



Bud
Differentiation



Fruit Set

Without sufficient Zn, crop production will be greatly reduced, since this micronutrient is essential for many critical functions

Factors That Affect Zinc Availability

Soil and environmental conditions are significant factors impacting zinc availability. For example, sandy soils with cool temperatures typically can't supply adequate zinc to meet a crop's requirement. The following factors can reduce zinc availability:

- High pH
- Sandy soil
- High free lime (CaCO_3)
- Land leveling or soil erosion exposing calcareous subsoils
- High concentrations of phosphorus with low zinc
- Interactions with Cu, Fe, and Mn
- Cooler soil temperatures decreasing solubility and diffusion

Plant roots take up Zn primarily as a divalent cation (Zn^{2+}) and in some cases Zn complexes. Zinc is primarily transported to plant roots by diffusion. Complexing agents or chelates assist in the movement of Zn to plant roots. When Zn is not available for uptake due to factors mentioned above, foliar application can be effective, as it bypasses the complex chemistry of the soil. Zinc ions and zinc complexes can enter plant leaves where they can be metabolized or translocated.

Impact of Zinc Deficiency on Crop Yield

Zinc deficiencies prevent normal crop development, leading to reduced yield and quality. In acute cases, deficiency leads to crop death. In a [2019 study](#), researchers observed a 57% reduction in pecan yield when trees were exposed to severe Zinc deficiency, and in another [2020 study](#), researchers found soil-applied Zinc to increase corn yield by up to 16.7%.

Common Signs of Zinc Deficiency

Zinc is phloem immobile in the plant. Therefore, Zn deficiency shows up on the new growth and is expressed as interveinal chlorosis on most crops. Zinc deficiencies also cause stunted plants and shortened inter-node length. On almonds and fruit trees, “little leaf” and “rossetting”, or clustering of leaves at the tips of new branch growth, are associated with Zn deficiency.

When trying to diagnose if your crops are Zinc-deficient, it is necessary to test plant tissue along with the soil. Performing both tests in tandem will give a more accurate picture of what is affecting plant health.



Pecan



Almond



Apple

Correcting Zinc Deficiency in Your Crops

Correcting zinc deficiencies through foliar application of zinc solutions is an effective way to provide crops with the Zn they need to meet crop demands. In field trials, the [foliar application of Zn](#) often performed better than other fertilizer options.

Our team at QualiTech has the resources you need for both organic and conventional crops. [Talk to a certified agronomist](#) to discuss your needs today.