

The importance of zinc

Growers, agronomists and researchers have for many years recognised zinc deficiencies in calcareous black soils as being a cause and contributing factor to yield decline in cotton crops.

Zinc is an essential element for plant growth. It is important in the intake of water by the plant and in its efficient use. Zinc also regulates the plant's growth rate and development through the correct functioning of enzyme systems. It is directly involved in the metabolism of nitrogen to produce proteins and starch.

Cotton crops deficient in zinc often have smaller leaves that are a bronzy yellow colour especially between the veins with the older leaves tending to be thickened, brittle and cupped upwards. In severe deficiencies young seedlings are unthrifty and often die.

Zinc deficiencies appear to be more likely to occur in the following situations:

- High phosphate, high pH (alkaline) soils;
- Cold wet and poorly aerated soils, low in vesicular arbuscular mycorrhiza (VAM);
- Areas where the topsoil has been removed by either erosion or by land levelling;
- Long fallows where VAM is low; and,
- Where restriction to root growth has occurred such as wheel tracks, chemical damage, hard pans or waterlogging.

There are many methods of correcting zinc deficiencies and the treatment will depend on the severity of the deficiency, timing, effectiveness, and the cost/benefit outcomes.

Foliar treatment can provide short term benefits to a crop but repeated applications may be required to correct the problem.

Starter fertilisers containing zinc may be applied at sowing providing the young seedling with enough zinc to survive a cold wet start, but starters may not supply enough zinc to the plant as it continues to grow.

One of the best long term approaches to correcting zinc deficiencies is by applying preventative treatments of zinc oxide during the soil preparation stage well before planting.

In the past many zinc oxide compounds contained unwanted heavy metals and consisted of coarse material (like sand) which made it rather ineffective and very difficult to apply evenly over the field.

But now high quality, extremely fine grade zinc oxide can be applied quickly and evenly using special spray equipment such as that used by Goddards in Narrabri and Gunnedah. Over the past 15 years, they have perfected this method which involves keeping the zinc oxide in complete suspension while the ground unit sprays out the slurry through 24 metre booms. This form of zinc is now also being used through aircraft.

Zinc is less mobile in the soil than phosphorus and so incorporation into the root zone is very important. Ideally soil treatments such as zinc oxide are best applied on the flat prior to hilling or bedding up. This allows the zinc to be incorporated throughout the hill or bed and is therefore in close proximity to the foraging roots of the cotton plant.