FACT SHEET
JUNE 2024

COPPER

COPPER IN SOILS

Copper (Cu) is present in relatively small amounts in soils. Sandy soils that are low in organic matter have the lowest concentrations. Elevated soil concentrations of copper are found in regions where copper rich ores are found, for example with silver, lead, or zinc, and where copper fungicides have been routinely used.

Copper exists in various oxidation states, with the divalent ion (Cu^{2+}), the form taken up by plants, being the most common. Copper is tightly held in clay and organic colloids in the soil. Consequently, it is immobile in the soil and low concentrations are found in the soil solution. Copper is not easily lost by leaching.

Copper is most available for plant uptake in acid soils. Its availability declines as the soil pH increases above 7.0 due to stronger copper adsorption.

COPPER IN PLANTS

Copper is a trace element. It is taken up by plants in small quantities and is essential in both plant and animal nutrition. Copper plays an important role in metabolic processes such as enzyme and chlorophyll formation, photosynthesis, respiration, and the metabolism of carbohydrates and some proteins.

Copper is not readily mobile in plants. Its movement is strongly dependent on the copper status of the plant. In wheat plants well supplied with copper, movement occurs from leaves to the grain, but in deficient plants, copper is relatively immobile. An adequate supply of copper is essential at pollination in wheat. A deficiency may result in barren heads.

DEFICIENCY SYMPTOMS

As copper is relatively immobile in plants, deficiency symptoms first develop on the growing points and the leaves. Common symptoms are chlorosis or yellowing, first developing on the leaf edges. In cereals, white leaf tips and narrow, twisted leaves that fail to unroll may be evident at tillering. Ears may form but not fill. In extreme cases ear or panicle formation is absent. In sugarcane the symptoms are known as “Droopy-top”. “Die-back” occurs in tree crops.

Plant deficiencies of copper are most likely to occur in sandy soils and in alkaline soils.

In Australia, copper deficiency occurs less commonly in crops than does zinc, but more often than deficiencies of the other metallic trace elements, iron, and manganese. Crops differ in their sensitivity to copper deficiency. Copper responsive crops include oats, wheat and lucerne, whilst potatoes and soybeans are less likely to respond.

TOXICITY SYMPTOMS

The inhibition of root and shoot growth is one of the first symptoms of copper toxicity, especially in bean, citrus and maize crops. Copper can displace metal ions (particularly iron) from their centres of activity within the plant, resulting in induced iron deficiency (chlorosis).

The range between deficiency and toxicity can be narrow but varies. Some plant species are capable of accumulating copper to levels two to fifty times the normal value of copper in leaf dry matter without toxicity occurring. Legumes are particularly susceptible to high copper, while grape vines are reported to be the most tolerant.

Pasture species may be unaffected by copper concentrations that are harmful to livestock.

APPLICATION

Copper can be applied to the soil or as foliar sprays. If high enough rates are applied, soil applications can remain effective for several years, while foliar applications need to be applied at least annually. Copper will not need to be included in fertiliser programs where copper fungicides are routinely sprayed in horticultural crops.

Soil application

As micronutrients (or trace elements) such as copper are typically applied at low rates, they are usually applied with some form of carrier, e.g. with other fertilisers, and in solution with water.

Copper Granules, a solid copper oxysulphate product containing 25% Cu, is used by Incitec Pivot in fertiliser blends where copper is required. A liquid addition of copper is also available that may be coated onto fertiliser granules.

Foliar sprays

Bluestone or Copper sulphate pentahydrate (25% Cu) may be used where copper is to be applied in solution (dissolved in water) to the soil or foliage. Bluestone is very corrosive, and the advice of equipment manufacturers should be sought before use. Finely divided suspension grades of insoluble copper compounds may be used as an alternative, e.g. copper oxide, and copper hydroxide, to reduce the risk of corrosion.

Chelates may also be used for soil and foliar application. Chelated trace elements are less subject to fixation in the soil than is sulphate but are more costly.

SAFETY DIRECTIONS

Refer to the Safety Data Sheet (SDS) for more detailed safety advice. Before use, read the Product Label and the SDS. Use safe work practices and avoid contact with the eyes and skin. Avoid ingestion and inhaling dust. Protective clothing, eyewear and dust masks should always be used when dealing with this product. Observe good personal hygiene, including washing hands after use. Avoid loss of fertiliser to waterways.

WARNING

This document contains information of a general nature. Before using fertiliser seek independent agronomic advice. Fertiliser programs may need to be varied depending on the plants being grown,

climatic and soil conditions, application methods, irrigation, agricultural and livestock management practices, the soil's fertility, and cultural practices. ('Unforeseen Elements')

Fertiliser may burn and/or damage crop roots or foliage. Foliar burn to the leaves, fruit or other plant parts is most likely to occur when fertilisers are foliar applied at high concentrations and/or on a regular basis, different products are mixed and sprayed together at cumulatively high rates, the water is of poor quality, or the spray is applied under hot dry conditions, e.g. in the heat of the day.

Fertiliser and supplements may affect animal health. Seek independent advice before using any supplements in livestock rations.

DISCLAIMER

As Unforeseen Elements are beyond the control of Incitec Pivot Limited, in no event Incitec Pivot Limited and its related bodies corporate be liable or accept any responsibility whatsoever for any direct, indirect, punitive, incidental, special or consequential damages (including but not limited to loss of revenue, crops and livestock), in respect of the illness, injury or death of a person, damage to property (including of a third party), or any other loss whatsoever arising out of or connected with the use or misuse of this fertiliser, or its transport, storage, handling or application. Where Incitec Pivot Limited and its related bodies corporate's liability cannot be lawfully excused, it and its related bodies corporate's liability shall be limited to the replacement of, or cost of the fertiliser supplied. The buyer accepts and uses this product subject to these conditions.

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