

THE EFFECT OF NUTRITION ON CROP TOLERANCE TO HERBICIDES.

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Herbicide damage has occurred in some cases when growers have used trifluralin and alachlor in transplanted cabbages and cauliflowers on krasnozem soils in the Redlands district. The symptoms of damage observed resembled those of molybdenum and boron deficiency. These crops have a particularly high demand for molybdenum, which is often accentuated by the low pH values of these krasnozem soils. A survey of grower cultural practices revealed that many were omitting some or all of their seedbed trace element sprays. It is a recommended practice on these soils to spray brassica crops with molybdate and borax sprays both in the seedbed and in the field.

A glasshouse hydroponics trial to study the effects of molybdenum and boron deficiency on trifluralin damage in cauliflowers was commenced in 1974 and continued in 1975. In this trial cauliflowers were grown in aerated solution cultures and received a foliar application of trifluralin at transplanting stage. Two weeks after spraying the plants were assessed for leaf thickening, chlorosis, and heart deformity. A definite relationship was found to exist between trifluralin damage and molybdenum deficiency; the damage being more severe when plants were molybdenum deficient.

Trifluralin belongs to the dinitroaniline group of herbicides, which are known to reduce protein synthesis (Probst and Tepe 1969). Recent work at the University of Nebraska by Klepper (1974) has shown that a wide variety of herbicides interfere in the normal process of nitrite reduction, which can result in nitrite accumulation. Free nitrite within the plant can help to explain the symptoms of injury. This could explain the role of molybdenum deficiency, which also reduces protein synthesis, causing nitrate accumulation.

In a recent field trial, trifluralin damage was more severe when the soil was not limed. Liming these krasnozem soils increases pH and makes molybdenum more readily available to the plant.

Herbicides which perform well during initial testing under carefully controlled conditions often perform less consistently when tested on growers' properties, resulting in a breakdown in weed control properties or a lower level of crop tolerance.