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Overview of Past Research and Trends in Micronutrient Deficiency in the South African Sugar Industry

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Abstract

Over the past four decades fairly extensive research has been carried out on the micronutrient requirement of sugarcane in the South African Sugar Industry. The first indication of a benefit to a micronutrient treatment in South Africa was in 1956 when a small area of cane growing on granite derived soils near Sezela were found to be deficient in Cu and a foliar application of copper sulphate gave a quick and spectacular response. From 1961 onwards the value of zinc was demonstrated when four observation trials in the Upper Tongaat area produced dramatic responses to furrow applications and top-dressings of 55kg zinc sulphate per hectare and to a foliar spray of a 1% zinc sulphate in solution. Nutrient surveys conducted in 1965 and in 1969 showed that Zn deficiency was initially fairly widespread in cane grown in the Midland's mistbelt and Upper Tongaat areas mainly on the humic Inanda soils. During the seventies increased use of zincated fertilizers such as zincated 2:3:2 and 2:3:4 mixtures have led to the current favourable situation of near zero Zn deficiency in commercially grown cane in these and other areas.

The results of past trials in which a range of micronutrients were tested are summarized in the paper and apart from Zn, marked responses to foliar applications of ferrous sulphate have also been obtained on young cane showing the characteristic symptoms of interveinal chlorosis. Regular nutrient surveys conducted since 1967, based on foliar diagnosis, have confirmed that there is no widespread deficiency of micronutrients but that there is an upward trend in the incidence of marginal leaf Fe, Mn and Cu levels in sugarcane. Field trials although costly and laborious to carry out, remain the basis of fertilizer research and will still be necessary to guide the industry and FAS towards the maximum economic yields. With the prospect of declining reserves of micronutrients in soils due to factors such as monocropping, introduction of high yielding varieties, the use of concentrated fertilizers and anti-pollution legislation, there can be little doubt that micronutrients are destined to become more important in the sugar industry. Nutrient surveys should be carried out regularly to monitor the situation.