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MINERAL NUTRIENT COMPOSITION OF SOYBEAN GROWN IN ACID SOIL AS AFFECTED BY RATE AND Ca:Mg RATIO OF THE LIMING MATERIAL [1/]

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1. INTRODUCTION

Soybean is one of the major crops worldwide, and in many tropical regions it is grown on soils considered inadequate for proper plant growth due to low pH's and high levels of exchangeable Al. Many experiments have shown that soil acidity and, or, Al toxicity reduces soybean production (*9, 16, 20, 21, 22, 28*) and alters nutrient uptake efficiency of most crop plants (*2, 3, 12*). In soils, lime has been shown to reduce availability of exchangeable K and Al (*19*) as well as those of Fe, Mn, Zn, and Cu (*7*). Soybean requires Ca for good nodulation by *Bradyrhizobium (21)*; although the bacterium may need only trace amounts (*24*). When soil correction is done with calcite only, there is competitive inhibition with Mg so that frequently Mg deficiencies can be induced (*1, 27*). Magnesium is required for chlorophyll formation (*6*), for enzyme activities (*18*), nodulation and N_2 fixation (*1*), and is essential for growth of Rhizobium (*23, 24*). It has been observed that at equal concentrations, Mg can be as effective as Ca in protecting corn roots from Al toxicity (*26*). However, high concentrations of Mg with respect to calcium can reduce soybean growth (*17*). Based on these findings both

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4. SUMMARY

The effect of four rates and five ratios of Ca:Mg of the liming material on mineral nutrient composition of soybean var UFV-1 grown in a Typic Haplorthox soil was studied under greenhouse conditions. Tissue calcium increased with addition of Ca+Mg while Mg increased linearly with increased Mg application. Phosphorus remained constant independent of treatment while K concentrations fluctuated. Iron concentration was reduced at the highest lime rate, which coincided with soil pH values above 6.0. Zinc and Mn concentrations were reduced and Cu was increased by increasing Ca+Mg quantities in the soil. Zinc and Cu concentrations were inversely correlated.

5. RESUMO

(EFEITO DA DOSE E DA RELAÇÃO Ca:Mg DO CALCÁRIO SOBRE A COMPOSIÇÃO DE NUTRIENTES MINERAIS EM SOJA PLANTADA EM SOLO ÁCIDO)

O efeito de quatro doses de calcário em cinco relações Ca:Mg foi estudado sobre a nutrição mineral da soja, variedade UFV-1, cultivada em um Latossolo Vermelho-Amarelo álico em condições de casa de vegetação. A concentração de Ca na parte aérea aumentou com a adição de Ca+Mg, enquanto a de Mg aumentou linearmente com aumentos na aplicação de Mg. As concentrações de P mantiveram-se constantes, independentemente do tratamento, e as de K variaram. As concentrações de Fe, Zn e Mn foram reduzidas e as de Cu aumentaram com as maiores doses de calcário, o que coincidiu com valores de pH no solo acima de 6,0. Porém, correlação negativa foi obtida apenas entre teores de Zn e Cu.

6. LITERATURE CITED

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