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Area of work: Forage and pasture

Morphological and physiological evaluation of forage sorghum grown in soil saturated with magnesium and treated with different doses of gypsum and dairy sludge.

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In addition to sodium, excess magnesium contributes to soil structural instability that promotes the dispersion of clay (especially in sodic soils), causing crusting, erosion, and also restricts the absorption of nutrients from vegetables, causing negative effects on the morphological and physiological characteristics of the plant. Soil degradation by salinization is the main reason for the loss of agricultural productivity and other environmental implications in many arid and semi-arid regions, Therefore, the objective was to evaluate the influence of different doses of gypsum and dairy sludge on the morphological and physiological characteristics of forage sorghum (*Sorghum bicolor* (L)), grown in soil with magnesium saturation. The experiment was conducted in a greenhouse at the Federal University of Agreste de Pernambuco, Pernambuco, Brasil, using forage sorghum cultivar IPA 467-4-2. The soil used meets the characteristics of a soil affected by magnesium. Seven treatments were evaluated, each treatment with three replications, characterized by a 15 L pot, with 12 kg of soil and a forage sorghum plant. Six treatments homogeneizador the soil ten days before planting the seeds, including dairy sludge 100% of the requirement; agricultural plaster 100% necessary; 100% of the dairy sludge requirement together with 100; 75; 50 and 25% of the plaster requirement. A treatment with gypsum homogenized to the soil 10 days before planting and dairy sludge added to the soil surface 20 days after seedling emergence, and the control treatment without any type of conditioner. Before planting in all treatments, foundation fertilization was applied. As recommended by soil analysis. The doses of the conditioners followed the recommendations of the National Environmental Council and the Pernambuco Agronomic Institute. The evaluations were carried out 42 days after the beginning of the experimental period (ten days after planting), all plants were evaluated regarding plant height, width and length of fully expanded leaf, number of total leaves, tiller number, chlorophyll a and b. The dairy sludge and dairy logo conditioners together with the plaster in the different doses promoted better development/growth of forage sorghum plants, compared to treatments with only the application of gypsum and the control. Among the treatments, dairy sludge plus 50% of the recommended dose of gypsum stands out. Because they provide lower costs for the producer, in addition to an increase of 126.4; 311.42; 88.75; 356.91; 266.00; 13.34 and 23.90%, for the variables plant height, width and length of fully expanded leaf, number of total leaves, tiller number, chlorophyll a and b, respectively. The different conditioners were able to help mitigate the effects of magnesium saturation, with emphasis on the dairy sludge treatment plus 50% of the need for gypsum, which in addition to promoting maximum plant development, would reduce field costs.
Keywords: *Sorghum bicolor* (L.), soil conditioners, nutrient absorption.

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