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Area of work: Forage farming

Morphological development of forage sorghum (*Sorghum bicolor* (L.)) seedlings in soil saturated with magnesium and treated with gypsum and dairy sludge.

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Forage sorghum (*Sorghum bicolor* (L.)) has a wide versatility of use in animal feed, this versatility takes into account its significant potential in terms of biomass and grain production. Accordingly, such productivity is associated with its plastic profile of adaptability to biotic and abiotic factors such as climate, temperature, pests and soils saturated with salts, including magnesium. Excess magnesium in the soil restricts the absorption of nutrients by plants, causing negative effects on germination and the morphological and physiological characteristics of plants. In this sense, the objective was to evaluate the morphological development of forage sorghum seedlings grown in soil with excess magnesium, in response to different levels of soil conditioners, dairy sludge and agricultural gypsum. The experiment was conducted in a greenhouse at the Federal University of Agreste de Pernambuco, Pernambuco, Brazil. The sorghum variety used was the IPA 467-4-2 cultivar. The design adopted was a randomized block design, with seven treatments, with three replications each. Each replication consisted of a 15 L pot, with 12 kg of soil and 15 seeds, sown 2 cm deep. Among the treatments, five with conditioners homogenized into the soil ten days before planting the seeds, with 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. And the treatment control without any type of conditioner. The doses of the conditioners followed the recommendations of the National Environmental Council and the Pernambuco Agronomic Institute. On the day of sowing, foundation fertilization was applied to all treatments as recommended by the soil analysis. Subsequently, after 10 days, the seedlings were evaluated for number of leaves, seedling height, dry weight and green root weight. The data obtained were evaluated using the mean comparison test, Scott-Knott at 5% probability. Treatments with dairy sludge + gypsum proved to be more effective in combating problems caused by excess salts in the soil, contributing to greater morphological development in sorghum seedlings during the evaluation period. The conditioners together provided a minimum increase of 3.66; 64.57; 9.09 and 16.95% for the variables number of leaves, seedling height, dry weight and green root weight, compared to the control treatment. The applications of dairy sludge in conjunction with agricultural gypsum provide better performance in the morphological development of forage sorghum, with emphasis on the treatment of dairy sludge plus 50% of the need for gypsum, which in addition to promoting maximum plant development, would reduce costs in the field.

Keywords: conditioners, excess salts, plant structure.

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