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Area of work: Forage farming

Root biomass of forage sorghum (*Sorghum Bicolor* (L.)) in soil saturated with magnesium and treated with soil conditioners.

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Soil salinity results from the excessive accumulation of salts, including magnesium, which in high concentrations has a negative influence on plant production, due to the inhibition of the absorption of essential nutrients. In addition to compromising the water retention capacity and impacting the soil's edaphic structure. Thus, the objective was to evaluate the height and root system of forage sorghum (*Sorghum Bicolor* (L.)) grown in soil saturated with magnesium and treated with different doses of organic and mineral conditioners. The experiment was conducted in a greenhouse at the Federal University of Agreste de Pernambuco, Pernambuco, Brazil. Using forage sorghum, cultivar IPA 467-4-2. The design adopted was a randomized block design, with eight treatments, with three replications each, characterized by a 15 L pot, with 12 kg of soil and a forage sorghum plant. Six treatments with conditioners homogenized into the soil ten days before planting, 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. A treatment with gypsum homogenized into 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. The soil used takes into account the characteristics of a soil affected by magnesium. Before planting in all treatments, foundation fertilization occurred as recommended by the 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 for plant height, green weight and pre-dry from the root. It should be noted that the roots were collected from the pots after cutting the plants, with excess soil removed under running water and weighing carried out after drying for 5 hours in the open air, at room temperature (green weight). Weighing to determine the pre-dried weight occurred after drying the plant material in a forced air circulation oven, at 55° C, for 72 hours. Subsequently, the data obtained were subjected to analysis of variance using the Scott-Knott test, at 5% probability. Treatments with dairy sludge + gypsum proved to be more efficient in minimizing the impacts of excess magnesium present in the soil, thus providing the best growth and development of sorghum plants during the cycle, with emphasis on the root system. Treatments in conditioner sets provided an increase of 126.4; 1,910.91 and 3,286.87% for the variables plant height, green weight and pre-dry from the root, respectively when compared to the control treatment. The conditioners, dairy sludge and agricultural gypsum when combined, provided benefits to the soil through magnesium remediation and organic matter allocation, promoting the plant's root development and consequently increasing its biomass.

Keywords: excess salts, gypsum, dairy sludge, plant morphology.

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