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Thematic area: pastures and forage

Bacterial inoculums in BRS capiaçu seedlings

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Plant growth-promoting bacteria (PGPB) are microorganisms that, in symbiotic or associative relationships with plants, benefit them directly and indirectly through various mechanisms such as biological nitrogen fixation, phosphate solubilization, phytohormone production, and pathogen suppression, thereby improving plant resistance to biotic and abiotic stresses. PGPB are notably important in agriculture as they help reduce the dependence on chemical inputs, promoting agroecological practices and sustainability in production chains. However, the market still lacks knowledge and access to PGPB-based bioproducts at the farm level, where many producers are unaware of the benefits that these microorganisms offer. Addressing this gap is essential to expanding their adoption and fostering sustainable agricultural productivity. Thus, this study aimed to evaluate the effects of inoculating different plant growth-promoting bacterial strains compared to a treatment without inoculation in Pennisetum purpureum (Schumach), BRS Capiaçu variety. The experiment was conducted in a completely randomized design, in a nine by four factorial scheme, with nine bacterial strains with potential for plant growth promotion, cultivated in a nutrient-rich culture medium supplemented with four concentrations of L-tryptophan (0, 5, 10, and 15 mmol). Each treatment had three replicates, each containing 10 seedlings. The seedlings were represented by a lateral bud/node with 3 cm of internode on each side. Evaluations were performed on the 21st day after stem inoculations; during this period, the stems were kept in a germination chamber at 25 ± 5 °C, under a 12-hour photoperiod. Data were subjected to analysis of variance, and mean groups were compared using orthogonal contrast at a 5% probability level. The number and length of roots were respectively 133% and 21.7% greater for the treatments that received inoculation compared to the control. Fresh weight was on average 38.3% higher in the treatments that received inoculants. Chlorophyll A levels were also higher, with a 22.8% superiority when comparing treatments with and without bacterial inoculants. For the variables stem width and leaf length, the control method showed better results. The number of plumules, shoot length, dry weight, chlorophyll B, and leaf width were not statistically significant. The substantial increases suggest that BRS Capiaçu plants benefited from the symbiotic relationship with the bacteria, promoting an increase in the number and length of roots and, consequently, greater vigor, fresh biomass production, and photosynthetic efficiency due to the higher level of chlorophyll A.

Keywords: biotechnology, bacteria-plant interaction, forage.

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