

PLANT GROWTH PROMOTING RHIZOBACTERIA MITIGATE DELETERIOUS EFFECTS OF WATER STRESS ON RED RICE PLANTS

RIZOBACTERIAS PROMOTORAS DE CRESCIMENTO VEGETAL MITIGAM EFEITOS DELETERIOSOS DO ESTRESSE HÍDRICO EM PLANTAS DE ARROZ VERMELHO

Meneses, CHSG¹; Santos, BC¹; Pereira, KMC¹;Chaves, FFA¹

¹Programa de Pós-Graduação em Ciências Agrárias – Universidade Estadual da Paraíba – CNPj: 12.671.814/0001-37 Rua Baraúnas, 351 – Bairro Universitário - Campina Grande – PB CEP: 58.429-500.
chmeneses@gmail.com; brunacavalcantes23@gmail.com; kathy.maciell08@gmail.com;
fabriaciac.fc@gmail.com;

Abiotic stress conditions are the main limiting factors for crop cultivation around the world. Drought stress adversely affects the growth and yield of red rice. The effect of selected plant growth-promoting rhizobacteria (PGPR) on the growth, chlorophyll content, nutrient element content, and yield of red rice plants under natural field drought stress was investigated. Field experiments were conducted using a randomized complete block design with five PGPRs collected from different areas of Paraíba in Brazil (PGB1, PGB2, PGB3, PGB4 and PGB5). PGPR inoculations significantly increased the growth, chlorophyll content, nutrient element content, and yield of red rice plants. PGPR treatments lowered electrolyte leakage of plants under water deficiency conditions. The leaf relative water content (LRWC) of plants rose with bacterial inoculation. All nutrient element contents of leaves and roots investigated were significantly increased with PGPR inoculations with the exception of sodium (Na) and chlorine (Cl). The highest efficiency to alleviate water stress on the yield and nutrient uptake of red rice plants was obtained from PGB1 (228 g per plant) and PGB3 (225 g per plant) treatment and the yield increasing ratio of plants was 48% for PGB1 and 46% for PGB3 compared with the control treatment (150 g per plant). The highest nitrogen (N), potassium (K), phosphorus (P), calcium (Ca), magnesium (Mg), sulfur (S), manganese (Mn), copper (Cu), and iron (Fe) concentrations were obtained from PGB1 and followed by PGB2, PGB4, and PGB5, and increasing ratio of leaves and root N, P, K, Ca, Mg, S, Mn, Cu, and Fe contents were 25% to 38%, 33% to 8.9%, 90% to 15%, 15.0% to 8.2%, 6.1% to 7.2%, 98% to 70%, 110% to 130%, 200% to 20%, and 102% to 10.0%, respectively. The results of the study suggested that PGPR inoculations could alleviate the deleterious effects of drought stress conditions on the growth and yield of red rice plants under water deficiency conditions.

Palavras-chave: PGPR; Alleviation abiotic stress, *Oryza sativa*, Semi-arid areas.

