

EFFECT OF SILICON FERTILIZATION ON SALINITY TOLERANCE IN RICE

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Soil salinity causes lower productivity of rice lands in the low country wet zone (LCWZ). The availability of salt-tolerant rice varieties suitable for LCWZ is limited. Information on the response of popular rice varieties in LCWZ to salt stress and their tolerance to the salinity stress of these varieties is unavailable. Therefore, screening commonly grown rice varieties for salt stress is needed. An experiment screened five popular rice varieties, including Bw 312, Bw 272-6b, Bw 367, Bw 372, and Bw 364 in LCWZ for salt tolerance. The experimental design was a split-plot design with three replicates. Firstly, seedlings were grown in nutrient solutions with salinity levels of 6 and 12 dS m⁻¹ and were evaluated based on standard evaluation score (SES) for salinity tolerance. Secondly, selected varieties (Bw 272-6b and Bw 364) were further tested in 6 and 12 dS m⁻¹ salinity levels with silicon (Si) fertilization. Results revealed that all tested varieties were moderately tolerant in the salinity level of 6 dS m⁻¹, but all varieties were susceptible in 12 dS m⁻¹. With increasing salinity, plant height (PHT), root dry weight (RDW), and shoot dry weight (SDW) of all varieties decreased significantly. Both Bw 272-6b and Bw 364 of the silicon-treated varieties showed significantly higher ($p < 0.05$) PHT, SDW, and RDW at the salinity level of 6 dS m⁻¹ compared to the non-silicon-treated varieties. According to the SES, the level of tolerability of Si-treated Bw 272-6b and Bw 364 increased from moderate tolerance to tolerance level at 6 dS m⁻¹. However, no significant effect of Si fertilization was observed at 12 dS m⁻¹ salinity level. In conclusion, Si application enhances the salinity tolerance of Bw 272-6b and Bw 364 to a certain extent. Hence Si fertilization could be a viable option to increase the productivity of rice grown in salt-affected areas.

Keywords: Low country wet zone, Nutrient solution, Varieties