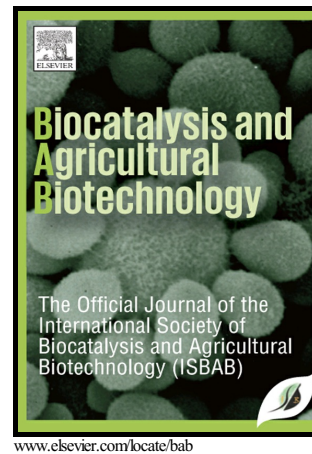


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Screening of drought tolerant rice through morpho-physiological and biochemical approaches

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Abstract

Drought is one of the major abiotic stresses that delimit rice production and yield especially in rainfed ecosystems. To identify the promising drought tolerant rice cultivars, an effort was made in the present study to screen few traditional rice landraces of Assam, India, aimed at investigating effect of low water potential on growth. Seeds of twenty one traditional rice cultivars along with ‘Sahbhagi Dhan’ (tolerant) and ‘IR64’ (sensitive) were subjected to drought stress. Drought was imposed in one week old seedlings by 15% PEG-6000 in Yoshida medium for 7 days followed by 20% PEG-6000 for another 7 days until the drought symptoms appeared. All the experiments were conducted in randomized block design with three replicates. Germination percentage, root length, shoot length, root fresh and dry weight, shoot fresh and dry weight, chlorophyll content and relative water content (RWC) were evaluated after stress treatment. On the basis of Standard Evaluation Score, 8 rice varieties showing high drought tolerability were finally selected for further biochemical analyses. Proline content, lipid peroxidation level and hydrogen peroxide concentration in shoots and roots were investigated. Increase in proline content and decrease in hydrogen peroxide and lipid peroxidation implied its protective role in tolerant rice cultivars against drought stress. To identify the drought tolerant rice cultivars, a thorough understanding of the various mechanisms that govern the yield of rice under drought condition is a prerequisite.

Keywords: water stress, rice landraces, polyethylene glycol, drought tolerant and sensitive, morpho-physiological features

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