

# VARIETAL DIFFERENCES FOR MORPHO- PHYSIOLOGICAL TRAITS IN RICE AT EARLY VEGETATIVE STAGE IN RESPONSE TO DEHYDRATION STRESS

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## Abstract

Under a rainfed ecology, drought is a significant constraint for rice production. Among a collection of 272 different rice genotypes, we chose thirteen rice cultivars with differing degrees of drought tolerance based on a field experiment carried out under drought stress. Thirty-day-old seedlings of 13 cultivars were evaluated for morpho-physiological aspects, and data was collected on the fifth, tenth, and fifteenth day of withholding water (DWW) to acquire a thorough trait-based response to drought at various stages of seedling development. In this study, increase in root length was observed across all cultivars with Apo being the longest followed by Dumai, Ranjit and Tepi Dumai whereas Dimbra showed least increase followed by Leuja Aus and Garu Jum as compared to other cultivars in the study. All physiological traits were significantly decreased under dehydration stress in all the three durations of moisture stress. With increasing water deficit, photosynthetic rate reduced among the physiological parameters examined, but the effect was less pronounced in Apo, Dumai, and Tepi Dumai. With a rise in the severity of drought, the rate of transpiration likewise dropped across all cultivars. In Apo, Tepi Dumai, and Dumai, all three stress periods (5DWW, 10DWW, and 15DWW) significantly increased the water use efficiency (WUE) of rice plants. All genotypes saw a drop in RWC, however Apo, Dumai, and Tepi Dumai showed the effect less noticeably. Our findings imply that drought stress at the seedling stage has a significant impact on rice morpho-physiological features and, consequently, on yield. Greater recovery capacity may help maintain relatively high grain production, which could be a major goal for crop breeders in creating rice cultivars that can withstand drought stress.

**Keywords:** Correlation, Drought, PCA, Photosynthetic rate, Root length, Water Use Efficiency