

Screening of Rice Varieties Tolerant to Drought Stress

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[Introduction]

Water deficit, more commonly referred to as ‘drought’, has been, and continues to be the most limiting factor affecting food production, especially in areas with inadequate agriculture water resources. Therefore, with the global shortage of water, reducing water consumption in crop production is recognized as an essential strategy for sustainable agriculture. Rice is one of the world’s most important staple foods. Rice grain yield and yield components have been known to be highly influenced by water supply. There are numerous studies about drought tolerance in rice. Drought tolerance is a complex trait that involves various aspects of developmental, physiological, biochemical, and molecular adjustments. The objective of this study is to screen and select rice varieties tolerant to drought under field conditions.

[Materials and Methods]

Field experiments were carried out following a randomized complete block design with three replications. Ten rice varieties were used in this study. Thirty days old seedlings were transplanted into fifteen-row plots, with a distance of 15cm between plants and 30cm between rows. A well-irrigated block received standard irrigation practices served as the control treatment, and a water-limited block simulated drought stress using a rain-out shelter by continued drought stress at 15 days after transplanting. Additionally, a basic fertilization was applied. Its composition was as follows: 9kg of urea, 4.5kg of ammonium phosphate, 5.7kg of potassium phosphate. Data collected from these experiments included leaf rolling score, drought score, stress tolerance index, yield, yield components, flowering date, plant height, panicle number, and tiller per plants, etc.

[Results and Discussions]

Ten rice varieties were screened for drought to select promising varieties and to be used drought prone environments. Leaf rolling score was taken and observed at 21 days of water stress. drought score was recorded at 29 days after stress using 0 to 9 scale of standard evaluation system for rice. Sticky rice variety, Baeogokchal which is a resistant check had the longest period of 41 days after stress at final score of 9 scale depending on assumedly their characteristic genetic tolerance. Result indicated that most rice varieties had longer survived periods above 100days by continued drought stress except for Ungwang and Hyunpum. Rice grain yield was reduced 14 to 35% by continued drought stress compared to that of well-irrigated blocks. Among these rice varieties, late maturing rice variety, Saenuri and medium maturing rice variety, Haiami showed the lowest reduced rice grain yield. Rice grown in drought stress condition produced significantly less rice grain yield than well-irrigated rice.

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