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Evaluation of Drought Donors at Reproductive Stage in Rice

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1. Introduction

Drought is the most important abiotic constraint that reduces yield of rice in rainfed areas (Bernier *et al*., 2009). The worldwide water shortage and uneven distribution of rainfall makes the improvement of drought resistance especially important. Fulfillment of this goal would be enhanced by an understanding of the genetic and molecular basis of drought resistance. The problem is severe in Eastern India, with more than 10 million ha of drought-prone fields covering states of Jharkhand, Odisha and Chhattisgarh with yield loss of around 40 per cent and were valued at $650 million. Drought tolerant cultivars are therefore an important breeding goal but limited progress has been made, despite considerable research efforts. Many donors are available but good donors with more drought tolerance donors reproductive stage of the crop is very crucial to get better yield under such situation. Hence, a set of donors were taken to evaluate them for reproductive stage drought tolerance.

2. Materials and Method

Seventy five land races / germplasm lines including check varieties were grown in dry season, 2012 in alpha lattice with two replications to evaluate reproductive stage drought donors amongst the materials. Adequate drought stress was applied at reproductive stage to screen the materials on the basis of various parameters. Amongst these 75 genotypes best donor is identified. Five representative plants for each genotype in each replication were randomly selected to record observations on plant height (cm), total tillers per plant, panicle length, grains per panicle, spikelet fertility and per se yield. Days to 50% flowering were computed on plot basis. Seed weight (g) was recorded by weighing 100 grains of each cultivar. The mean data after computing for each character was subjected to standard methods of analyses of variance.

3. Results and Discussion

Rice genotypes showed considerable differences in grain yield and varied from 0.16 t ha^{-1} (RTS 4) to 1.32 t ha^{-1} (UPLRI 4). In present study, results indicated that UPLRI 4 recorded highest grain yield(1.32 t ha^{-1}) along with good tiller number. But, the genotype has 59% spikelet sterility and poor harvest index. one another genotype Taichung 65(0.84 t ha^{-1}) was as good yielder under reproductive stage drought stress condition. Further, rice genotypes showed a wide variation in yield components such as ear bearing tiller $hill^{-1}$ (EBT) and harvest index (HI). A high number of productive tillers have been considered a crucial diagnosis index along with a high spikelet m^{-2} resulting in a higher yield of tillering cereal crops. IR 1561-228-3-3 and RD21 were good performer in case of tiller number(13.5) and (12.5) respectively under stress. TKM 6 showed highest total dry matter production (92.31 gram) followed by BPI RI 10 (89.79 gram) and Dinorado (85.97 gram). Taichung 65 is having next best genotype with respect to yield. But, the genotypes exhibit less spikelet sterility, more harvest index and tiller number as compared to UPLRI 4.The third donor for drought is Kinastano with some yield under drought.

4. Conclusion

Drought intensity may vary from place to place, depending on soil type and amount and intensity of rainfall. Therefore varietal response to drought is diverse. UPLRI 4 was identified best donor among these genotypes on the basis of highest grain yield along with good tiller number. Consequently, the search for new donors should be continued to improve drought tolerance under target environment.

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