Entry No. IRRC-0309

Category	: International Rice Research Conference
Select Theme	: Genetic improvement
Endorsement email	:
Keyword 1	: Abiotic stress tolerance
Keyword 2	: Marker-assisted selection
Keyword 3	: Genotype x Environment Interactions
Title of Entry	: Evaluation of Indian Rice Genotypes for Cold Tolerance and Validation of QTL's
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Select only one type of presentation	: 15 minute oral presentation
Abstract	: Cold is the major abiotic stress affecting rice crop productivity. Low temperature stress at germination and seedling stage results in poor stand establishment and cold at reproductive stage results in spikelet sterility in indica genotypes. The genetic gain for cold tolerance under selection programmes is low due to considerable Genotype x Environment interaction . Thirty nine rice genotypes were evaluated for germination and seedling cold tolerance in laboratory based on percent seeds with coleoptiles superior to 5 mm , percent reduction in coleoptile length and difference in germination percentile under normal(280 C) and cold (150 C) temperature in comparison to the tolerant checks viz., Tellahamsa, Sheetal and JGL 3844. The genotypes Krishna, Varalu, Bhadrakali, MTU 1010,Pusa 1121,KNM 110, JGL 11118 and JGL 11470 were identified as cold tolerant based on laboratory studies. The same set of 39 genotypes were evaluated for reproductive cold tolerance in the field. The genotypes viz., MTU 1010 , KNM 110, Pusa 1121 and Varalu exhibited reproductive cold tolerance recording significantly superior spikelet fertility over checks, whereas the genotypes RNR 21582, JGL 18047 ,RNR 21588 recorded significantly high seed yield per plant. The confirmation of phenotypic responses of genotypes against cold tolerance was done at genetic level using linked polymorphic SSR markers. Nine genotypes viz., WGL 32100,Swarna,RNR 15048,JGL 11470,JGL17004,JGL 17420,KNM 110,JGL 18047 and Bhadrakal

were identified as cold resistant based on QTL's. Out of these 9 genotypes KNM 110 exhibited cold tolerance at seedling and reproductive stages whereas Bhadrakali exhibited seedling tolerance hence validated the presence of QTL's. In other genotypes, there was no correspondence between phenotype and genotype with respect to cold tolerance. Hence, large populations over locations and seasons must be evaluated for establishing correlation between lab and field parameters and also for developing mapping populations and identification of more polymorphic markers linked to QTL's conferring cold tolerance for facilitating Marker Assisted Selection in rice.

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