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Exploitation of heterosis for response for improvement of nitrogen use efficiency in Basmati rice (*Oryza sativa* L.): A case study from Indo-Gangetic plains

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Abstract

The present study is an effort to conceptualize heterosis for response to supplement yield at reduced cost by utilizing Nitrogen more efficiently. Primarily genotypic diversity for response towards pattern of environmental variations and diversity based on morphological characters was assessed to find out promising parents in order to select promising segregants for improvement of Basmati rice. Out of 10 pairs diverse for response, progenies of only two crosses Pusa Basmati1xType3 and P1121xType3 provided desirable transgressive segregants. The segregating population was screened following pedigree method in order to get basmati type plants with better gene recombination. Uniform bulks of F_5 and/ F_6 generations were evaluated for response to different levels of inputs, diseases, lodging resistance and parameters of quality. Response towards fertilizers' application and disease reactions were evaluated under specifically induced environmental conditions. Disease severity % and AUDPC (Area Under Disease Progress Curve) parameters were used for screening blast resistance. Better types were finally evaluated in station trials as well before inclusion for statutory evaluation in multitier trials co-ordinated by ICAR (Indian Council of Agriculture Research). Data of National coordinated trials were also used to validate the supposition of heterosis of response. Consequently two varieties of basmati rice Vallabh Basmati-22 and Vallabh Basmati-24 which could utilize the Nitrogen more efficiently were developed. This technique has dual benefits to the farmers; fertilizers could be utilized more efficiently along with enhanced productivity of the crop.

Biography

Devi Singh has completed his Ph.D. and postdoctoral studies from Institute of Advanced Studies, CCS University, Meerut. He is the Director of Research at Sardar Vallabhbhai Patel University of Agriculture & Technology, Meerut, India, a premier government organization. He has worked as Professor and Head, Department of Genetics and Plant Breeding. He also has served as Dean, College of Biotechnology and Dean, Post Graduate Studies. He has published more than 50 papers in reputed journals. He also organized 5 national symposiums on current topics in crop improvement and biotechnology.