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### Identification of alternate dwarfing gene(s) to the widely used green revolution gene 'sd1' in rice

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The short statured varieties of rice developed using Dee-Geo-Woo-Gen (DGWG), a spontaneous dwarf mutant as the donor, have enabled many countries to achieve self-sufficiency in rice production. Initial attempts to study the genetics of semi-dwarfism using crosses of traditional tall varieties and semi-dwarf varieties suggested that semi-dwarfism is controlled by a single recessive gene, *sd1*. The success of DGWG-based varieties such as IR8 and Taichung (Native) 1 has made breeders all over to depend excessively on these two rice cultivars as source breeds for short stature trait. Genetic analysis of a large number of dwarfs of spontaneous and induced origin has revealed that dwarfs non-allelic to *sd1* are rare. Recently dwarf accessions non-allelic to *sd-1* gene (putatively termed as *asd1* (alternate semi-dwarf) gene(s)) have been identified from a set of 33 mutant dwarf accessions of rice employing a gene specific marker for *sd1* gene and biochemical assay (Gibberellic acid (GA) response). Keeping the foregoing in view, the present study was initiated to find and map alternative dwarfing gene (*asd1*) from a F<sub>2</sub> population derived from the cross of CN384, a mutant dwarf accessions and a tall landrace, INRC10192. The phenotypic data of 19 traits related to important plant height and yield component traits has been recorded in parents i.e., CN384 and INRC10192 and 189 F<sub>2</sub> individuals. The parents are significantly different in all the traits measured which are reflected in obtaining of many transgressive segregants ranging from 7.94% (plant height) to 100% (appearance of sixth internode) in F<sub>2</sub> offspring. Most of the traits measured showed clear normal distribution except for few traits. Parental polymorphism study between the parents was done using 605 hypervariable SSR markers. Then genotyping of F<sub>2</sub> individuals was performed using 30 polymorphic SSR markers. Linkage analysis using 26 marker loci and 19 phenotypic traits data by MAPMAKER/QTL Cartographer revealed 13 QTLs, out of which 7 were associated with plant height related traits having phenotypic variance (R<sup>2</sup> value) in the range of 8-58%. Two QTLs for plant height, three QTLs for culm height and one QTL for internode number were identified in the chromosome number 6. One QTL for internode length was also identified in the chromosome number 5.

#### Biography

Siddhartha Swarup Jena has completed his master degree in Molecular Biology and Biotechnology from G.B. Pant University of Agriculture & Technology, Pantnagar, Uttarakhand. Presently he is pursuing his Ph.D. degree in Acharya N.G. Ranga Agriculture University, Hyderabad since 2010.

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### Combining ability analysis to identify superior F1 hybrids for yield and quality improvement in tomato (*Solanum lycopersicon* L.)

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Combining ability and gene effects for yield and quality traits in tomato were studied by involving twenty four cross combinations obtained from crossing eight diverse lines with three testers in line x tester mating fashion. The analysis of variance revealed that the variance due to line x tester effects were highly significant for all the traits except lycopene content under study. Combining ability analysis revealed that magnitude of *sca* variance was greater than *gca* variance suggesting the predominance of non-additive gene action for yield per plant, pericarp thickness, TSS, titrable acidity, lycopene and shelf life. The degree of dominance revealed, over dominance is the cause of heterosis for these traits. Based on *gca* effects of parents, the lines LE-62 and LE-53 and the testers Arka Meghali and Arka Vikas were good general combiners for most of the traits under study. The crosses *viz.*, EC-157568 x Arka Vikas, EC-163611 x Arka Alok, LE-62 x Arka Alok and LE-64 x Arka Vikas were found to be superior specific combiners for yield per plant. For quality traits, the cross EC-165749 x Arka Alok was also superior specific combiner for yield per plant, TSS, ascorbic acid and shelf life and the cross EC-157568 x Arka Alok was superior specific combiner for TSS, titrable acidity and lycopene.

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