Entry No. IRRC-0227

Category	: International Rice Research Conference
Select Theme	: Genetic improvement
Endorsement email	:
Keyword 1	: Marker-assisted selection
Keyword 2	: Biotic stress tolerance
Keyword 3	: Breeding Strategy
Title of Entry	: Introgression of High Yielding and Multiple BLB Resistance Genes in Elite Super Basmati Rice using Marker Assisted Backcross Breeding Approach in Punjab, Pakistan
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Select only one type of presentation	: 15 minute oral presentation
Abstract	: Bacterial leaf blight (BLB), caused by Xanthomonas oryzae pv. oryzae (Xoo), is one of the devastating diseases of rice that accounts for significant crop losses around the world. Basmati rice, famous for its excellent grain and cooking qualities is highly susceptible to prevalent population of Xoo specifically in subcontinent region. The only reliable strategy to manage this disease is the development of resistant host by introgression of resistance genes, with diverse defense mechanism, in elite genetic backgrounds., By employing marker assisted backcross breeding in the current study, we developed 25 advanced lines with single and different combination of three resistance genes i.e. Xa4, xa5, Xa21 in Super Basmati genetic background. Phenotypic and marker assisted foreground selection showed that all 25 advanced lines have restored key Basmati features, i.e. aroma, amylose content and grain length. Analysis of recurrent parent genome recovery by background genome selection using Simple Sequence Repeat (SSR) and Single Nucleotide Polymorphism (SNP) genotyping revealed that most of 25 advanced lines were able to recover > 90% recurrent parent genome after BC4F4 generation. Advanced lines with a combination of Xa4+xa5+Xa21 and xa5+Xa21 were able to restrict colonization of all tested Pakistani and Philippines Xoo strains. Performance of seven important agronomic traits of all advanced lines, evaluated during field trials conducted from 2015-2017, was comparable with that of recurrent parent i.e. Super Basmati. Further, of these 25 lines, 5 lines were selected on the basis of their yield, grain quality and days to maturity. These lines

were tested in the field during 2016-2017 to evaluate their agronomic performance. Two of these lines will be sent to the National Uniform Yield Trials after 2018 field experimentation. Therefore, selected, high yielding BLB resistant Basmati advanced lines would be a step ahead towards sustaining and protecting indigenous Basmati germplasm against bacterial blight.

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