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PYRAMIDING OF BLAST RESISTANCE GENES IN THE BASMATI RICE VARIETY PUSA BASMATI 1121 THROUGH MARKER ASSISTED BACKCROSS BREEDING

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Introduction: Pusa Basmati 1121 (PB1121) is a Basmati rice variety with exceptional grain and cooking quality and fetches highest price in the domestic and international markets. It is susceptible to blast disease caused by *Magnaporthe grisea*, which affects both yield as well as grain quality.

Methodology: Marker assisted simultaneous but step wise backcross breeding (MASS-BB) was used to incorporate the blast resistance genes *Piz5* and *Pi54* from Pusa 1602 and Pusa 1603 respectively, into PB1121 using gene linked markers. Inter-crossing was done at BC3F1 generation to pyramid both the blast resistance genes. In each backcross generation, the plants selected for respective genes using foreground markers were subjected to rigorous phenotypic and background selection to accelerate the recovery of recurrent parent phenome and genome.

Results: MASS-BB led to the development of NILs Pusa 1716 (PB1121 + *Piz5*) and Pusa 1717 (PB1121 + *Pi54*) with RPG recovery of 93.8 % and 94.7% using 58 and 56 STMS markers representing genome wide coverage, respectively. The pyramided lines (PB1121 + *Piz5* + *Pi54*) and NILs exhibited resistance to blast under artificial inoculation with respective diagnostic isolates. The improved lines showed performance on par with PB1121 for agronomic and cooking quality traits.

Discussion and conclusion: Marker assisted backcross breeding was successfully employed for pyramiding two blast resistance genes into popular Basmati rice cultivar Pusa Basmati 1121. The pyramided lines will be evaluated under multilocation trials for release as improved cultivar and as an invaluable source for blast resistance in Basmati rice improvement.