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TOWARDS IMPROVEMENT OF YIELD POTENTIAL IN BASMATI RICE: FROM MAPPING TO MARKER ASSISTED SELECTION

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Basmati rice from Indian subcontinent is one of the most popular premium rice known for its unique quality. Systematic efforts for its genetic improvement at Indian Agricultural Research Institute (IARI), New Delhi has enhanced the average per hectare productivity from 2.0 to more than 5.0 tons in the improved Basmati varieties. As a result,

India's forex earning has increased from USD 55 million in 1990's to USD 3.33 billion in 2012-13, 75% of which is contributed by IARI varieties. Rapid advances in molecular techniques have helped in development of robust markers and their effective utilization in crop improvement. In Basmati rice, novel QTLs for yield traits have been mapped and novel alleles for yield contributing characters such as grain length including a 342 bp deletion in GS3 locus in short grain aromatic rices, width and weight have been identified. Additionally, MAS has been successfully utilized for introgression of gene(s) governing resistance to various biotic stresses such as bacterial blight, blast, brown plant hopper and tolerance to abiotic stresses including salinity, submergence, drought and phosphorus uptake resulting in the development of improved Basmati varieties with resistance to bacterial blight (Improved Pusa Basmati 1), blast resistance (Pusa Sugandh 6), and improved parental lines of Pusa RH 10 with resistance to BB (Pusa 1601, Pusa 1605) and blast (Pusa 1602, Pusa 1603, Pusa 1609). Further, MAS is used in maintenance breeding, testing seed purity in hybrids, and helped in refining and re-orienting the strategy for designing Basmati rice with higher per unit productivity.