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Breeding for improved aromatic short grain rices of India

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Aromatic rice constitute small and special group of rice and highly priced due to their quality. Aromatic rice is very much synonymously used term for Basmati rice in India and in the International market. Besides the Basmati, the other short and medium scented rices are grown in India for centuries. Almost every state in India has its own collection of non-basmati short and medium grain aromatic rices. Farmers still grow these cultivars mainly for personal consumption despite being aware of their poor productivity and limited markets. Many of these aromatic rices have in general long growth duration, photoperiod sensitive, with low yield with susceptibility to lodging and to several pests/diseases. As a result in the last several years many valuable aromatic rice varieties have either disappeared or are in the process of disappearing which needs to be addressed to conserve, characterize as well as concerted research efforts to harness their potential to ensure better quality and improved yields. As there was not much organized breeding work undertaken on the small and medium grain scented rices, efforts were made at this Directorate of Rice Research, Hyderabad were made in collection and characterization as well as genetic enhancement for yield and agronomic characteristics with due attention to quality. A total of 237 indigenous aromatic short grain land races collected from IGAU, Raipur, RAU Pusa, NDUAT, Faizabad and OUAT, Bhubaneswar are being maintained in working germplasm at Directorate of Rice Research (DRR), Hyderabad. These genotypes were characterized for as many as 46 characters were documented. Wider genetic diversity was observed among these genotypes. Majority of them possess high head rice recovery, intermediate amylose, medium to soft gel consistency, intermediate alkali spreading value or gelatinization temperature, strong aroma. Similarly top performing accessions for other parameters viz., rationing ability, yield, panicle length, leaf area, specific leaf weight, grain weight, head rice recovery, volume expansion ratio, water uptake, kernel length after cooking, elongation ratio were also identified. The information would be useful to breeders for use in the genetic improvement programmes on aromatic short grain rices in India. Some of the the genotypes Juhibengal-A, Barikunja, Khosakani, Kala Namak (Nichlaul) etc., recorded high levels of 2 ap content, the aroma compound which can be utilized in aromatic rice breeding programmes. On the overall basis of quality and yield assessment, Heerakani, Malaysia, Chhabiswa, Sonachoor, Gati and Parbatjira were found promising. Molecular diversity analysis with SSR markers were found to be very informative and could able to differentiate all the ASG genotypes and can be utilized in the genetic diversity studies of aromatic rice. Further, the study also revealed four SSR makers as genotypic specific markers which can be utilized as a DNA fingerprints to ensure their identity during conservation and their registration in addition to the morphological descriptors. Many of these aromatic short grain rices were utilized in crossing programme and several elite lines with outstanding yield and quality are in advanced generation and some of them were in multilocation testing under AICRIP.

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