

Short Communication

Identification of restorers and maintainers for hybrid rice development in Chhattisgarh

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Among many genetic approaches being explored to break the yield barrier in rice, hybrid rice technology appears to be the most feasible and readily adoptable one. The commercial exploitation of heterosis has been made possible by the use of cytoplasmic male sterility and fertility restorer genes, though the male sterility genes do not produce satisfactory seed set. Hence screening and selection of elite breeding lines as effective and genetically diverse maintainers and restorers for respective cytoplasmic male sterile (CMS) lines is essential. It induces the identification of sterility system and its maintenance and registration for commercial exploitation.

The experiment was conducted at the research farm, Dept. of Plant Breeding and Genetics, IGAU, Raipur (C.G.) to identify the maintainer and restorer lines. It involved two stages, source nursery and test cross nursery.

Based on spikelet fertility and pollen fertility percentage PKV-HMT can be treated as restorer for CMS line IR 68888A; R-1075-266-1-1 can be regarded as restorer for IR 68886A; R-650-1817 for IR 58025A and IR 58092A and MTU-1010 for the CMS line IR 70959A. These effective restorers can be utilized in further hybrid rice breeding programme to develop specific hybrids.

A very low magnitude of pollen fertility was observed in the hybrid IR 68888A/Ratna, its spikelet fertility was 8.69 percent and pollen fertility was 9.67 percent.

Thus, Ratna can be regarded as effective maintainer for the CMS line IR 68888A.

Selected restorer and maintainer will be further exploits in rice hybrids development for lowland ecosystem of rice.

Table 1 : Restorers and Maintainers for the 5 CMS lines

S.No.	CMS lines	Source	Restorer	Source	Maintainer	Source
1	IR 68888A	IRRI	PKV-HMT	PKV, Akola	Ratna	CRRRI, Cuttak
2	IR 68886A	IRRI	R-1075-266-1-1	IGAU, Raipur		
3	IR 58025A	IRRI	R-650-1817	IGAU, Raipur		
4	IR 58092A	IRRI	R-650-1817	IGAU, Raipur		
5	IR 70959A	IRRI	MTU 1010	APAU, Maruteru		

The source nursery consisted of five CMS lines (IR 68888A, IR 68886A, IR 58025A, IR 58092A and IR 70959A) and eleven test varieties (R-650-1817, R-1075-266-1-1, Poomima, R-1259-2-1319-1, Danteshwari, Nidhi, R-710-4-37-1-1, IR-64, Ratna, PKV-HMT and MTU-1010) comprising improved/local/high yielding varieties. The test cross nursery consisted of F₁ seeds of 18 cross combination along with the parents.

Standard agronomic and plant protection measures were followed. Data on days to 50% flowering, Plant height, number of productive tillers/plant, spikelet sterility percentage, panicle length, number of filled spikelets/panicle, spikelet sterility percentage, 100 grain weight, biological yield/plant, harvest index and grain yield/plant were collected on five randomly plants from each hybrids and parents. Pollen fertility was estimated by squashing anthers in 1% Iodine-potassium iodide solution and screening for sterile and fertile pollen under microscope. Male parents of the hybrids showing very low pollen/spikelet fertility were designated as potential maintainers.

Of the 11 genotypes screened for the fertility restoration ability using 5 CMS lines, 5 were identified as restorer and maintainer (Table 1). The number of restorers for 'WA' cyto sterility was found higher, also reported earlier by Mohanty & Sharma (1983) and Govind Raj *et al.* (1984).

REFERENCES

Govind Raj, K. and Siddiq, E.A. (1984). Genetics of fertility restoration and biochemical basis of male sterility- fertility restoration system in rice. *Rice Genet. News*, 1:103-104
Mohanty, P.L. and Sharma, N.P. (1983). Fertility restorers for cyto sterile stocks. *Int. Rice Res. Newsl.*, 8(2):3-4.

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