

## Evaluation of new non-scented CMS lines and their maintainer lines of rice (*Oryza sativa* L.) for their agronomical and floral traits

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### SUMMARY

Eighteen CMS lines and their isogonic maintainers were evaluated for agronomical traits viz., days to 50% flowering, plant height (cm), number of panicles per plant, number of spikelets per panicle, spikelet fertility (%), panicle exertion (%), scent and floral traits viz., pollen fertility (%), stigma length (mm), style length (mm), angle between stigma lobes (q), anther length (mm), anther breadth (mm), filament length (mm) and out crossing rate of CMS lines (%) with standard check cms line IR 58025A. Generally A lines took more number of days to 50 per cent flowering than the corresponding B lines. All the CMS lines were shorter than their corresponding maintainers. Number of panicles were more in B line than in A lines. More number of spikelets per panicle was observed in KCMS 17A, KCMS 16A and KCMS 21A. Maximum out crossing rate was noticed in KCMS 11A, KCMS 16A, CRMS 31A and KCMS 12A. Most of the CMS lines showed 100 per cent pollen sterility and less than 3.4 per cent spikelet fertility. All the CMS lines were non-scented in nature. Genotype KCMS 11A and IR 68888A were promising for panicle exertion, the CMS lines IR 70369A, CRMS 32A, KCMS 17A, KCMS 12A, KCMS 22A and KCMS 25A had long stigma. The style length of RTN 10A and CRMS 32A were high, while KCMS 25A and CRMS 32A exhibited greater angle between stigma lobes. The maintainer lines KCMS 10B, IR 70369, RTN 10B, IR 68888B excelled in anther length, anther breadth and filament length. Two CMS lines viz., KCMS 11A, KCMS 16A and CRMS 31A were identified as promising ones as they showed high out crossing rate, low pollen fertility and low spikelet fertility and are suitable for hybrids development.

**Key words :** Rice, CMS lines, Maintainer lines, Agronomic traits, Floral trait

Rice (*Oryza sativa* L.) is the most important staple food crop of the world. In India rice is also the most important and stable food crop of more than two third of the population. The slogan 'Rice is life' is the most appropriate for India as this crop plays a livelihood for millions of rural households. India has the largest area under rice (44.6m.ha) and it ranks second only to china in production (90 million tones). However the productivity of India is 2086 kg/ha (Mishra, 2005).

Jones first reported heterosis in rice in 1926, but Chinese demonstrated the commercial exploitation of heterosis in early 1970's and they developed rice hybrids

that had yield 20% higher production over the high yielding cultivars (Yuan, 1997). In India too, hybrid rice breeding programme gained momentum from 1989 onwards (Anonymous, 2002). The advantage observed at field level is in the range of 15-20 per cent over the highest yielding check varieties of corresponding duration (Paroda, 1998, Mangla Rai, 1998).

In hybrid rice research, CGMS or 3-line system is the most effective and stable system being used to develop rice hybrids. With the introduction of hybrid rice technology, WA (Wild Abortive) male sterile cytoplasm has been used every year in more than 93% of the total area under hybrid rice in China. However, in India, the most of the released hybrids are based on WA-CMS line IR 58025A. Hybrid production faces a potential threat from pests and diseases due to homogeneous narrow genetic base as it makes them genetically vulnerable (Xiao *et al.*, 1998). Since, rice is self pollinated crop, seed yield in hybrid seed production plots is very less (1.5 t/ha) and it is mainly depends on out crossing and out crossing depends on morphological and floral traits of CMS lines. Hence, the development and identification of new CMS lines with good morphological and floral characters is essential to increase the seed yield and hybrid seed production. Thus, a research study was undertaken to evaluate new non-scented CMS lines and their maintainer

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