

Temperature stress and Fertility Reversibility in Wild Abortive CMS Lines of Rice for Quality Hybrid Seed Production

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August 3, 2020

Abstract

CMS lines are highly sensitive to temperature change for the sterility status. Determination of critical temperature for sterility breakdown in wild abortive cytoplasmic male sterile (WA-CMS) lines under field condition is essential for efficient seed production planning. CMS lines IR58025A and IR68897A were grown at different dates of sowing to give exposure to a series of temperature regime and day length at natural field condition. At panicle initiation stages temperatures below 28.5°C, the CMS lines were sterile and at temperatures below 30°C, the lines became partially sterile. Above 30°C, the CMS line reverted to fertile. The highest pollen sterility was recorded (98.3%) during the long day condition while the lowest was recorded (43.5%) during the short day condition indicating the effect of both temperature and day-length on break down of sterility. Differential expression of floral characters like panicle exertion and stigma was found with variation in temperature. This simple field-driven technique can be successfully employed to work out the functional temperature for fertility reversibility which is of utmost importance for planning seed production and maintenance of genetic purity of the hybrids. The techniques will aid in designing seed production planning for hybrid rice in any rice-growing area in the world

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