

Evaluation of Photoperiod and Thermosensitive Genic Male Sterile Lines For Hybrid Rice Seeds Production in Kenya

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Abstract:

Photo–thermo-sensitive genic male sterile (P(T)GMS) rice is a new hybrid rice technology that uses prolonged light length and high temperatures to induce sterility. This technology is being introduced in Kenya but such growth conditions are lacking in the tropics. To overcome this, we grew P(T)GMS under greenhouse conditions where day light length was prolonged to 14 hrs using solar illumination and day and night temperatures were maintained above 36°C and 24°C respectively. Sterility of P(T)GMS was determined by the level of abortive pollen and seed set rates. Hybrid seeds were produced by crossing three P(T)GMS lines (V1PGM, V2TGM and V3PGM) as female lines with Basmati 370 and Basmati 217 varieties as pollen donors. Under long and normal day lengths and high temperatures, pollen sterility ranged from 99-100% but no seeds were set in PGMS lines. However, TGMS recorded 3% and 2% seed set under similar conditions. Under natural conditions both PGMS and TGMS reverted to fertility. Agronomic evaluation showed outstanding ($P < 0.01$) performance of hybrids over parents in flag leaf length (V2370; 35.8 cm), panicle exertion (V2217; 8cm) and shorter flowering time (V3217; 85 days) under greenhouse conditions while flag leaf width (V1370; 1.48 cm) and tillering (100) performed better under natural conditions. Percentage seed set positively correlated with flag leaf related traits and flowering days but negatively correlated with panicle length, panicle exertion and tillering. We conclude that the P(T)GMS lines are adaptable for hybrid rice seed production in Kenya but there is need to review the P(T)GMS lines' background so as to minimize incompatibility in hybrids. Key words: *Oryza sativa*, Basmati, PGMS/TGMS, seed technology, pollen sterility