

TGMS lines in Kerala

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A study was conducted to analysis the floral characteristics of TGMS lines. All TGMS lines in the present study took more than 3 hrs duration for spikelet opening and more than 3 days for complete a thesis in a panicle. This study indicated that the widest glume opening of 38.30 was recorded in TGMS 91S and the lowest in TGMS 93S (200). Stigma exertion percentage ranged from 21.88 (TGMS91S) to 80.84 per cent (TGMS 94S). Rice is the staple food for about half of the world's population. The rapidly increasing demand for rice and the continuous decrease in rice growing areas emphasizes the need to improve rice production. The use of hybrid rice has proved to be an effective and economical way to increase rice production. It is easy to obtain about 10% yield increase just by growing hybrid rice. Thermosensitive genic male sterility (TGMS) is a useful genetic tool for the development of two-line hybrids in rice. At the thermo sensitive stage of panicle development, the TGMS gene(s) cause/s male sterility under high environmental temperatures and result/s in fertility under low temperatures. A TGMS line can therefore be used for hybrid seed production as well as for its seed multiplication under different growing environments. The system provides a much simpler and economic hybrid seed production and broader choice of male parents for enhancing yield potential. The two line system of hybrid breeding utilizing Environmental Sensitive Genic Male Sterility (EGMS) is considered as an alternative to overcome the problems associated with three-line breeding and to surpass the yield plateau. In rice, both photoperiod sensitive genic male sterility (PGMS) and temperature sensitive male sterility (TGMS) have been discovered

and successfully developed. In tropical condition like India, where day length differences are marginal, TGMS system is considered to be more useful than the PGMS system. After the identification of the TGMS mutant, Among 1S, several TGMS lines have been developed in China, IRRI and other countries. For successful exploitation of this novel male sterility system in heterosis breeding, more TGMS lines need to be developed and characterized for their sterile and fertile alteration. Studying the inheritance of TGMS would help in breeding new TGMS lines with diverse genetic back grounds. The TGMS lines become completely sterile under high temperature (>32°C) and fertile under low temperature (< 24°C) at panicle initiation stage. This phenomenon has taken advantage of hybrid seed production and seed increase of TGMS lines. The TGMS gene of Norin PL 12 is has been transferred to tropical indica varieties at IRRI, Philippines through a Memorandum of Understanding between IRRI and Government of Japan which states that the TGMS lines derived by using Norin PL 12 gene would be made useful to all countries. The major advantages of TGMS system are simplicity, overcoming the negative effects of male sterile cytoplasm and the ease of multiplication and restoration. These two line hybrids have been reported to exhibit 5-10 per cent yield advantage over the three line hybrids. Two line breeding is a viable proposition in a state like Kerala where rice is cultivated from below mean sea level to altitudes of 1500 MSL. Exploiting the difference in temperature regimes between the high altitudes and plains, the MS lines can be multiplied and hybrids can be produced on a commercial scale.

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