

Usanee Wongpatsa 2014: Effects of Temperature on Pollen Development of Male Sterility Lines on Two-Line Hybrid Rice System. Master of Science (Botany), Major Field: Botany, Department of Botany. Thesis Advisor: Associate Professor Lily Kaveeta, Ph.D. 101 pages.

The lower temperature of TGMS critical temperature is environmental factor which had been reported to loosen sterile pollen of TGMS line (A line of the two-line hybrid system). This study was to investigate the effect of various temperature conditions on pollen fertility of 2 TGMS lines. The TGMS lines of KU-TGMS1 and KU-TGMS3 were re-grown and transferred to growth chamber and natural conditions (summer: April to May and winter: December to January at Kasetsart University, Bangkok campus). The day and night temperature of 26/22 °C, 26/20 °C, 24/18 °C and 22/20 °C were employed under growth chamber conditions of 11.30 h photoperiod and 75% relative humidity. The pollen viability and seed setting were used as male sterility identification. For the pollen viability test, spikelets in each line were collected from the panicle at R3 to R4 stage. The pollen viability with various techniques, including I₂-KI staining technique, FDA staining technique, DAPI staining technique and the germination rate of pollen tube were examined. The results showed that the percentage of pollen viability was increased around 18 °C to 22 °C and seed setting showed 18 °C to 20 °C at the night times. However, testing the pollen viability which DAPI nucleic acid staining technique and the germination rate of pollen tube in pistil (*in vivo*) were related with seed set percentage on individual lines. These result indicated that DAPI nucleic acid staining technique and the germination rate of pollen tube in pistil (*in vivo*) were suitable for viability test of pollens in inbred rice line and these 2 lines were differed in critical temperature. Additionally, study on microsporogenesis development under various temperature the results showed that microsporogenesis at the stage of meiotic cell division had highly respond to temperature. Tapetum and mature pollen showed abnormal structure under high temperature.

Student's signature

Thesis Advisor's signature