

Warunee Detpittayanan 2014: Phenotypic Characterization and Expression Response of Heat Shock Transcription Factor (Hsf) Genes under High Temperature at Reproductive Stage of Jao Hom Nin Rice Mutant Lines. Master of Science (Agronomy), Major Field: Agronomy, Department of Agronomy. Thesis Advisor: Assistant Professor Chanate Malumpong, Ph.D. 85 pages

High temperature at the reproductive stages is one of an important factor to determine grain yields of rice because of its male in the florets are sterile. In this research, Jao Hom Nin (wild type) and their mutant lines, i.e. M9962 M7988 and M7766 were used to evaluate percent of seed set, percent of pollen viability, 100 seed weight, yield/plant, panicle weight, panicle height, no. panicle/plant, tiller/plant, and plant height under high temperature condition compare to natural temperature condition (control). Greenhouse at 40-45 °C for 6 hours/day from booting stage until harvesting was used as high temperature condition. In addition, *heat-shock transcription factor* genes including, *OsHsfA2a*, *OsHsfA2b*, *OsHsfA2d*, *OsHsfA7*, *OsHsfA9*, *OsHsfA2e* and *OsHsfA4d* and *MADS box* genes were observed the expression level in flag leaf and young flowers. The result showed that percent of seed set, 100 seed weight, yield/plant, tiller/plant, panicle height and panicle weight under natural temperature were better than high temperature except panicle/plant and plant high were lower than high temperature. The M9962 line showed the highest percent of seed set (75.57 %), whereas the M7766 line showed the lowest percent of seed set (18.09 %). However, percent of pollen viability were non-significant difference between temperature conditions. The expression level of *heat shock transcription factor* and *MADS box* genes at R2 stage in flag leaf and florets were affected by under heat stress, *OsHsfA2a* *OsHsfA2b* *OsHsfA2d* *OsHsfA2e* *OsHsfA4d* *OsHsfA7* and *OsAP1*, except *OsHsfA9*. Interestingly, their expression response was different among varieties. The heat tolerant mutant line (M9962) showed different expression pattern from heat sensitive mutant line (M7766) clearly.

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Thesis Advisor's signature