Malinee Janwan 2013: Breeding Rice for High Yield and Photoperiod Insensitivity Using Single Seed Descent Selection. Master of Science (Agronomy), Major Field: Agronomy, Department of Agronomy. Thesis Advisor: Assistant Professor Tanee Sreewongchai, Ph.D. 86 pages.

Rice breeding for high yield was conducted by crossing between KDML 105 and Qiqnizhan cultivars. Single seed descent method was used for selection of photoperiod insensitive character in the F_2-F_6 progenies. The results revealed that photoperiod sensitivity of rice was controlled by single gene of which photoperiod sensitive character was dominant to photoperiod insensitive character. A preliminary yield test of the 271 F_7 lines was done using an Augmented Design with 4 replications. Seed yield, yield component and agronomic traits of the F_7 lines were evaluated. It was found that there were three F_7 lines which gave higher yield than the highest yielding check variety (CNT1). Transgressive segregation was determined in the F_7 progeny. The results showed that high number of transgressive lines were observed for three traits including plant height, number of days to 50% flowering and number of panicles per plant. Correlation analysis of yield, yield components and agronomic characters manifested that yield gave positive correlation with all other characters. The effective tillering capacity showed positive correlation with all yield components while panicle weight and seed-setting rate gave positive correlation with filled seeds per panicle and 1,000 seed weight. Stepwise regression analysis indicated that panicle weight, number of panicle per plant, number of days to 50% flowering, seed-setting rate and flag leaf length could be used in combination with yield as criteria for selection. Single seed descent method can be applied for improving of quantitative characters especially the yield because this method can maintain genetic diversity of the progenies and selection for high yielding lines can be achieved. Moreover, large number of lines with highly transgressive segregation are maintained as germplasm source for selection.

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