

Piyavadee Nasaree 2011: Evaluation and Selection of Parental Lines for Study on Heterosis of Two Line Hybrid in Rice. Master of Science (Plant Breeding), Major Field: Plant Breeding, Interdisciplinary Graduate Program.
Thesis Advisor: Mr. Theerayut Toojinda, Ph.D. 103 pages.

Hybrid rice technology is an effective approach to greatly increase rice yield per area. Evaluation and selection of parental line to study on heterosis are important for developing two-line hybrid rice system in Thailand. A total of 252 lines from two populations; BC_3F_3 of a cross of Norin PL12/KDML105*3 and F_3 of a three-way cross of NorinPL12/KDML105*3//DHL279/3/23-215//Norin PL12/KDML105*3, were screened for pollen viability under field and sunlit-chamber conditions. Two lines, T6-4 and T6-6, showing thermo genetic male sterility and good agronomic characteristics were selected to use as female parents. To evaluate and select male parents, 205 rice varieties from six different genetic sources were manipulated in field and it was found that a rice variety, PSL01195-66-1-3-6, had the highest yield (962 kg/rai). After crossing by hand pollination method, a total of 235 F_1 populations and ten standard checks were conducted in an augmented design. Grain yield of ten F_1 populations ranged from 2,394 to 2,963 kg/rai were higher than parents and standard checks and a population from a cross between T6-4 and PSL96028-21-7-PSL-1-1 showed the highest yield (2,963 kg/rai). It was found that best-parent heterosis (heterobeltiosis) on grain yield of a cross between T6-6 and PSBRC44 was highest (459%) and a cross of T6-4 and PSL96028-21-7-PSL-1-1 showed the highest standard heterosis (145%). It was found standard heterosis on grain yield over standard check variety of the best ten hybrid such as the crosses of T6-4/PSL96028-21-7-1-1, T6-4/(NSICRC122), T6-4/PSBRc54, T6-4/(8)3-1-22-9-1, T6-4/PSL00510-CNT-105-1-PSL-1-2, T6-4/PSBRc70, T6-4/IR71701-28-1-4, T6-4/IR72158-68-6-3, T6-6/F7Nipon/hompama No.64 and T6-4/IR38 were ranged from 98 to 145%. Therefore, ten crosses were suggested for improving the potential of two-line hybrid rice production in Thailand.

Student's signature

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