

Jakkrit Seesang 2013: Heterosis of Yield and Yield Components of Three-Line Hybrid Rice System. Master of Science (Agronomy), Major Field: Agronomy, Department of Agronomy. Thesis Advisor: Assistant Professor Tanee Sreewongchai, Ph.D.

101 pages.

Three-line hybrid rice's technology is an effective approach to greatly increasing rice yield per unit area. The identification of maintainer and restorer lines of rice lines/cultivars is an essential for three-line hybrid rice production. The 20 genotypes of rice lines/cultivars were identified by testcrossing with 2 male sterile lines. The results showed that 10 and 6 genotypes of rice lines/cultivars were identified to be maintainers and restorers, respectively. The estimation of heterosis of 12 F_1 hybrids rice revealed that there were 2 F_1 hybrids including HB2 (cross IR80151A/CH1) and HB8 (cross IR80151A/CH4), which gave the highest heterosis in both heterobeltiosis and standard heterosis. They yielded 1,268 and 1,087 kg/rai, respectively. Among the 8 parental lines/cultivars tested for combining ability, the 3 lines/cultivars involving CH1, CNT1, RD31 and IR80151A showed good general combining ability for grain yield they could be used as parental lines for producing F_1 hybrid with high yielding. The estimation of broad-sense heritability, genetic advance and path analysis of F_1 hybrids rice revealed that number of panicles per plant, number of seeds per panicle and harvest index could be used as criteria for selection of superior hybrid genotypes. The inheritance of pollen sterility was done in the F_2 progenies of the crosses IR80151A/CH1 and IR80151A/CH4. The segregation ratio of male fertile and sterile was 15: 1 which indicated that the male sterility system of IR80151A line was controlled by 2 recessive genes and the expression belonged to sporophytic abortion. The distribution of agronomic trait, yield and yield components of fertile plants in both crosses of F_2 progenies showed transgressive segregation in all traits. It's suggested that the farmer should not use the seeds collected from F_1 plants for planting, because they might give low yield and difficult to manage.

Student' signature

Thesis Advisor's signature