

Pattanasak Chansong 2010: Breeding of Male Sterile Lines of Rice from the Crosses between Maintainer Lines by Early Generation Backcrossing. Master of Science (Agronomy), Major Field: Agronomy, Department of Agronomy. Thesis Advisor: Associate Professor Prapa Sripichitt, D.Agr. 81 pages.

Breeding of male sterile lines (A line) of rice was conducted by diallel cross between maintainer lines (B line) to produce F_1 seeds of 10 crosses. The F_1 plants were grown and crossed to A line (IR 79156) for transferring male sterility of A line to the F_1 plants and the new A lines (A' lines) were obtained. Meanwhile, the F_1 plants were selfed to produce F_2 seeds. The F_2 plants were grown, selected and backcrossed (BC_1) to A' lines to produce A'' lines. While, the F_2 plants were selfed to produce F_3 seeds. The F_3 plants (B line) were grown, selected and backcrossed (BC_2) to A'' lines to produce A''' lines which were isogenic to B lines. The 56 A lines and isogenic B lines were obtained. Combining ability of A''' lines were determined by yield testing of the topcross progenies which derived from crossing between A''' lines and R line (variety SPR1). Yield test of the F_4 lines (B lines) were done as well using augmented design in RCBD. It was found that the A lines giving top 10 high yield of topcrosses were PTT-KU 1-2-1A $''''$ /SPR1, PTT-KU 9-1-4A $''''$ /SPR1, PTT-KU 9-4-4A $''''$ /SPR1, PTT-KU 3-4-2A $''''$ /SPR1, PTT-KU 3-3-9A $''''$ /SPR1, PTT-KU 2-2-2A $''''$ /SPR1, PTT-KU 6-1-6A $''''$, PTT-KU 7-3-2A $''''$ /SPR1, PTT-KU 10-3-4A $''''$ /SPR1 and PTT-KU 4-3-11A $''''$ /SPR1 which exhibited the yield varying from 751 to 1,034 kg/rai. While the B lines having top 10 high yield were PTT-KU 1-4-6B, PTT-KU 2-4-6B, PTT-KU 1-3-13B, PTT-KU 8-3-6(1)B, PTT-KU 7-3-2B, PTT-KU 1-2-1B, PTT-KU 4-3-11B, PTT-KU 2-3-9B, PTT-KU 6-1-6B and PTT-KU 9-1-6B which showed the yield ranging from 593 to 976 kg/rai. The standard check variety (SPR1) used in this experiment showed the yield of 582 kg/rai. Selection of A lines having good combining ability by yield test of the topcross progenies is more precise than selection of A line based on yield trial of B lines. This is because A lines which are isogenic to B lines giving high yield may not have good combining ability with R line that produces high yielding hybrid. In this experiment, selection was made for A and B isogenic lines which exhibited top 10 high yield to be developed as promising A and B lines and used for improved hybrid variety.

Student's signature

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