

Papichaya Sirikulchayanont 2011: Development of Parental Lines of Three-Line Hybrid Rice by Backcrossing and Early Generation Testing. Master of Science (Agronomy), Major Field: Agronomy, Department of Agronomy. Thesis Advisor: Associate Professor Prapa Sripichitt, D.Agr. 127 pages.

Development of parent of three-line hybrid rice was conducted by factorial crossing between 3 B lines and 5 R lines to produce  $F_1$  hybrid seeds of 15 crosses. The  $F_1$  hybrids obtained were backcrossed to A lines twice for transferring male sterility from A line to  $F_1$  hybrids. The newly developed B lines and R lines were selected simultaneously. Combining ability of newly developed A" lines were determined by testing the yield of topcross progenies which derived from crossing between 56 A" lines and 3 testers (R line) including SPR90, RD7 and SPR93014-PTT-22-1-3-1-1. Yield of the  $F_4$  lines (B" lines and R" lines) were tested as well using augmented in RCBD. It was found that the top-10-high-yield topcross progenies exhibited the yield varying from 863 to 1,079 kg/rai and the topcross progeny of PTT-KU11-10-25A"/SPR90 manifested the highest yield. While the top-10-high-yield B" line showed the yield ranging from 721 to 844 kg/rai and the line PTT-KU15-8B" manifested the highest yield. The standard check variety, RD31 showed the yield of 690 kg/rai. The 2 A" lines and their isogenic B" line involving PTT-KU12-10-18A"/PTT-KU12-18B" and PTT-KU31-05-10A"/PTT-KU31-10B" gave the yield within the range of top-10-high yielding. Selection of A lines based on a good combining ability and high-yielding of the isogenic B lines is more precise than basing on the yield of B lines. This is because A line which is isogenic of B line that gives high yield may not have good combining ability with selected tester (R line). The results of this study indicate that early generation backcrossing method can develop A line, B line and R line simultaneously. The selected lines will be used for improved hybrid variety.

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