Abstract

Hybrid rice has contributed significantly to meet the increasing demand for food and Temperature sensitive genetic male sterility (TGMS) system facilitates hybrid production. Seven TGMS lines were obtained from International Rice Research Institute (IRRI) and evaluated their potential use for hybrid production. These TGMS lines were crossed with 7 Thai cultivars to produce 49 hybrids. These hybrids were planted along with Thai parental lines in central area. The result showed that nine hybrids generated from 4 TGMS lines had 13-65% higher grain yield than the best parents, and three hybrids demonstrated 10-14, 10-14, and 17-86% grain yield higher than check varieties; PTT1, SPR1, and PSL2, respectively. To determine temperature for sterility and fertility, the TGMS line containing *tms3* were grown in 24, 26, 28 and 32°C growth rooms. At 24 and 26°C this TGMS line had seed setting about 75 and 64%, respectively whereas at 28 and 32°C the TGMS line showed completely sterile. To transfer *tms3* gene to Thai cultivar, IR683015 was crossed with PTT1 and the resulting F_1 progenies were backcrossed repeatedly to PTT1 until BC_3F_1. To enhance an efficiency of selection this gene in breeding programe via marker-assisted selection (MAS), positions of the linked RAPD markers to *tms3* were identified in rice genomic sequences. Only one out of four RAPD markers has the sequences matched the sequences at 7.14 Mb in rice chromosome 6. Thus, gene-based markers were generated near 7.14 Mb and tested for polymorphism between parents. Bulked segregant analysis was performed to identify linked markers. The Gene-based markers that show polymorphisms were used to genotype F_2 male sterile plants derived from crosses between *tms3* and 2 Thai elite lines using SSCP technique. The results from genotyping 122 male sterile plants from a total of 533 F_2 plants showed that gene-based markers Os06g17920 at 10.4 Mb on chromosome 6 were linked to *tms3* at the distance of 24.6 cM.