Variation in Fertility Rate, Plant Height, and Selection Rate for Progenies of Indica-Japonica Rice Hybrids in Relation to Generations of Backcross

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Crosses were made between 5 Japonica rice varieties (as maternal parents) and 13 Indica varieties/stains (as paternal parents) for the purpose to introduce superior characteristics from Indica to Japonica rice. Among the 16 F₁ hybrids obtained, 4 were backcrossed to both their paternal and maternal parents. The resulted 8 BC₁ and the remaining 12 F₁ were backcrossed for 1 to 4 generations to their respective maternal parent (as recurrent parents). The fertility rate and plant height were investigated on all the F₁, F₂, BC₁F₁, BC₂F₁, and BC₃F₁ offsprings. Experimental results indicated that fertility rate of the F₁ hybrids ranged from 3.57 to 62.21%, with significant variation among combinations. Fertility rate of the F₂ generations showed the character of normal distribution, and the average was higher than that of the F₁ populations. Fertility rate of BC₁F₁ also varied according to the parental genotype for backcrossing. The value was higher with Indica genotypes as the recurrent parent than with Japonica genotypes. In addition, fertility increased with increasing generations of backcross. Significant hybrid vigor in plant height was observed in F₁ populations. Plant height of F₁ exceeded that of the parents by 0.51—29.1%. Backcross to a tall parent tended to produce plants 10% taller than the offsprings from backcross to a short parent. Plant height decreased with increasing generations of backcross. In general, plant height of BC₃F₁ was similar to that of the parent. The Indica-Japonica hybrids showed the characteristics of low fertility, awned spikelets, and colored palea and lemma which were not observed on both parents. However, no correlation was recorded among the three characteristics. According to the selection criteria of Japonica rice breeding programs, no strain could be selected from single crosses between the two types of rice. After 3 generations of backcross, superior strain could be selected from most cross combinations, however, the selected rate was usually lower than 1%. The rate increased to over 2% for most combinations if the F₁ plants were backcrossed their maternal parent for 4 generations.

Key Words: Rice, Indica-Japonica Cross, Backcross, Recurrent Parent, Fertility Rate, Awned Spikelets, Colored Palea and Lemma, Plant Height, Selection Rate

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