Studies on the Yield Components in the Progenies Derived from the Hybrid and Backcross between *Oryza sativa* L. and *O. nivara* Sharma et Shastry

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Summary

Two *sinica* varieties, Tainung 67(TNG 67) and Taiken 1(TK1), and a wild rice, *O. nivara* (Acc.104705) were used as the recurrent parents and non-recurrent parent, respectively, to investigate the genetics and breeding behaviors for the fertility, panicle number, grain number of per panicle and 1000-grain weight of the interspecific hybrid progenies of *Oryza* species. The F\textsubscript{1}, F\textsubscript{2}, BC\textsubscript{1}F\textsubscript{1}, BC\textsubscript{2}F\textsubscript{2}, BC\textsubscript{3}F\textsubscript{1}, BC\textsubscript{3}F\textsubscript{2}, BC\textsubscript{4}F\textsubscript{1} and BC\textsubscript{4}F\textsubscript{2} populations of two cross combinations were simultaneously planted at the experimental farm of Taiwan Agricultural Research Institute in the first crop of 1996. The following results were obtained. The F\textsubscript{1} cross compatibility of two crosses, TNG67 × *O. nivara* and TK1 × *O. nivara*, was 51% and 58% respectively. These results might suggest that no serious reproductive barrier between the *sinica* varieties and the wild rice. Heterosis was found in both number of panicle per plant and 1000-grain weight for the hybrids. The grain number per panicle was similar to the wild parent. From observing the distribution patterns of F\textsubscript{2} population, it was found that there were many plants leaned toward the wild parent, the variation was height and showed transgressive segregation in all of these characters. The results put F\textsubscript{2} populations at a disadvantage in selection. In the BC\textsubscript{1}F\textsubscript{1} generation, backcrosses were carried out in both cross combinations based on plant type (similar to cultivated varieties). The selected hybrid plant was ratoon to obtain F\textsubscript{3} seeds. The variation in yield components for various backcrosses were then observed. Results indicated that the plants with superior characters would be observed in duplication in various backcross populations. For example, the mean of fertility and 1000-grain weight of BC\textsubscript{2}F\textsubscript{2} and BC\textsubscript{3}F\textsubscript{2} in TK1 × *O. nivara* cross combination were better than the recurrent parent(TK1). Furthermore, as increasing in the number of backcross the variation in the characters became small. This indicated that plants with homogeneous genetic background could be obtained from the populations in a short time spectrum. According to the results found, that the wild rice *O. nivara* could be a germplasm potential for improving cultivated rice yield components, i.e., spikelet fertility, panicle number per plant, grain number of per panicle and 1000-grain weight, by recurrent backcross method should be hypothesized.

Key words: Recurrent backcross, Interspecific hybridization, *Oryza sativa*, *O. nivara*. Yield components.

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