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Early-breed Rice Development by Knock-out of PCKP, a Flowering Suppressor Gene

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[Introduction]

Every year, South Korea suffers serious damage to rice growth and productivity in various regions and situations due to typhoons. In particular, there is a high possibility that may become dry, discolored and infertile in panicle, if occurred typhoon during the flowering period of rice. In this study, we tried to develop a early maturing cultivar with a reduced flowering period so that a stable yield could be created even when damaged by a typhoon.

[Materials and Methods]

single guide RNA (sgRNA) was designed to knock-out the flowering suppressor gene *PCKP* of Ilmi. The sgRNA was designed around the *PCKP* domain region, and the PAM sequence used 5'-NGG-3'. Three guide RNAs that act on the target sequence were selected, inserted into pRGEB32, and then a vector for *agrobacterium*-mediated transformation was constructed. Using the regeneration plants, it was confirmed whether the *PCKP* gene was knock-out.

[Results and Discussion]

Three sgRNAs were selected that act only on the target sequence without acting on the non-specific site among the designed sgRNA. Using the selected sgRNA1, sgRNA2 and sgRNA3, pRGEB32::sgRNA was constructed and transformed into *agrobacterium*. 20 days callus were used in order to transform into Ilmi. A total of 300 callus were transformed, and 20 (6.7%) of these regeneration plants were obtained. After these acclimatization treatments, 14 plants were transferred to wagner pot of the greenhouse. When the gene expression level of *PCKP* was confirmed by qPCR whether *PCKP* was edited, the gene expression level in 10 plants was decreased. Through of advanced generation, we will try to select plants in which *PCKP* expression was suppressed and flowering period was shortened.

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