

OB-01

Assessment of Gene Flow and Natural Viability of CaMsrB2 Gene Inserted Rice

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[Introduction]

GM(Genetically modified) crops have been created by the development of genetic modification techniques, and the concern for gene transfer is also increasing due to the increased cultivation area of GM crops. There are two types of gene transfer; pollen-mediated gene flow (PMGF) and seed-mediated gene flow (SMGF). Factors of PMGF include wind speed, wind frequency, heading date, temperature, relative humidity, and growing density. Factors of SMGF are the transfer of genetic material by humans, animals or the environment. In this research, we measured the wind speed, wind frequency, heading date, and germination ability of frozen soil in order to understand the gene flow between GM and Non GM crop in an independent space.

[Materials and Methods]

The gene flow test field, located at Gunwi, Gyeongbuk province, consists of 8 directions (North, South, East, West, Northeast, Southeast, Southwest). The planted area per plant is 3m × 24m (72m²) and the planting distance is 15cm × 30cm. The pollen donor plant is the GM rice and they have basta (ammonium glufosinate) resistance gene. The pollen recipient plant used Ilmi (Non GM rice). We randomly selected 20 plants per direction field. basta herbicide spray was twice (1 and 2 weeks interval). After the basta treatment, changes in the group were recorded at 1:00 pm everyday. The wind speed and wind frequency were measured by using an anemometer of the flow field. The daily mean temperature, rainfall and relative humidity were measured and compared with heading date.

[Results and Discussion]

Ilmi and HV23 heading dates are August 21 and August 25. The rainfall is August 23, 4.5mm, August 24, 10.0mm, and the maximum daily average temperature during the flowering period is 28.1°C. This means that the environmental pollen infertility rate is very low. On the 3rd day after the basta spray withering was started. On the 10th day, the Ilmi was terminated with 100% withering. In this experiment, there was no gene transfer between GM crop and non-GM crop. These data provide methods and criteria for evaluation of genetically modified organisms risk assessment.

[Acknowledgement]

This work was supported by a grant from the Next-Generation BioGreen 21 Program (No. PJ0136472019), Rural Development Administration, Republic of Korea.

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