

## Fitness of F<sub>1</sub> and F<sub>2</sub> hybrids between genetically modified *Brassica napus* and *B. rapa*

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### [Introduction]

A number of studies have been conducted on hybridization between transgenic *Brassica napus* and *B. rapa* or backcross of F<sub>1</sub> hybrid to their parents. However, trait changes must be analyzed to evaluate hybrid sustainability in nature. In the present study, *B. rapa* and early flowering transgenic (*BrAGL20*) *B. napus* were hybridized to verify the early flowering phenomenon of F<sub>1</sub> hybrids, and F<sub>1</sub> hybrid traits were analyzed to predict their impact on sustainability.

### [Materials and Methods]

Early flowering transgenic *Brassica napus* L. ‘Youngsan’ (AACC, 2n = 38) was transformed with CAMV 35S-regulated *bar* and *BrAGL20* [26], and *B. napus* L. ‘Youngsan’ and *B. rapa* L. ssp. *pekinensis* ‘Jangkang’ (AA, 2n = 20) seeds were obtained from the National Agrobiodiversity Center (Jeonju, Republic of Korea). Cross experiments were conducted in the GMO greenhouse of NAAS (National Academy of Agricultural Science) located in Suwon, Korea. Interspecific crossability was determined using transgenic *B. napus* as the pollen donor and *B. rapa* as the seed parent, by means of artificial emasculation and crossing.

### [Results and Discussions]

F<sub>1</sub> hybrids bloomed later than transgenic *B. napus*, but without vernalization, owing to the expression of the *BrAGL20* transgene. The size of F<sub>1</sub> hybrid seeds was intermediate between those of *B. rapa* and transgenic *B. napus*, and ~40% of F<sub>1</sub> pollen exhibited abnormal size and morphology. The form of the F<sub>1</sub> stomata was also intermediate between that of *B. rapa* and transgenic *B. napus*, and the number of stomata was close to the parental mean. F<sub>2</sub> hybrids could not be obtained, while BC<sub>1</sub> progenies were obtained by hand pollination of *B. rapa* with F<sub>1</sub> hybrid pollen, with an outcrossing rate of 50%. Our results suggest that introgression of transgenes from transgenic *B. napus* to *B. rapa* will be slowed down in nature.

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