

## Variation of pod shattering of RIL population and selection for pod shattering tolerance in soybean [*Glycine max* Merr (L.)]

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### [Introduction]

Pod shattering at maturing stage causes serious loss of yield in soybean. It is a main limiting factor of soybean cultivation and mechanization. For labor and cost saving, it is important to develop varieties suitable for mechanical harvesting as well as to develop the energy-efficient agricultural machinery. In particular, pod shattering tolerance is a pre-requisite trait for machine-harvestable cultivars in soybean. ‘Daewonkong’ developed by National Institute of Crop Science (NICS) in 1997 is an elite cultivar which occupies more than 80% of soybean cultivation area in Korea. Due to its relatively strong tolerance of pod shattering, farmers prefer to cultivate ‘Daewonkong’. The objectives of this study were to investigate the variation of pod shattering degree and agronomic traits in RIL population developed from ‘Daewonkong’ as a parent and to select promising lines with pod shattering tolerance.

### [Materials and Methods]

This study was conducted for two years with two RIL populations developed from ‘Daewonkong’; ‘Daewonkong’ × ‘Tawonkong’ (D×T), ‘Daewonkong’ × ‘Saeolkong’ (D×S). The level of pod shattering was measured by determining the ratio of shattered pods (number of shattered pods/total number of tested pods × 100) after drying matured pods for 24, 48, and 72 hours in the oven at 40 °C. The agronomic traits were measured for each of 40 tolerant and susceptible lines; plant height (PH), number of nodes (NN), number of branches (NB), number of pods (NP), first pod height (FPH), and 100-seed weight (SW). Promising lines were selected based on the results of pod shattering test and their agronomic traits.

### [Results and Discussions]

As compared to ‘Tawonkong’ and ‘Saeolkong’, ‘Daewonkong’ showed high level of tolerance to pod shattering with no shattered pods after 72 hour-drying. Screening of pod shattering showed that the tolerant and susceptible lines were distinguished clearly from each other. It is probably due to the existence of major genes associated with pod shattering. As the distribution of pod shattering ratio in the two populations showed a similar patterns for two years ( $r^2=0.72^{**}$ ), it can be supposed that the phenotypes of pod shattering were almost fixed in F<sub>6</sub> and F<sub>7</sub> generations. Forty tolerant and susceptible lines showed normal distribution for each agronomic trait. Tolerant lines were lower in PH, NN, NB, FPH than those of susceptible lines except for SW. The promising lines with pod shattering tolerance were 72 lines in the D×T population and 36 lines in the D×S population, respectively. Elite lines are expected to be selected as breeding parents for pod shattering tolerance through yield trials of promising lines.

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