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Selection of Soybean Genotypes for breeding and Development of *Phytophthora sojae* Resistant Lines

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[Introduction]

Under the current scenario of expanding soybean cultivation in paddy fields, the threat of *Phytophthora* root rot (PRR) is increasing in Korea. A few races of soil-borne oomycete *Phytophthora sojae*, the causal organism of PRR, have been found in soybean fields in Korea. The objective of this study was to identify soybean genotypes for breeding and development of PRR resistant lines.

[Materials and Methods]

A total of 195 soybean genotypes were screened for their resistance to two races of *P. sojae* i.e., 3053 and 3617, which were collected from the fields of Andong and Kimje, respectively, in 2019. The genotypes were screened following the hypocotyl inoculation technique. After one week of inoculation, the numbers of live and dead seedlings were counted and the genotypes were identified as susceptible (S), intermediate resistant (IR), and resistant (R) if <30%, 30-70%, and >70% plants survived, respectively. In addition, 5 selected genotypes were further investigated by comparing their disease reaction and the product of a few previously reported SSR markers with those of 7 reference genotypes, including a universal susceptible Williams.

[Results and Discussion]

In the initial screening of 195 genotypes, 41 genotypes (21%) were R or IR to one or both races. In the second screening, 18 (44%) of the 41 genotypes showed R or IR to one or both races. Finally, considering the consistent resistance level and economic values, 3 resistant (중모3009, 소백나물콩, and 만풍) and 2 susceptible (선풍 and 선유2) genotypes were identified as parental lines for breeding and development of PRR resistant soybeans. 중모3009 showed different disease reactions from that of 6 reference genotypes. Although 소백나물콩 and 만풍 had similar reactions with that of KLG13221 and Williams82, respectively, the PCR products of a few molecular markers suggested that the selected parental lines might have different *Rps* genes. The results provide useful information for the breeding and development of PRR soybeans.

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