A5. Selection of Resistant Genotype to Soybean Cyst Nematode (*Heterodera glycines*) Using Molecular Marker

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Objectives

Soybean cyst nematode (*Heterodera glycines* Ichinohe; SCN) is an important soybean pest and the use of resistant cultivars is the effective method to reduce or eliminate SCN damage. SCN resistance loci, *rhg1* and *Rhg4* are generally accepted as a necessity for the development of resistant genotypes using any source of resistance. In the present study, resistant F2 genotypes to SCN have been selected using molecular markers linked to the *rhg1* and *Rhg4* gene.

Materials and Methods

Materials - Female parents (susceptible to SCN): Korean native and Cultivar
Male parents (resistant to SCN): PI543795, PI437654, and PI88788
Population: Four different F2 population

Methods - Molecular markers: Primer548/563 (linked to the *Rhg4* gene)
Satt309 (linked to the *rhg1* gene)
PCR and electrophoresis: Primer548/563 (agarose) and Satt309 (silver staining)

Results and Discussion

The segregation of the markers in the F2 population was matched to a 3:1 ratio in the case of the primer548/563 and a 1:2:1 ratio for the Satt309 (Table 1). Total 273 F2 genotypes were selected based on primer 548/563 marker and 76 F2 individuals were selected by Satt309 primer from four different F2 segregating populations (Fig. 1). Total 35 F2 genotypes were chosen based on both primer 548/563 and satt309 markers. These F2 individuals have the resistant genes to SCN and will be advanced to the next generation for improving SCN resistant cultivars using MAS technique.

Table 1. Segregation of molecular marker 548/563(linked to *Rhg4* gene) and Satt309 (linked to *rhg1* gene) in the F_2 population

Marker	Population	Hypothesis	Expected	Observed	χ^2	P
548/563	Cultivar × PI543975	3 : 1	62.25 : 20.75	57 : 26	1.77	0.183
	Native × PI543795		39.00 : 13.00	42 : 10	0.92	0.337
	Native × PI437654		76.50 : 25.50	73 : 29	0.64	0.424
	Native × PI88788		93.75 : 31.25	101 : 24	2.24	0.134
Satt309	Cultivar × PI543975	1 : 2 : 1	20.75 : 41.5 : 20.75	23 : 47 : 13	3.87	0.145
	Native × PI543795		19.25 : 38.5 : 19.25	16 : 40 : 21	0.77	0.682
	Native × PI437654		29.25 : 58.5 : 29.25	31 : 60 : 26	0.50	0.777

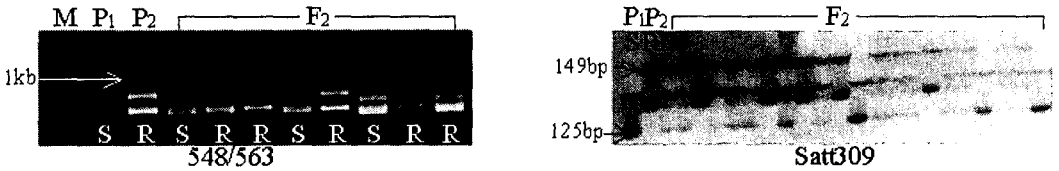

Fig. 1. The fragments amplified by primer 548/563 and Satt309 markers. P_1 is susceptible to SCN and P_2 is resistant. M: Molecular marker, R: Resistant, S: Susceptible, H: Moderate

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