D18 1RS 특이적인 Secalin Subunit의 유전 분석

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Genetic Analysis of Secalin Subunits Specific to 1RS

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1. Purpose

The purpose of this study was to analyze genetic inheritability of secalin subnits encoded by the genes located on 1RS and to develop biochemical marker system to detect 1RS using 1D SDS-PAGE.

2. Material and method

Plant material : Ten kernels from each of 42 F_2 plants which were obtained by the cross between "Geumgangmil" and K-14 (1AL/1RS translocation line) and 10 kernels from 39 F_2 plants which were obtained cross between "Urimil" and K-14.

Sample preparation and one dimension SDS-PAGE :

1) sample preparation : extraction by 70% EtOH for 1hour.
2) 1D SDS-PAGE : separation in 12% resolve gel for 3 hours at 15 W and detected with silver staining.

3. Results and Discussion

1. K-14 carried 40 kDa γ-secalin (*Sec-1a*) and 45 kDa ω-secalin (*Sec-1b*) which were known to be encoded by the genes located on 1RS and Gumgangmil and Urimil did not observe any secalin subunits. Presence of 70kDa secalin in K-14 indicated that K-14 has *Sec-4* loci on 1RS (Fig.1).

2. The 70 kDa γ-secalin (*Sec-4*) found in K-14 was also observed TAM 107, TAM 202, Century, and TXGH12588. But, null allele(Sec-4) was found in Siouxland and GRS 1202 (Fig 2).

3. Twelve out of 42 F_2 plants from the cross between K-14 and Gumgangmil were expected to carry homologus 1AL/1RS chromosomes. Nineteen F_2 plants showed to possess 1AL/1RS and 1AL/1AS chromosomes and eleven lines were lacking secalin subunits. The other crosses aiso showed monogenic segregation for 1RS (Table 1).

4. γ-gliadin (45kDa) expected to be derived from 1AS was found in F_2 plants of either homozygous or heterozygous for 1AL/1AS. Therefore 45kDa subunits as well as three secalin subunits was expected to be used to select homologus 1RS chromosome in wheat breeding programs.

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Source	Chromosome type	Number of plants	χ^2	a
K-14× Geumgangmil	1AL/1RS	12	0.61	0.740
	1AL/1RS, 1AL/1AS	19		
	1AL/1AS	11		
K-14×Urimil	1AL/1RS	8	1.248	0.544
	1AL/1RS, 1AL/1AS	23		
	1AL/1AS	8		

Table. Segregation patterns of secalin subunits in each plants which were derived from cross of 1RS translocation line and two non-translocation lines.

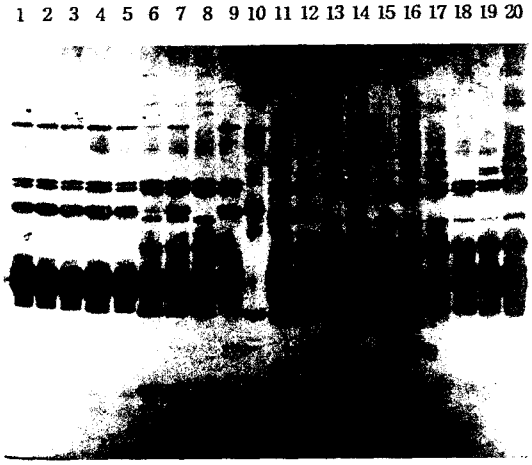

Fig. 1. Segregation pattern of secalin subunits located on 1RS chromatin through sodium dodecyl sulfate polyacrylamide gel electrophoresis. That was cross of K-14 and Geumgangmil. Lane 1. K-14; Lane 2~5. homologous 1AL/1RS type; Lane 6~9. hetero 1AL/1RS type; Lane 10. Size molecular marker; Lane 11~14. hetero 1AL/1AS type; Lane 15~19. homologous 1AL/1AS type; Lane 20. Geumgangmil.

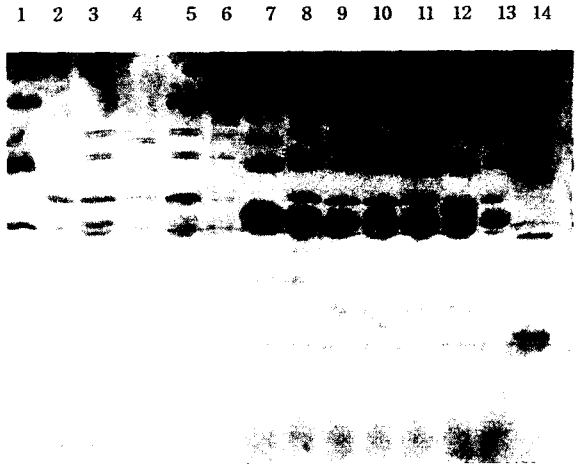

Fig. 2. Sodium dodecyl sulphate-polyacryl amide gel electrophoresis of unreduced prolamines of several translocation cultivars and non-translocations. Lane 1, 14. Size molecular marker; Lane 2. Scot66; Lane 3. Karl; Lane 4. geumgangmil; Lane 5. Arapahoe; Lane 6. Urimil; Lane 7. K-14; Lane 8. TAM107; Lane 9. TAM202; Lane 10. Century; Lane 11. TXGH12588; Lane 12. Siouxland; Lane 13. GRS1201