## Genetic Variations of Puroindolines, Genes for Grain Hardness, in Korean Wheats

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## **Objectives**

This study was performed to analyze genetic variations of puroindolines, related to the controlling grain hardness of wheat, in Korean wheats and to provide DNA marker information to wheat breeding programs for varietal identification and their quality.

## Materials and Methods

- Materials
  - 96 wheat cultivars and lines
    - : Korean (57), U.S. (16), CIMMYT (10), Japan (7), China (6),
- Methods
  - o Genomic DNA extraction: Rogowsky et al (1992)
  - o Puroindolines amplification: Gautier et al (1994)
    - Primer: Pina-D1 (447bp) F: 5'-ATGAAGGCCCTCTTCCTCA-3'

B: 5'-TCACCAGTAATAGCCAATAGTG-3'

*Pinb-D1* (447bp)

F: 5'-ATGAAGACCTTATTCCTCCTA-3'

B: 5'-TCACCAGTAATAGCCACTAGGGAA-3'

- o Full length primers were annealed at 58°C and PCR products were separated on 2.0% agarose gels.
- o PCR products of Pinb-D1 was restricted with BsrBI to characterize Pinb-D1b (200bp)

## Results

- O Two of U.S. wheat cultivars, Arlin and IDO377S, were *Pina-D1b* and *Pina-D1b* was not found in Korean wheat cultivars and lines.
- O Eleven wheats of Korean wheat cultivars and lines (19.3%) were Pinb-D1b, 2 of CIMMYT lines, 2 of Japan wheats, 2 of China wheats and 5 cultivars from U.S. wheats were Pinb-D1b.
- O Grain hardness and milling properties will be tested to evaluation of the effect of genetic variation in puroindolines on the grain quality of Korean wheats.

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Table 1. Puroindolines Genotypes of 96 Wheats<sup>a</sup>

Cultivar	Pina	Pinb	Cultivar	Pina	Pinb	Cultivar	Pina	Pinb
	-D1	-D1		-D1	-D1		-D1	-D1
Korea			Iksan307	а	а	CIMMYT0610	а	b
Changkwang	a	a	Iksan308	a	a	Japar	1	
Youngkwang	a	a	Iksan309	a	a	Daichinominori	a	b
Jinpoong	a	a	Iksan310	a	b	Hachimangomugi	a	a
Kyungkwang	a	a	Iksan311	a	b	Chugoku108	a	b
Shinkwang	а	a	Iksan312	a	a	Chugoku122	a	a
Chokwang	a	a	Iksan313	a	a	Chugoku97	a	a
Olmil	a	a	Iksan314	a	а	Kanto107	a	a
Geurumil	a	а	Iksan315	a	b	Norin61	а	а
Dahongmil	a	a	Suwon252	a	a	China	ì	
Chunggyemil	a	a	KD1-16-04DP01	а	a	BaiHuo	а	а
Eunpamil	a	a	KD2-17-04DP02	a	a	Shanghai4-0CHN	a	а
Tapdongmil	a	a	KD3-18-04DP03	a	b	Heng-You18	a	b
Namhaemil	а	a	KD10-19-04DP16	a	a	Lun-Xyan987	a	a
Urimil	a	a	KD12-21-04DP21	a	a	Heng5229	a	a
Olgeurumil	a	a	KD14-23-04DP42-1	а	b	Zhong-You9507	a	b
Alchanmil	a	a	KD14-23-04DP42-2	а	a	U.S.		
Gobunmil	a	a	KD4-04DP5	a	a	Chinese Spring	a	a
Keumgangmil	a	b	04DP8	a	a	Drumchamp	a	а
Sudunmil	a	a	04DP11	а	b	Clark's Cream	a	b
Saeolmil	a	a	04DP15	a	b	Klasic	a	b
Jinpoommil	a	a	04DP40	a	a	Oveson	a	a
Milsungmil	a	a	04DP53	a	a	Rohde	a	a
Joeunmil	a	a	04DP55	a	b	Arlin	b	a
Anbaekmil	а	a	Mexico			Ike	a	a
Jopoommil	a	b	CIMMYT0601	a	a	Lambert	a	a
Shinmichalmil	a	b	CIMMYT0602	a	a	IDO377s	b	a
Jonongmil	а	а	CIMMYT0603	a	a	Cayuga	a	a
Jokyungmil	a	а	CIMMYT0604	a	b	Brundage	a	a
Suwon300	а	b	CIMMYT0605	a	a	KS96WGRC37	a	a
Suwon301	a	а	CIMMYT0606	a	a	Trego	a	b
Suwon304	a	a	CIMMYT0607	a	a	Heyne	a	b
Suwon305	a	a	CIMMYT0608	a	a	NuSky	a	b
Suwon306	a	а	CIMMYT0609	a	a			

<sup>&</sup>lt;sup>a</sup> a indicate presence of puroindoline allele and b is absence of allele.

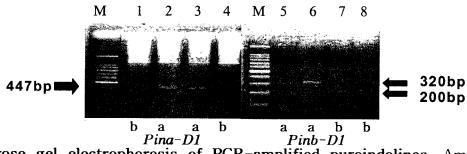


Fig. 1. Agarose gel electrophoresis of PCR-amplified puroindolines. Amplified puroindoline b were cut by BsrB I, wild-type (a, 320bp) and mutant (b, 200bp). M is 100bp DNA ladder, 1: Arlin, 2:Ike, 3: Lambert, 4: IDO377S, 5: Chinese Spring, 6: Drumchamp, 7: Clark's Cream, 8: Klasic.