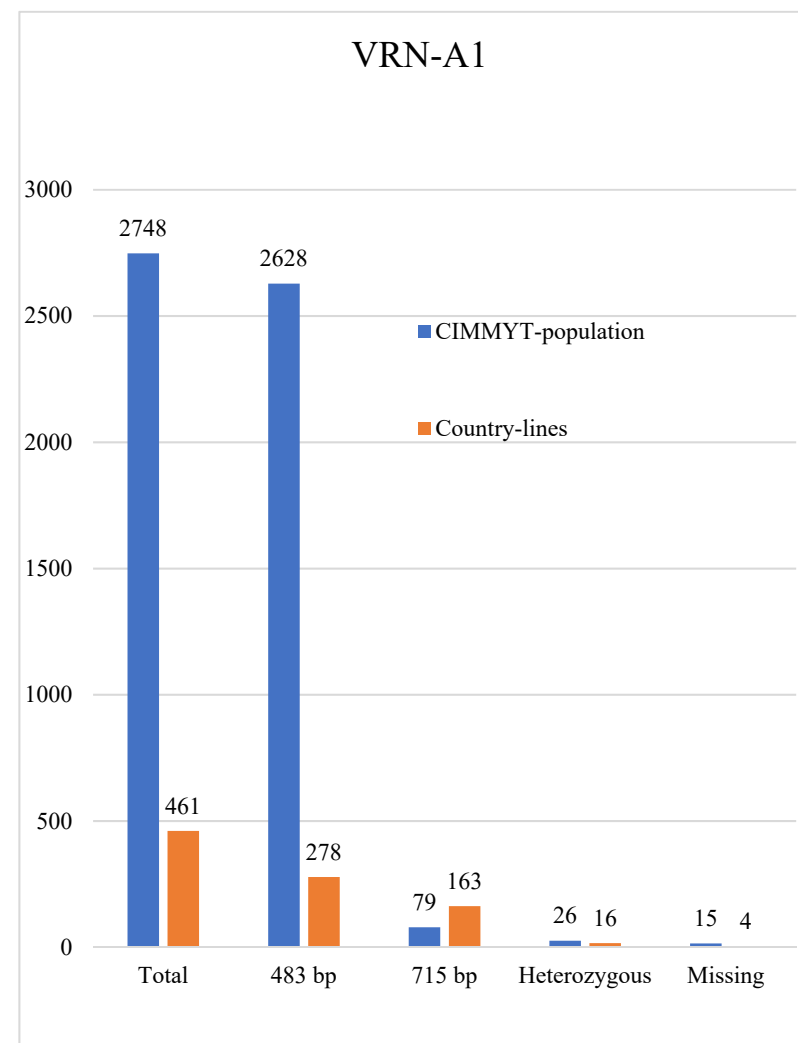
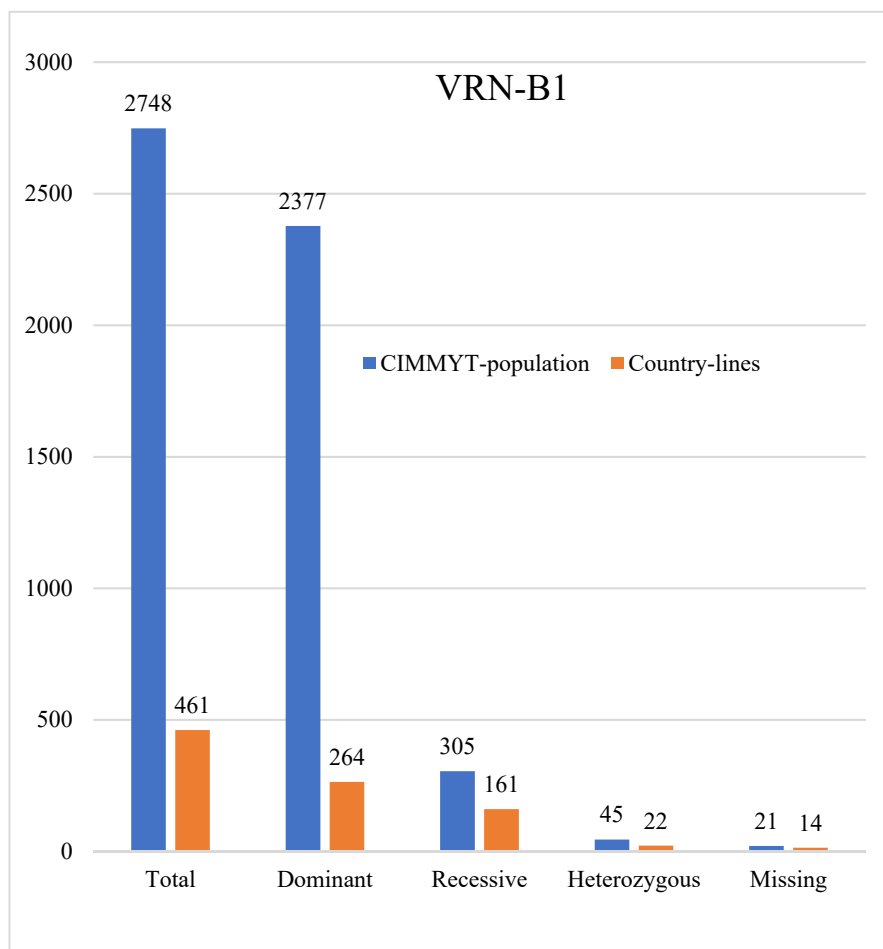


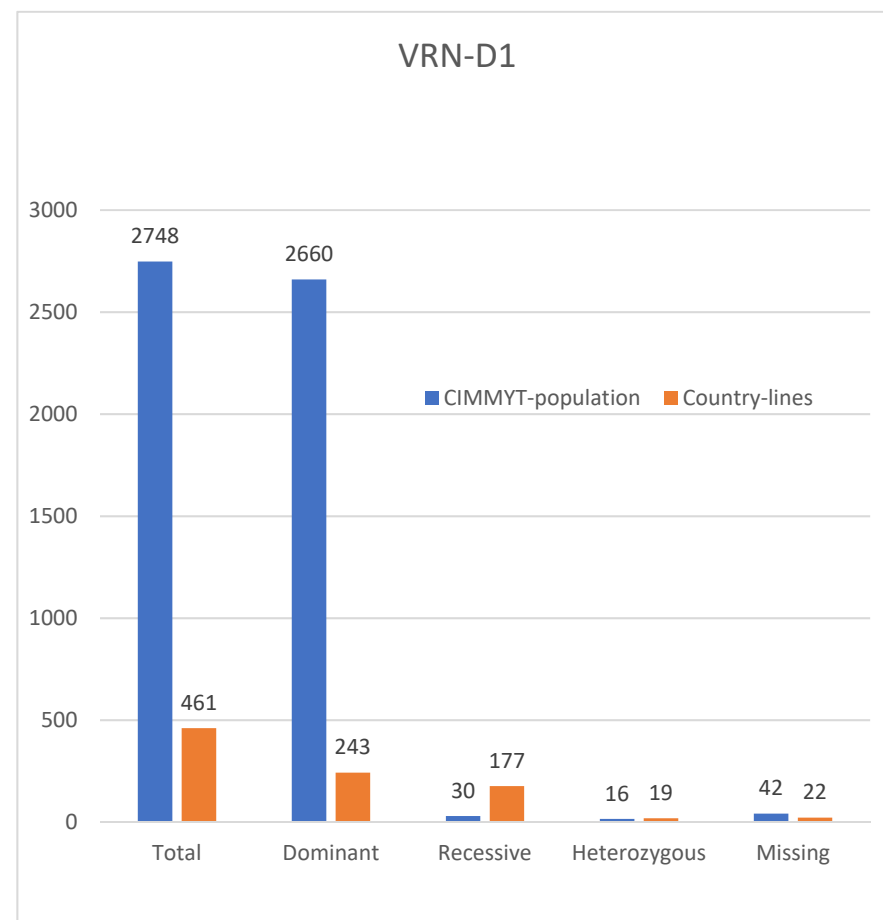
**Figure S1.** Genotyping results for *Ppd-D1*



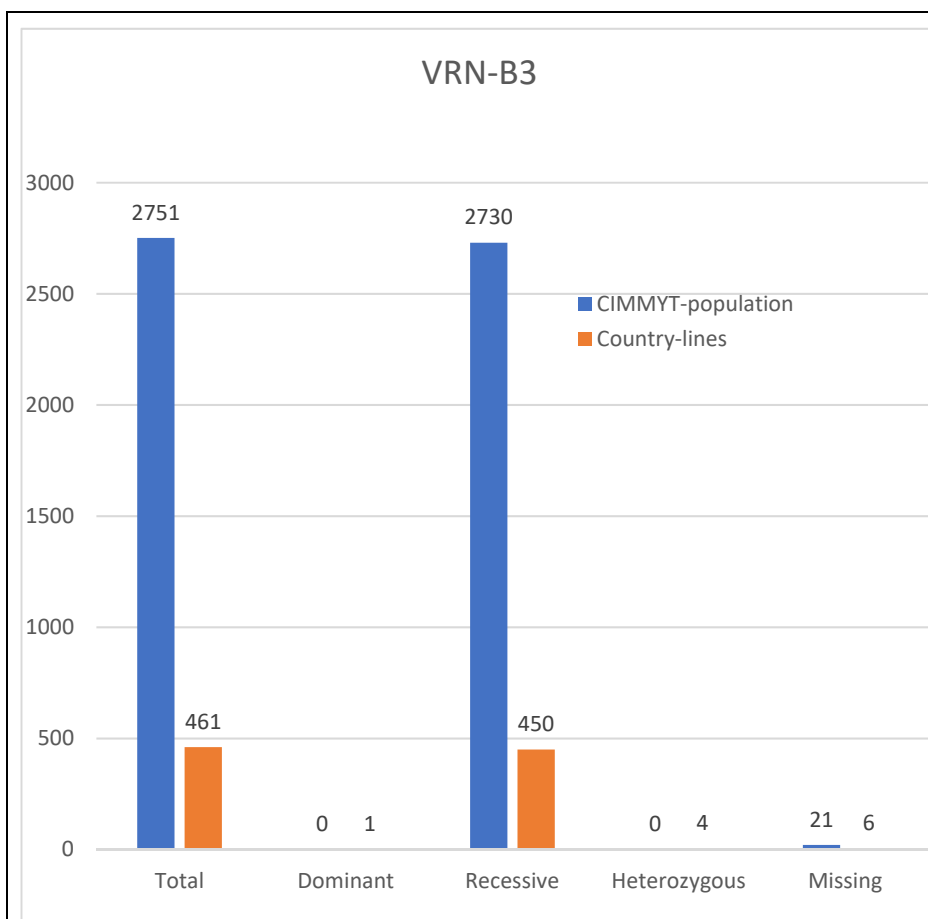
**Figure S2.** Genotyping results for *Vrn-A1*



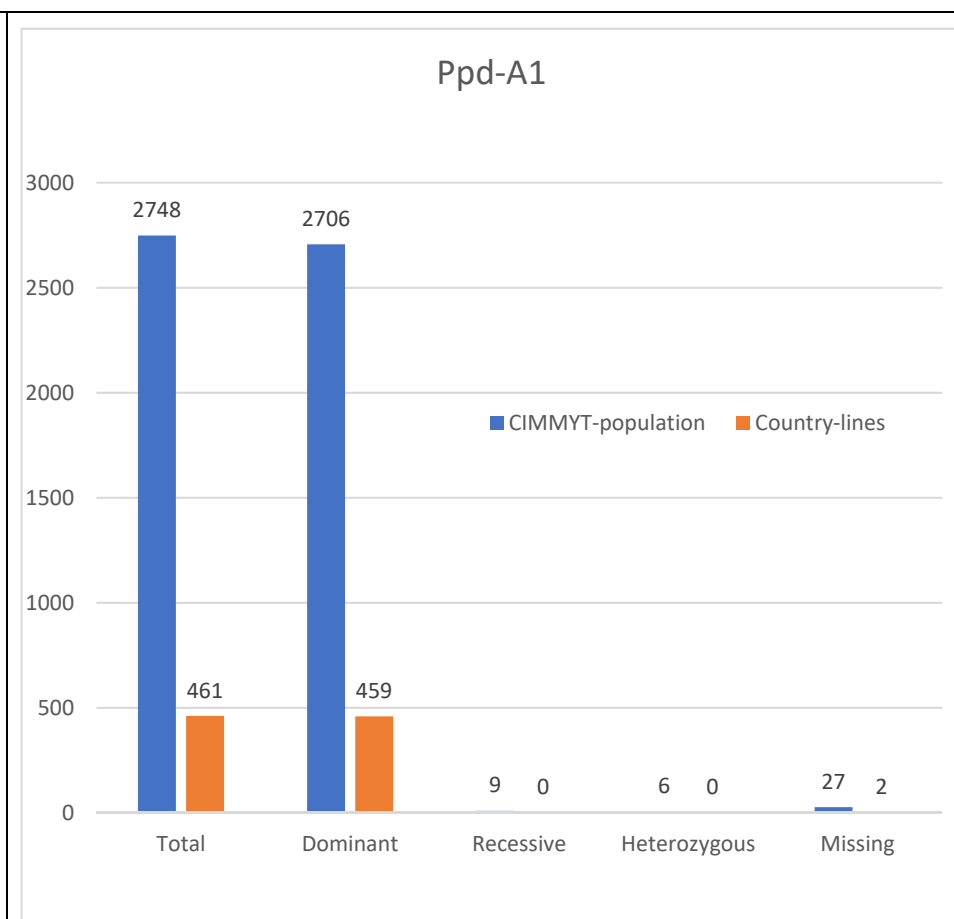
**Figure S3. Genotyping results for Vrn-B1**



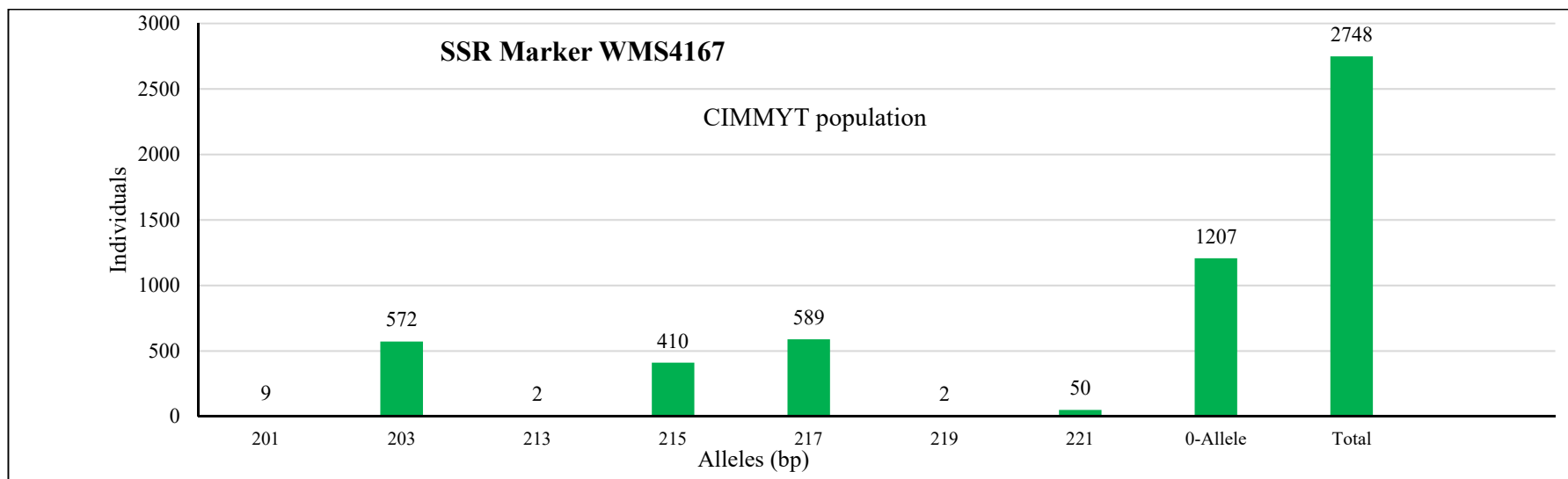
**Figure S4. Genotyping results for Vrn-D1**



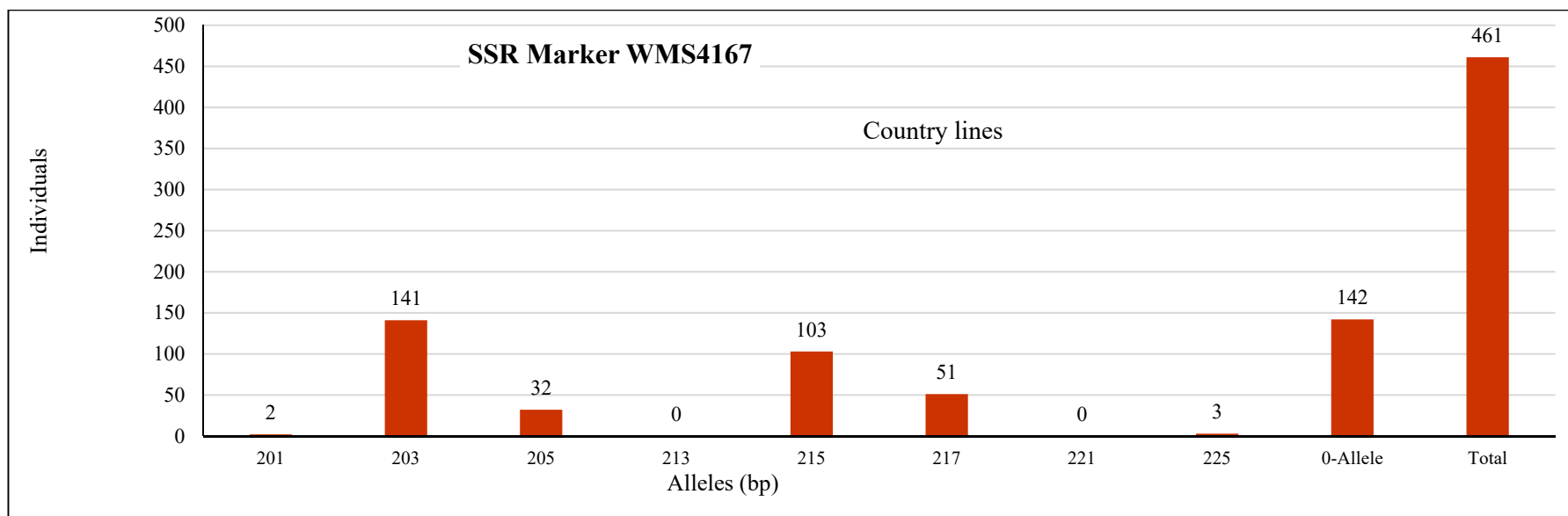
**Figure S5. Genotyping results for Vrn-B3 in CIMMYT and country lines**



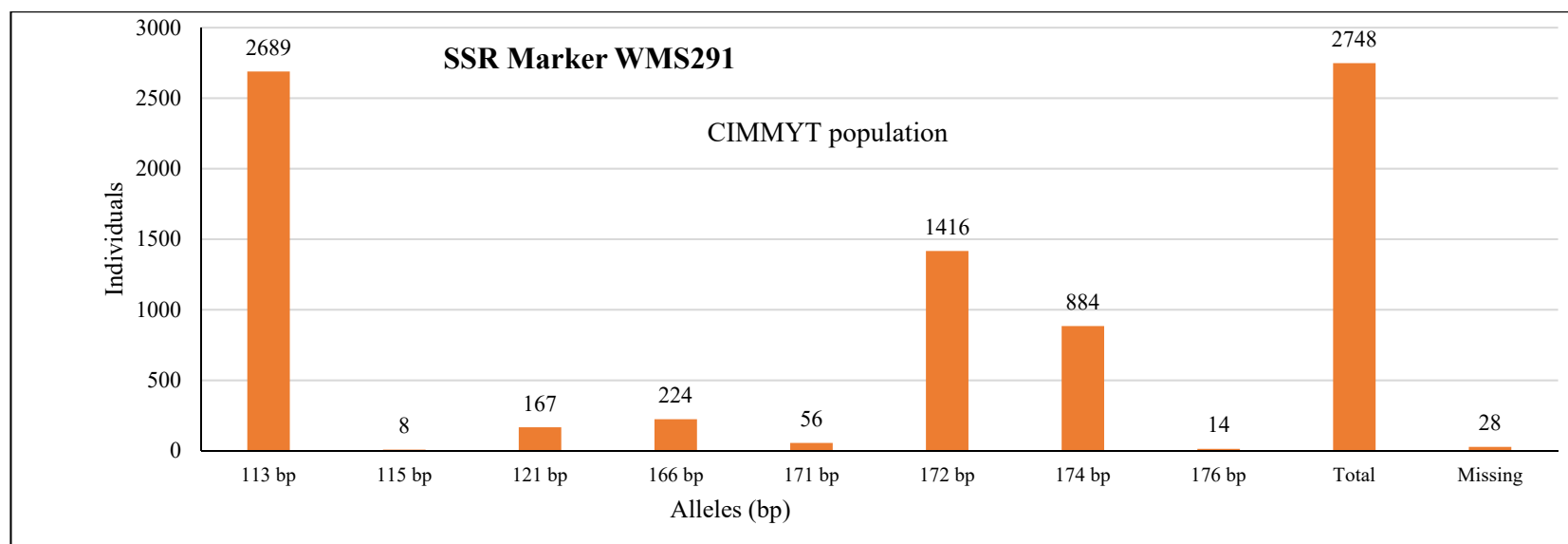
**Figure S6. Genotyping results for Ppd-A1**



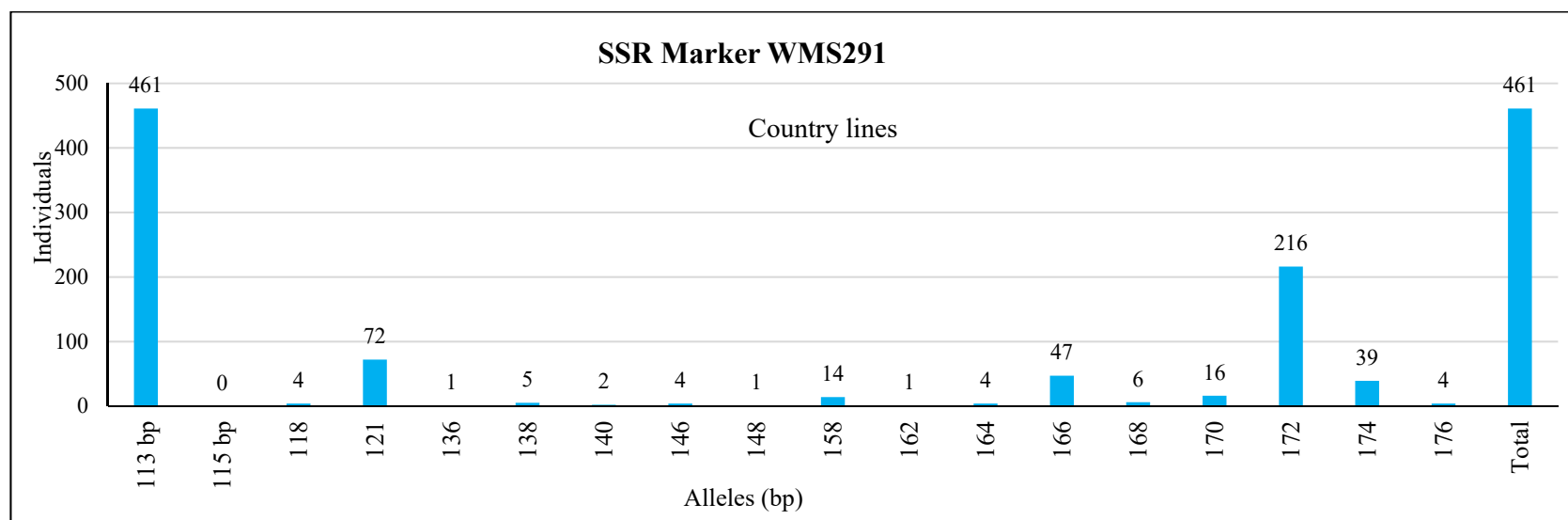
**Figure S7.** Genotyping of SSR-marker WMS4167 (linked to *Ppd-B1*) in the CIMMYT lines



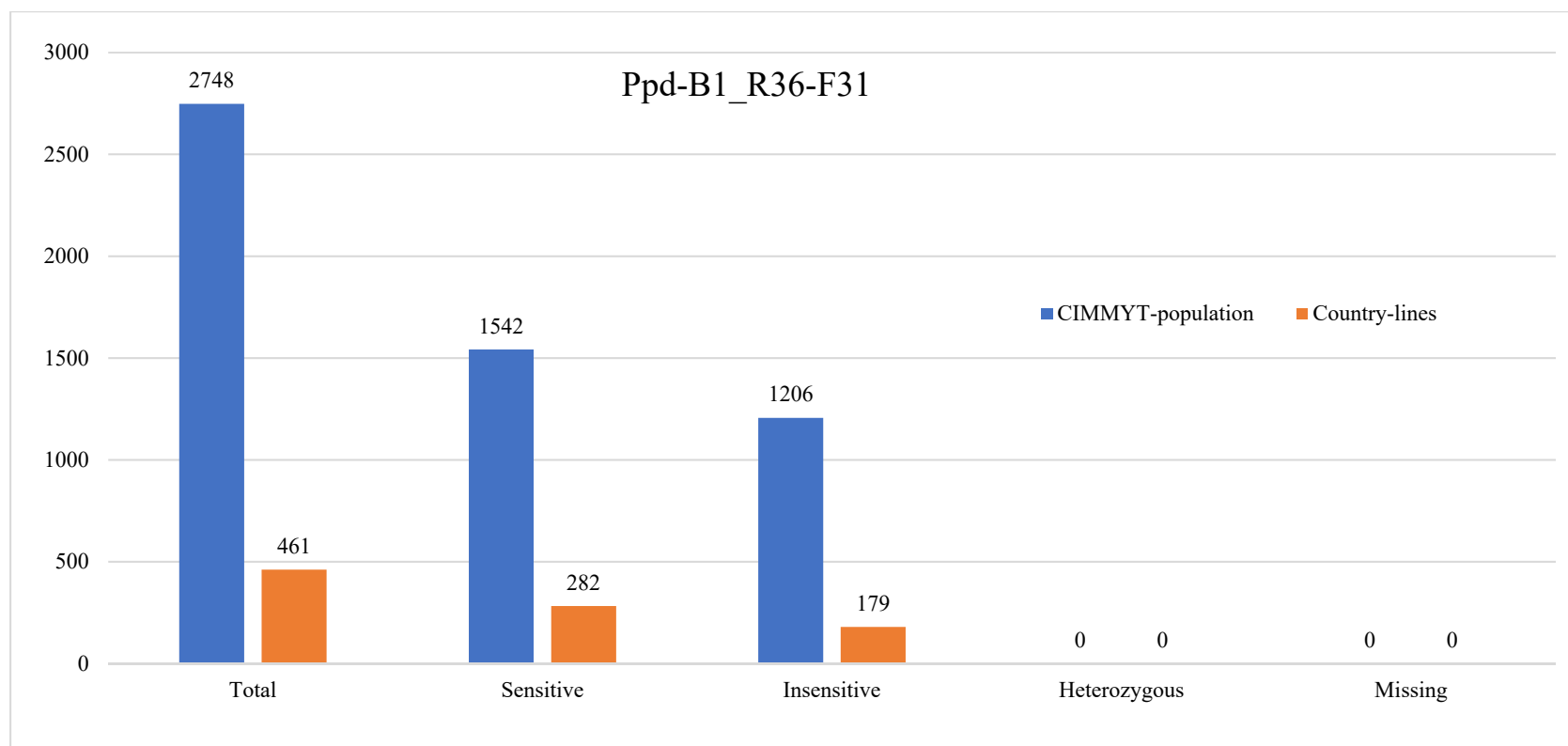
**Figure S8.** Genotyping of SSR-marker WMS4167 (linked to *Ppd-B1*) in the country lines



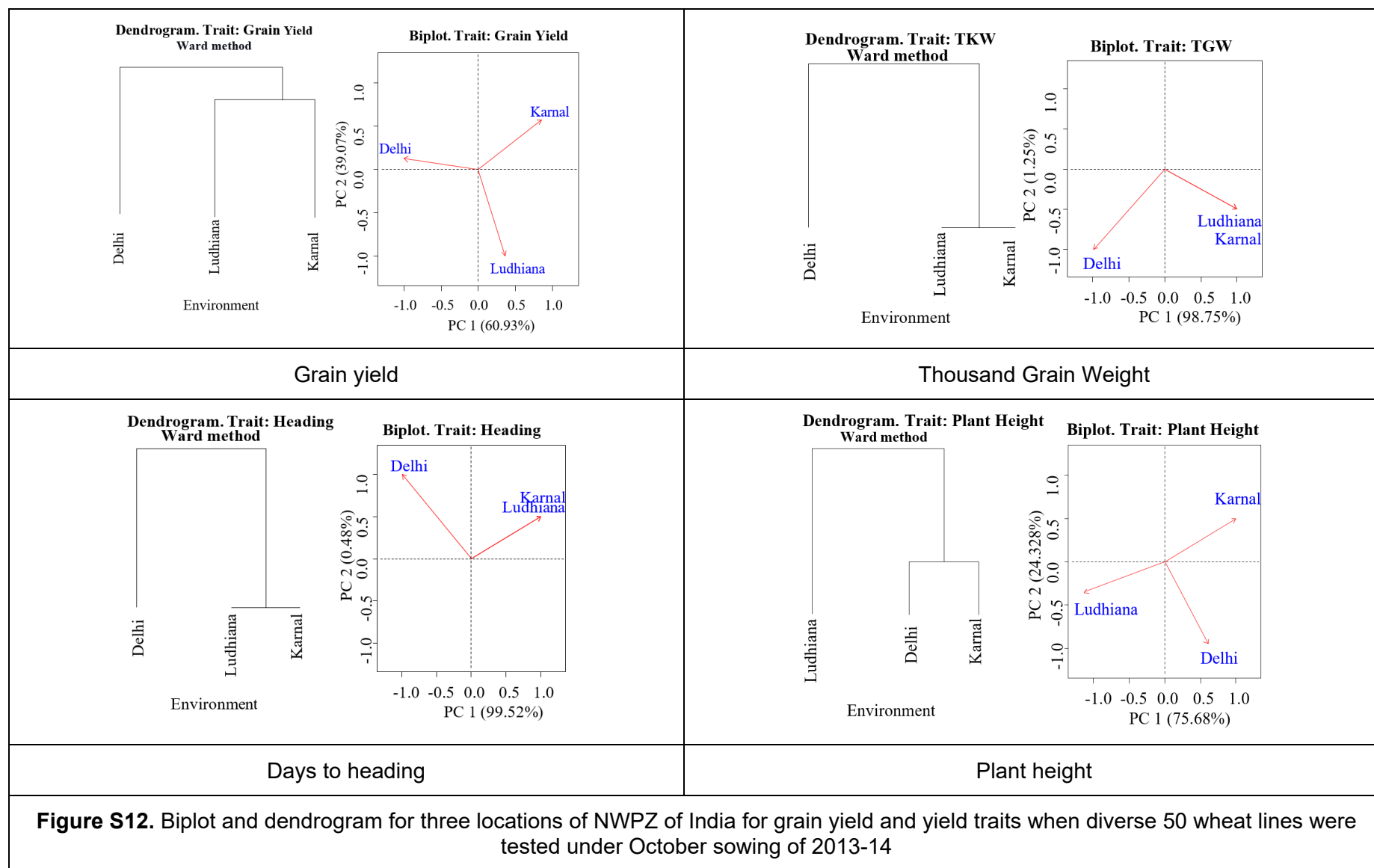
**Figure S9.** Genotyping of SSR-marker WMS291 (linked to *Vrn-A2*) in the CIMMYT lines

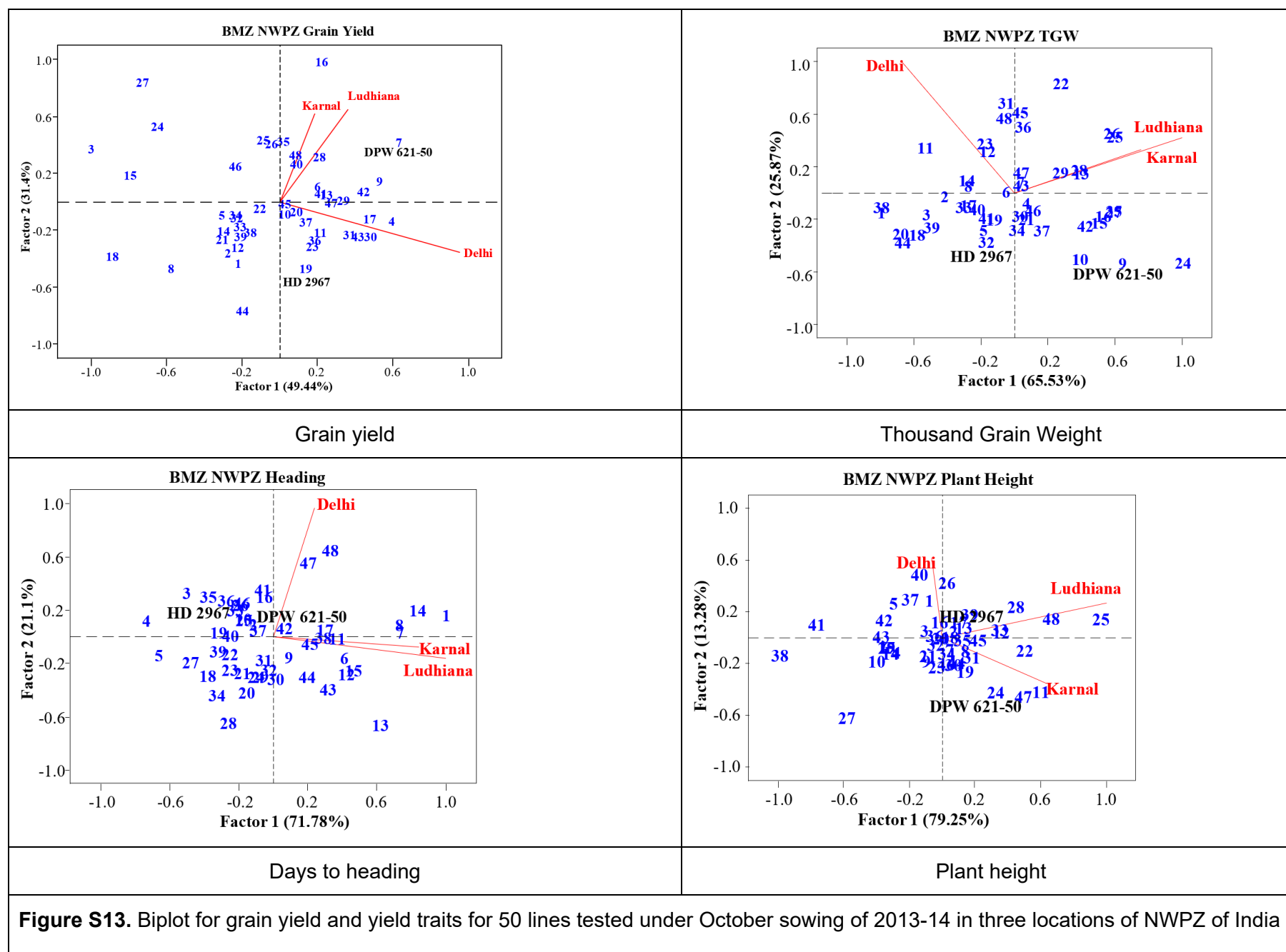


**Figure S10.** Genotyping of SSR-marker WMS291 (linked to *Vrn-A2*) in the country lines

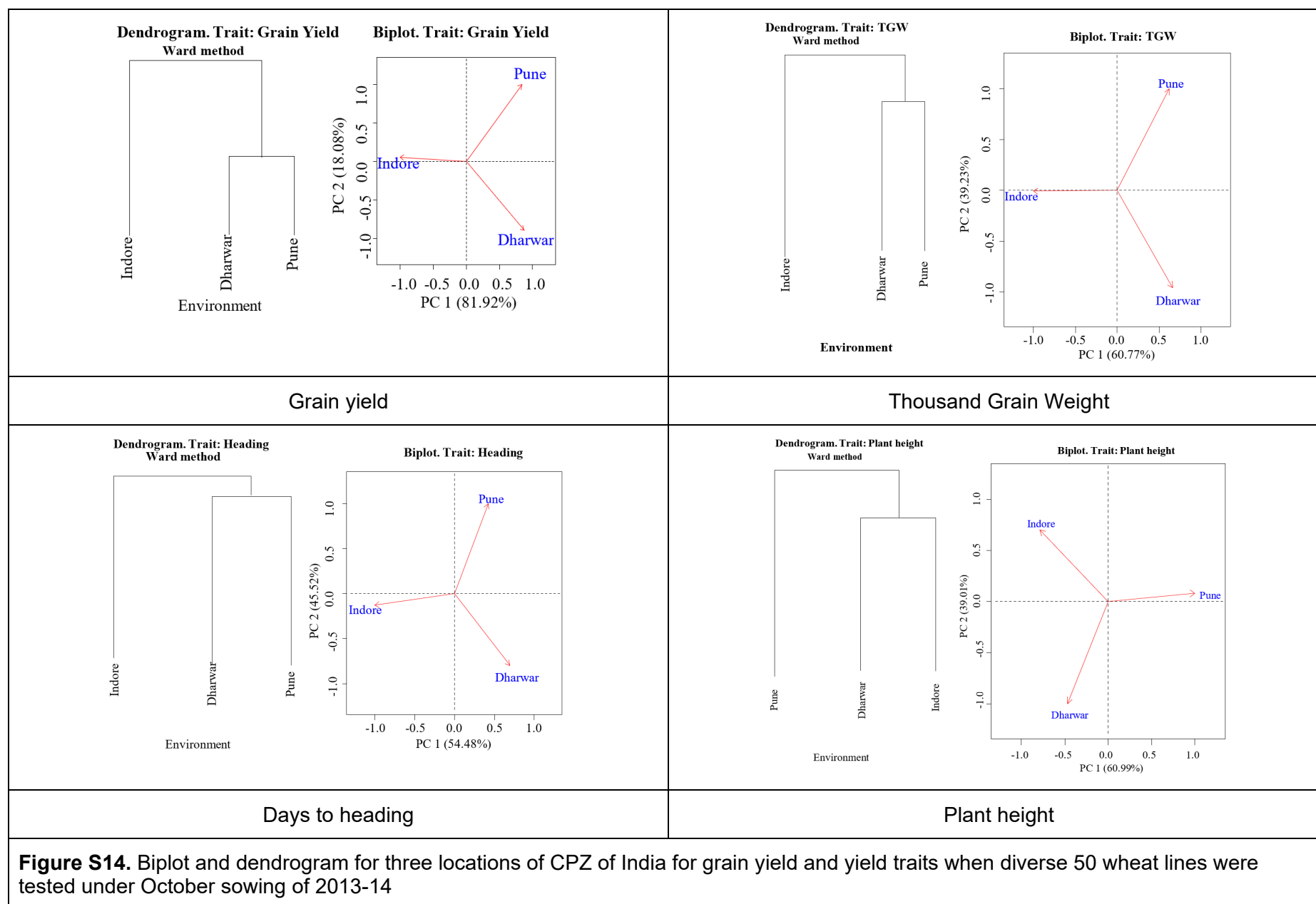


**Figure S11.** Genotyping results for Ppd-B1\_R36-F31

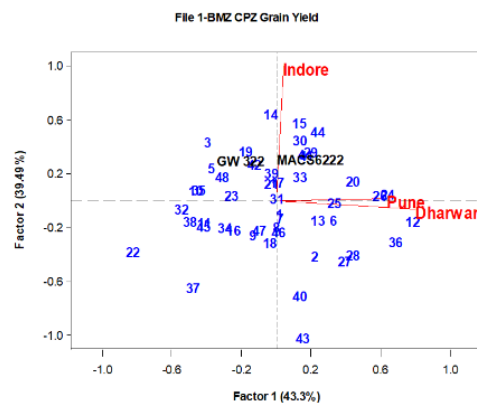




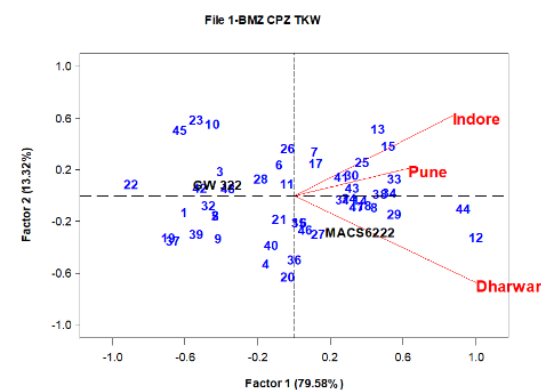




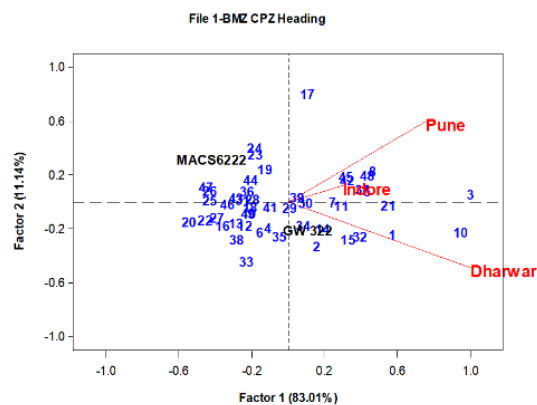
**Figure S14.** Biplot and dendrogram for three locations of CPZ of India for grain yield and yield traits when diverse 50 wheat lines were tested under October sowing of 2013-14



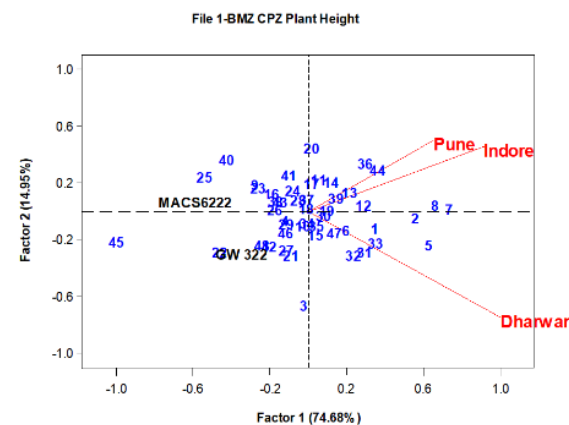
Grain yield



Thousand Grain Weight

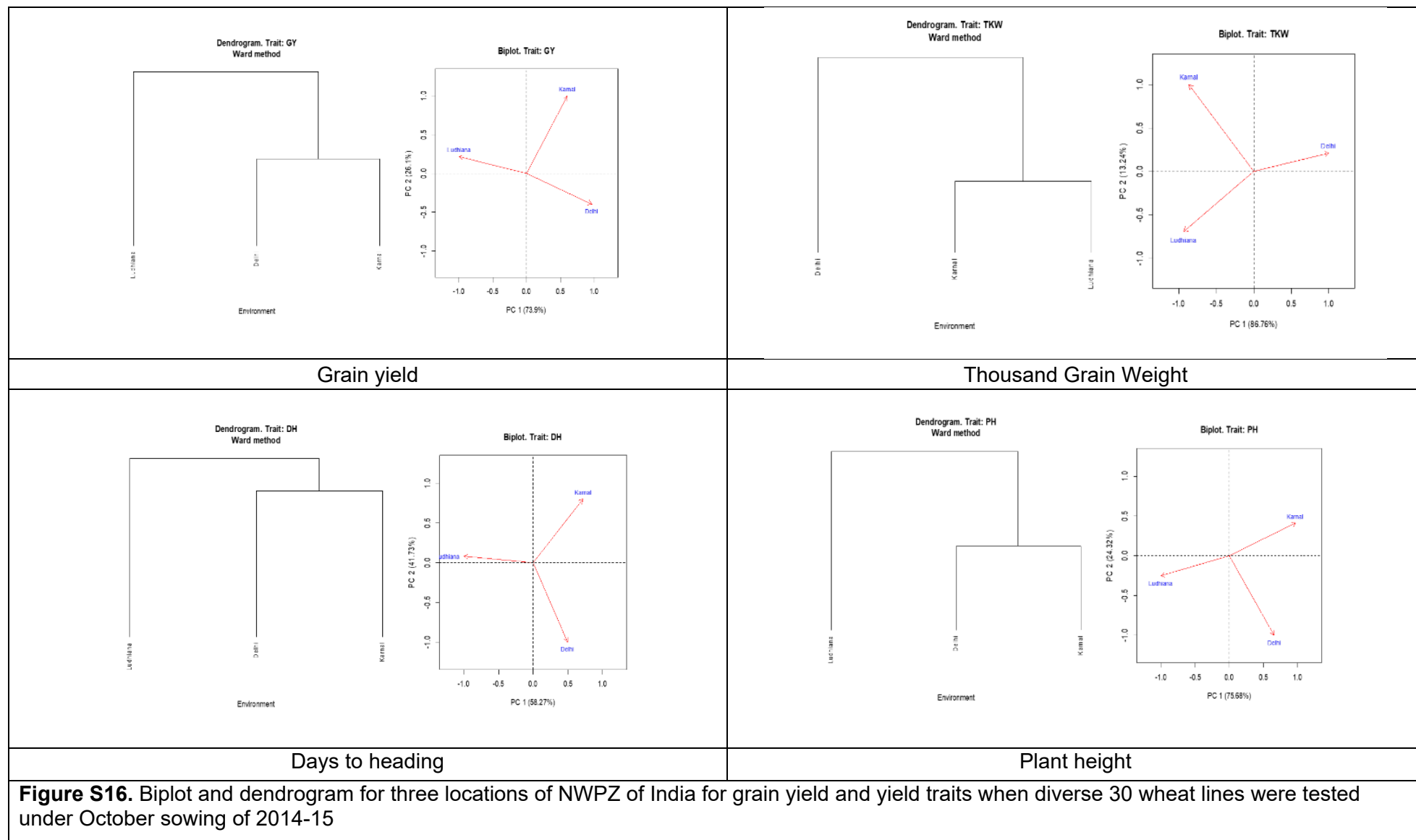


Days to heading



Plant height

**Figure S15.** Biplot for grain yield and yield traits for 50 lines tested under October sowing in three locations of CPZ of India in 2013-14



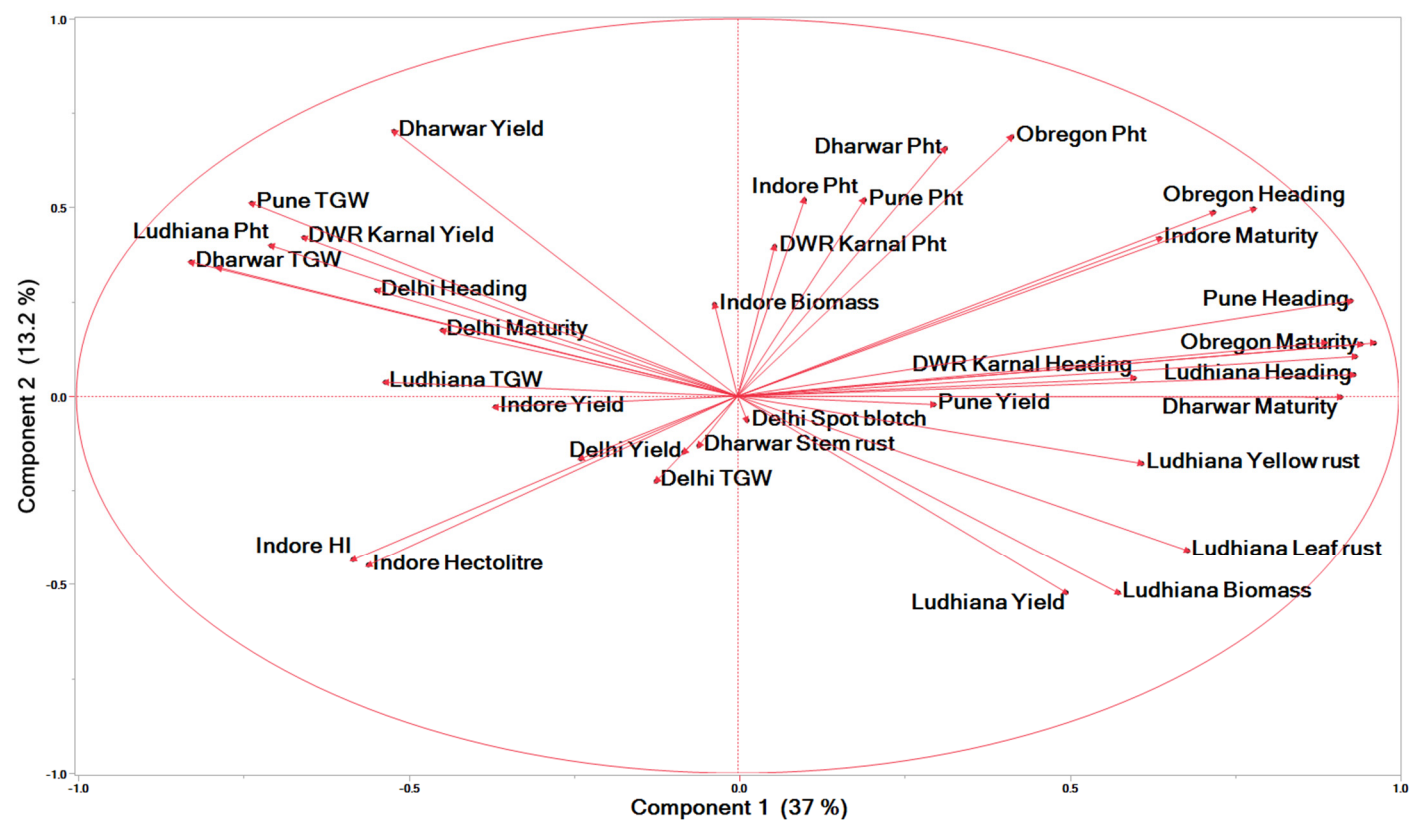
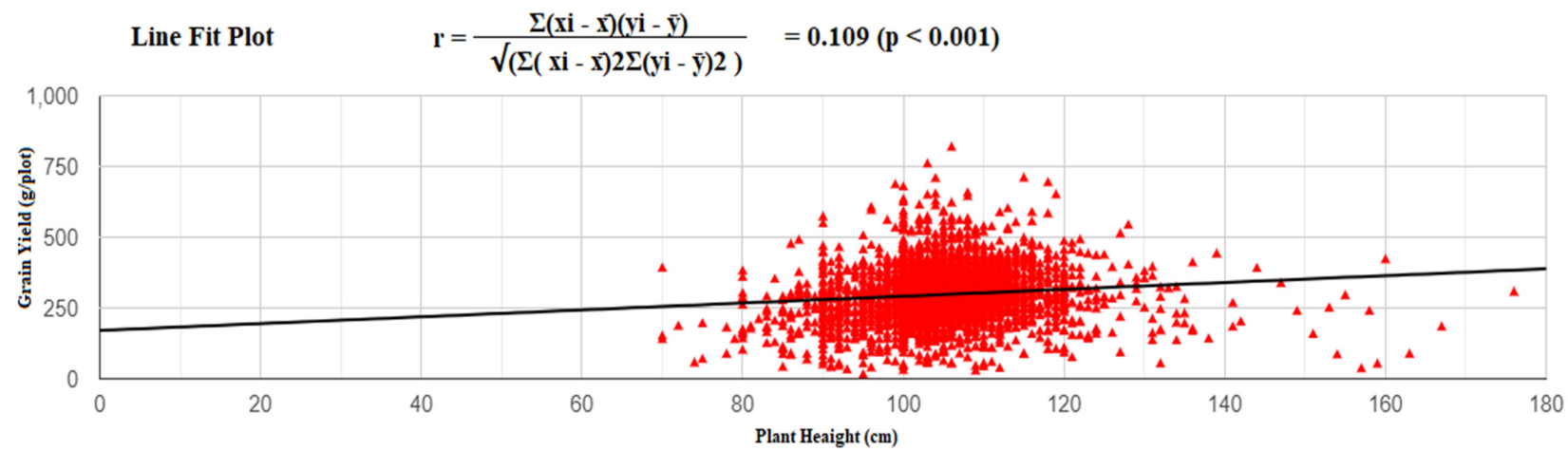


Figure S17: PCA plot of the traits in the different environments



**Figure S18** Line Fit Plot for plant height and grain yield for 3222 lines evaluated under early sown condition

Table S1: Details of lines with pedigree, origin source, selection history, unique GID and other information.

	CIMMYT-population		Country-lines	
Ppd-D1				
Total	2748	100%	461	100.00%
Insensitive	2573	93.60%	401	86.99%
Sensitive	138	5.02%	40	8.68%
Heterozygous	39	1.42%	20	4.34%
Missing	1	0.04%	0	0.00%
VRN-A1				
Total	2748	100%	461	100%
Insensitive	2628	95.63%	278	60.30%
Sensitive	79	2.87%	163	35.36%
Heterozygous	26	0.95%	16	3.47%
Missing	15	0.55%	4	0.87%
VRN-B1				
Total	2748	100%	461	100.00%
Insensitive	2377	86.50%	264	57.27%
Sensitive	305	11.10%	161	34.92%
Heterozygous	45	1.64%	22	4.77%
Missing	21	0.76%	14	3.04%
VRN-D1				
Total	2748	100%	461	100.00%
Insensitive	2660	96.80%	243	52.71%
Sensitive	30	1.09%	177	38.39%
Heterozygous	16	0.58%	19	4.12%
Missing	42	1.53%	22	4.77%
VRN-B3				
Total	2748	100%	461	100.00%
Insensitive	2751	100.11%	1	0.22%
Sensitive	0	0.00%	450	97.61%
Heterozygous	2730	99.34%	4	0.87%
Missing	0	0.00%	6	1.30%
Ppd-A1				
Total	2748	100%	461	100.00%
Insensitive	2706	98.47%	459	99.57%
Sensitive	9	0.33%	0	0.00%
Heterozygous	6	0.22%	0	0.00%
Missing	27	0.98%	2	0.43%

Table S2: Type, number and frequency of alleles based on DNA analysis of markers associated with Vrn nd Ppd genes

	CIMMYT-population		Country-lines	
<b>Ppd-D1</b>				
Total	2748	100%	461	100.00%
Insensitive	2573	93.60%	401	86.99%
Sensitive	138	5.02%	40	8.68%
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Insensitive	2706	98.47%	459	99.57%
Sensitive	9	0.33%	0	0.00%
Heterozygous	6	0.22%	0	0.00%
Missing	27	0.98%	2	0.43%

Table S3: Associations using a two-sided t-test and the p-values for the t-test used to indicate significance of the association among heading and alleles of Ppd and Vrn genes

Trait	Term	Estimate	Std Error	t Ratio	Prob> t  (p-value)	Significance of the association
Delhi Heading	Intercept	90.92	2.95	30.8	4.79E-176	***
Delhi Heading	Ppd-D1a sensitive	-0.95	0.56	-1.71	8.82E-02	NS
Delhi Heading	VRN A1 715 bp	-0.83	1.27	-0.65	5.13E-01	NS
Delhi Heading	VRN D1 dominant	-4.61	2.23	-2.07	3.86E-02	NS
Delhi Heading	VRN-B1 dominant	2.20	1.08	2.03	4.21E-02	NS
Dharwar Heading	Intercept	62.80	2.13	29.52	7.04E-164	***
Dharwar Heading	Ppd-D1a sensitive	5.67	0.40	14.05	3.63E-43	***
Dharwar Heading	VRN A1 715 bp	-8.66	0.92	-9.44	8.53E-21	***
Dharwar Heading	VRN D1 dominant	-1.39	1.61	-0.87	3.86E-01	NS
Dharwar Heading	VRN-B1 dominant	-2.49	0.78	-3.19	1.42E-03	**
DWR Karnal Heading	Intercept	115.53	3.08	37.45	1.34E-242	***
DWR Karnal Heading	Ppd-D1a sensitive	5.14	0.58	8.82	2.20E-18	***
DWR Karnal Heading	VRN A1 715 bp	-7.99	1.33	-6.01	2.19E-09	**
DWR Karnal Heading	VRN D1 dominant	-1.83	2.33	-0.78	4.33E-01	NS
DWR Karnal Heading	VRN-B1 dominant	-3.30	1.13	-2.92	3.52E-03	NS
Indore Heading	Intercept	129.20	1.74	74.41	0.00E+00	***
Indore Heading	Ppd-D1a sensitive	2.95	0.33	9.02	3.72E-19	***
Indore Heading	VRN A1 715 bp	0.47	0.76	0.62	5.35E-01	NS
Indore Heading	VRN D1 dominant	-3.44	1.31	-2.63	8.58E-03	NS
Indore Heading	VRN-B1 dominant	-0.69	0.63	-1.09	2.77E-01	NS
Ludhiana Heading	Intercept	107.87	2.55	42.28	1.31E-292	***
Ludhiana Heading	Ppd-D1a sensitive	4.73	0.48	9.8	2.89E-22	***
Ludhiana Heading	VRN A1 715 bp	-5.14	1.09	-4.71	2.68E-06	**
Ludhiana Heading	VRN D1 dominant	-1.65	1.91	-0.86	3.87E-01	NS
Ludhiana Heading	VRN-B1 dominant	-0.22	0.94	-0.23	8.17E-01	NS
Obregon Heading	Intercept	87.48	3.25	26.93	6.13E-140	***
Obregon Heading	Ppd-D1a sensitive	7.81	0.62	12.69	9.31E-36	***
Obregon Heading	VRN A1 715 bp	-11.94	1.40	-8.52	2.66E-17	***
Obregon Heading	VRN D1 dominant	-2.58	2.45	-1.05	2.92E-01	NS
Obregon Heading	VRN-B1 dominant	-2.88	1.19	-2.42	1.56E-02	NS
Pune Heading	Intercept	63.07	2.40	26.23	1.03E-133	***
Pune Heading	Ppd-D1a sensitive	6.34	0.45	13.95	1.31E-42	***
Pune Heading	VRN A1 715 bp	-9.58	1.04	-9.24	5.36E-20	***
Pune Heading	VRN D1 dominant	-3.03	1.81	-1.67	9.52E-02	NS
Pune Heading	VRN-B1 dominant	-0.56	0.88	-0.63	5.28E-01	NS



