

Table S1. Seedlings reaction of Thatcher *Lr* genes isogenic lines to eight *Prt* pathotypes, Kazakhstan.

Thatcher Near Isogenic Line	Seedlings Reaction to Leaf Rust Pathotypes:							
	TKT/Q	KHT/B	TGT/G	TLT/R	SBR/H	THT/B	QBQ/G	SBP/C
TcLr1	4	2+	4	3+	3+	3+	3+	3+
TcLr2a	3+	3+	4	4	3+	3+	4	3+
TcLr2c	3	3+	3+	3+	3+	3+	;1-	3+
TcLr3a	3+	3	3+	3+	2+	3+	2+	2+
TcLr3bg	4	3	3+	3+	2+	3+	2+	2+
TcLr3ka	3	3+	3+	3+	3+	3+	3+	3+
TcLr9	0	0	0	3	0;	0	0;	0
TcLr10	;1	2+	3+	3+	2+	;1	0;	;1-
TcLr11	3+	3+	3	3	3+	3+	3+	2+
TcLr14b	3	2	3+	3+	2+	3+	3+	3+
TcLr16	4	3	3+	;1	;1-	3+	;1-	;1-
TcLr17	3+	3	3+	3+	2+	3	2+	3+
TcLr18	3	2	3+	3+	2	3+	2+	;1
TcLr19	3+	0	2	3	2	;1-	0	0
TcLr20	3+	2	3+	3+	3+	;1-	3+	2+
TcLr21	3+	2+	4	3+	2+	3+	0	0
TcLr23	3+	;1	2	;1	2+	;1-	0	2+
TcLr24	3+	;1-	0;	;	0	2+	0;	2+
TcLr25	0	0;	0	0	0;	0;	0;	0;
TcLr26	3+	3	2	;1-	2+	3+	2+	2+
TcLr29	2	2	;1-	3+	3+	2+	2+	3+
TcLr30	3+	3	3+	3+	3+	3+	2+	3+

Table S2. Markers and primers used to identify the presence of *Lr* genes in wheat germplasm.

Gene	Localization	Primer Name	Primer Sequence (5'-3')	Annealing Temp. (°C)	Fragment Size (bp)	Reference
<i>Lr1</i>	5DL	pTAG 621-3 pTAG 621-5	5'-CCT TGC CAG CCC AAA AG-3' 5'-GGG TCA CGT ACT ACT ATA-3'	55	560 bp	[47]
<i>Lr9</i>	6B	J13/1 J13/2	5'-TCC TTT TAT TCC GCA CGC CGG-3' 5'-CCA CAC TAC CCC AAA GAG ACG-3'	62	1100 bp	[48]
<i>Lr10</i>	1AS	F1.2245 Lr10-6/r2	5'-GTG TAA TGC ATG CAG GTT CC-3' 5'-AGG TGT GAG TGA GTT ATG TT-3'	57	310 bp	[49]
<i>Lr19</i>	7A	PSY1-EF2 PSY1-ER4	5'-CTA CGT TGC GGG CAC CGT T-3' 5'-AGA GAA AAC CAT TGC ATC TGT A-3'	63	191 bp	[50]
<i>Lr26</i>	1BL	SCM9	5'-TGACAACCCCTTTCCCTCGT-3' 5'-TCATCGACGCTAAGGAGGACCC-3'	60	207 bp	[51]
<i>Lr28</i>	4AL	Wmc313	5'-GCA GTC TAA TTA TCT GCT GGC G-3' 5'-GGG TCC TTG TCT ACT CAT GTC C-3'	51	320 bp	[52]
<i>Lr34</i>	7D	csLV34-F csLV34-R	5'-GTT GGT TAA GAC TGG TGA TGG-3' 5'-TGC TTG CTA TTG CTG AAT AGT-3' 5'-AGGGGCTACTGACCAAGGCT-3'	55	150 bp 229 bp	[53]
<i>Lr37</i>	2AS	Ventriup Ln	5'- TGCAGCTACAGCAGTATGTACACAAAA- 3'	65	262 bp	[54]
<i>Lr68</i>	7BL	csGS-F1 csGS-R1	5'-AAG ATT GTT CAC AGA TCC ATG TCA- 3' 5'-GAG TAT TCC GGC TCA AAA AGG-3'	60	385 bp	[55]