

Table 1. Number and frequency (%) of virulence phenotypes of *Puccinia triticina* in the United States in 2021 identified by virulence to 20^a lines of Thatcher wheat with single genes for leaf rust resistance.

Phenotype virulence	Area 1 ^b		Area 2 ^c		Area 3 ^d		Area 4 ^e		Area 5 ^f		Area 6 ^g		Area 8 ^h		Total	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
LCDSG	0	0	0	0	0	0	0	0	0	0	0	0	1	14.3	1	0.5
1,26,17,B,10,14a,28																
MBDSD	0	0	0	0	0	0	10	18.5	19	32.2	19	30.6	0	0	48	23.2
1,3,17,B,10,14a,39																
MBTNB	1	6.3	0	0	0	0	0	0	1	1.7	3	4.8	0	0	5	2.4
1,3,3ka,11,17,30,B,14a																
MCDSG	0	0	0	0	0	0	0	0	0	0	0	0	2	28.6	2	1.0
1,3,26,17,B,10,14a,28																
MCQHB	0	0	1	16.7	0	0	0	0	0	0	0	0	0	0	1	0.5
1,3,26,3ka,11,10,18																
MCTNB	5	31.3	1	16.7	0	0	0	0	1	1.7	1	1.6	0	0	8	3.9
1,3,26,3ka,11,17,30,B,14a																
MJBJG	0	0	0	0	0	0	2	3.7	0	0	2	3.2	0	0	4	1.9
1,3,16,24,10,14a,28																
MJMJG	0	0	0	0	0	0	0	0	0	0	2	3.2	0	0	2	1.0
1,3,16,24,3ka,30,10,14a,28																
MLPSD	0	0	0	0	0	0	0	0	2	3.4	0	0	0	0	2	1.0
1,3,9,3ka,17,30,B,10,14a,39																
MNPSD	1	6.3	0	0	0	0	30	55.6	22	37.3	20	32.3	1	14.3	74	35.7
1,3,9,24,3ka,17,30,B,10,14a,39																
MPPSD	4	25.0	2	33.3	0	0	11	20.4	13	22.0	8	12.9	2	28.6	40	19.3
1,3,9,24,26,3ka,17,30,B,10,14a,39																
PBDQJ	0	0	0	0	0	0	0	0	0	0	1	1.6	0	0	1	0.5
1,2c,3,17,B,10,28,39																
TBBGS	0	0	0	0	0	0	0	0	0	0	2	3.2	0	0	2	1.0
1,2a,2c,3,10,21,28,39																
TBTNB	2	12.5	0	0	0	0	0	0	0	0	2	3.2	0	0	4	1.9
1,2a,2c,3,3ka,11,17,30,B,14a																
TBTSB	0	0	0	0	0	0	0	0	0	0	1	1.6	0	0	1	0.5
1,2a,2c,3,3ka,11,17,30,B,10,14a																
TCTJB	2	12.5	0	0	0	0	0	0	0	0	0	0	0	2	1.0	
1,2a,2c,3,26,11,17,B,10,14a,18																
TCRKG	0	0	0	0	0	0	0	0	0	0	0	0	1	14.3	1	0.5
1,2a,2c,3,26,3ka,11,30,10,14a,18,28																
TCTLB	0	0	0	0	0	0	0	0	1	1.7	0	0	0	0	1	0.5
1,2a,2c,3,26,3ka,11,17,30,B																
TCTNB	0	0	0	0	1	33.3	0	0	0	0	0	0	0	0	1	0.5
1,2a,2c,3,26,3ka,11,17,30,B,14a																
TCTSB	0	0	2	33.3	0	0	0	0	0	0	0	0	0	0	2	1.0
1,2a,2c,3,26,3ka,11,17,30,B,10,14a																
TDPSB	0	0	0	0	1	33.3	0	0	0	0	0	0	0	0	1	0.5
1,2a,2c,3,24,3ka,17,30,B,10,14a																
TFTSB	1	6.3	0	0	1	33.3	0	0	0	0	0	0	0	0	1	0.5
1,2a,2c,3,24,26,3ka,11,17,30,B,10,14a																
TNBJ	0	0	0	0	0	0	1	1.9	0	0	0	0	0	0	1	0.5
1,2a,2c,3,9,24,10,28,39																
TNBJS	0	0	0	0	0	0	0	0	0	0	1	1.6	0	0	1	0.5
1,2a,2c,3,9,24,10,14a,21,28,39																
Total	16		6		3		54		59		62		7		207	

^a Thatcher lines with genes *Lr1*, *Lr2a*, *Lr2c*, *Lr3*, *Lr9*, *Lr16*, *Lr24*, *Lr26*, *Lr3ka*, *Lr11*, *Lr17*, *Lr30*, *LrB*, *Lr10*, *Lr14a*, *Lr18*, *Lr21*, *Lr28*, *Lr39* and *Lr42*.

^b States of MS, GA, LA, AL, NC, and VA.

^c State of NY.

^d States of MO, IN, KY, OH, IL.

^e States of TX and OK.

^f States of KS and NE.

^g States of MN, SD, and ND.

^h States of ID, WA.

Table 2. Number and frequency (%) of *Puccinia triticina* isolates from the United States in 2021 with virulence to Thatcher lines of wheat near-isogenic for leaf rust resistance genes.

Resistance gene	Area 1 ^a		Area 2 ^b		Area 3 ^c		Area 4 ^d		Area 5 ^e		Area 6 ^f		Area 8 ^g		Total	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
<i>Lr1</i>	16	100.0	6	100.0	3	100.0	54	100.0	59	100.0	62	100.0	7	100.0	207	100.0
<i>Lr2a</i>	5	31.3	2	33.3	3	100.0	1	1.9	1	1.7	6	9.7	1	14.3	19	9.2
<i>Lr2c</i>	5	31.3	2	33.3	3	100.0	1	1.9	1	1.7	7	11.3	1	14.3	20	9.7
<i>Lr3</i>	16	100.0	6	100.0	3	100.0	54	100.0	59	100.0	62	100.0	6	85.7	206	99.5
<i>Lr9</i>	5	31.3	2	33.3	0	0.0	42	77.8	37	62.7	29	46.8	3	42.9	118	57.0
<i>Lr16</i>	0	0.0	0	0.0	0	0.0	2	3.7	0	0.0	4	6.5	0	0.0	6	2.9
<i>Lr24</i>	6	37.5	2	33.3	2	66.7	44	81.5	35	59.3	33	53.2	3	42.9	125	60.4
<i>Lr26</i>	12	75.0	6	100.0	2	66.7	11	20.4	15	25.4	9	14.5	6	85.7	61	29.5
<i>Lr3ka</i>	14	87.5	6	100.0	2	66.7	44	81.5	35	59.3	33	53.2	3	42.9	125	60.4
<i>Lr11</i>	11	68.8	4	66.7	2	66.7	0	0.0	3	5.1	7	11.3	1	14.3	28	13.5
<i>Lr17</i>	16	100.0	5	83.3	3	100.0	51	94.4	59	100.0	55	88.7	6	85.7	195	94.2
<i>Lr30</i>	14	87.5	5	83.3	3	100.0	41	75.9	40	67.8	37	59.7	4	57.1	144	69.6
<i>LrB</i>	16	100.0	5	83.3	3	100.0	51	94.4	59	100.0	55	88.7	6	85.7	195	94.2
<i>Lr10</i>	8	50.0	5	83.3	2	66.7	54	100.0	56	94.9	56	90.3	7	100.0	188	90.8
<i>Lr14a</i>	16	100.0	5	83.3	3	100.0	53	98.1	58	98.3	59	95.2	7	100.0	201	97.1
<i>Lr18</i>	2	12.5	1	16.7	0	0.0	0	0.0	0	0.0	0	0.0	1	14.3	4	1.9
<i>Lr21</i>	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	4.8	0	0.0	3	1.4
<i>Lr28</i>	0	0.0	0	0.0	0	0.0	3	5.6	0	0.0	8	12.9	4	57.1	15	7.2
<i>Lr39</i>	5	31.3	2	33.3	0	0.0	52	96.3	56	94.9	51	82.3	3	42.9	169	81.6
<i>Lr42</i>	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	16		6		3		54		59		62		7		207	

^a States of MS, GA, LA, AL, NC, and VA.

^b State of NY.

^c States of MO, IN, KY, OH, IL.

^d States of TX and OK.

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