

**Table S2. Strains used in this work**

Strain ID	Relevant Genotype	Comment / Source or origin
Uh359	<i>MAT-1 Uhavr1</i>	wild type, alias Uh4854-4, virulent on cv. Hannchen [38]
Uh362	<i>MAT-2 Uhavr1</i>	wild type, alias Uh4854-10, virulent on cv. Hannchen [38]
Uh364	<i>MAT-1 UhAvr1</i>	wild type, alias Uh4857-4, avirulent on cv. Hannchen [38]
Uh365	<i>MAT-2 UhAvr1</i>	wild type, alias Uh 4857-5, avirulent on cv. Hannchen [38]
Um324	<i>a2b2</i>	wild type; Um521 [102]
Uh951	Uh364 ( <i>MAT-1, ΔUHOR_08134</i> ); hyg <sup>R</sup>	this work
Uh1041	Uh364 ( <i>MAT-1, Δ18A2</i> ); cbx <sup>R</sup>	deletion of fragment 18A2 (see Figure 1); this work
Uh1046	Uh364 ( <i>MAT-1, Δ18A3</i> ); cbx <sup>R</sup>	deletion of fragment 18A3 (see Figure 1); this work
Uh1051	Uh364 ( <i>MAT-1, 18A4</i> ); cbx <sup>R</sup>	deletion of fragment 18A4 (see Figure 1); this work
Uh1116	<i>MAT-2, Δ18A2 (31)</i> ; cbx <sup>R</sup>	progeny #31 ( <i>MAT-2</i> ) of cross Uh362xUh1041; this work
Uh1117	<i>MAT-2, Δ18A2 (33)</i> ; cbx <sup>R</sup>	progeny #33 ( <i>MAT-2</i> ) of cross Uh362xUh1041; this work
Uh1118	<i>MAT-2, Δ18A2 (35)</i> ; cbx <sup>R</sup>	progeny #35 ( <i>MAT-2</i> ) of cross Uh362xUh1041; this work
Uh1131	Uh364 ( <i>MAT-1, Δ18A2-b</i> ); cbx <sup>R</sup>	deletion of fragment 18A2-b, clone 52 (see Figure 1); this work
Uh1137	Uh364 ( <i>MAT-1, Δ18A2-c</i> ); cbx <sup>R</sup>	deletion of fragment 18A2-c, clone 19 (see Figure 1); this work
Uh1142	Uh364 ( <i>MAT-1, Δ18A2-c</i> ); cbx <sup>R</sup>	deletion of fragment 18A2-c, clone 59 (see Figure 1); this work
Uh1149	Uh364 ( <i>MAT-1, Δ18A2-d</i> ); cbx <sup>R</sup>	deletion of fragment 18A2-d, clone 1 (see Figure 1); this work
Uh1155	Uh364 ( <i>MAT-1, Δ18A2-d</i> ); cbx <sup>R</sup>	deletion of fragment 18A2-d, clone 82 (see Figure 1); this work
Uh1166	Uh364 ( <i>MAT-1, Δ18A2-a</i> ); cbx <sup>R</sup>	deletion of fragment 18A2-a, clone 76 (see Figure 1); this work
Uh1173	Uh364 ( <i>MAT-1, Δ18A2-a</i> ); cbx <sup>R</sup>	deletion of fragment 18A2-a, clone 316 (see Figure 1); this work
Uh1189	Uh364 ( <i>MAT-1, Δ18A2-e</i> ); cbx <sup>R</sup>	deletion of fragment 18A2-e, clone 64 (see Figure 1); this work
Uh1197	Uh364 ( <i>MAT-1, Δ18A2-e</i> ); cbx <sup>R</sup>	deletion of fragment 18A2-e, clone 109 (see Figure 1); this work
Uh1205	Uh1041 [BAC1-6]; cbx <sup>R</sup> hyg <sup>R</sup>	BAC clone pBAC1-6 (Figure 1A) randomly integrated, clone 2; this work
Uh1207	Uh1041 [BAC1-6]; cbx <sup>R</sup> hyg <sup>R</sup>	BAC clone pBAC1-6 (Figure 1A) randomly integrated; clone 8; this work
Uh1250	Uh1041 [HSP70: <i>UHOR_10021:HA</i> ]; cbx <sup>R</sup> zeo <sup>R</sup>	complemented with randomly integrated effector UHOR_10021:C-terminal HA tag, expressed from constitutive HSP70 promoter, clone 3; this work
Uh1251	Uh1041 [HSP70: <i>UHOR_10021:HA</i> ]; cbx <sup>R</sup> zeo <sup>R</sup>	complemented with randomly integrated effector UHOR_10021:C-terminal HA tag, expressed from constitutive HSP70 promoter, clone 4; this work
Uh1253	Uh1041 [HSP70: <i>UHOR_10021-SP:HA</i> ]; cbx <sup>R</sup> zeo <sup>R</sup>	complemented with randomly integrated effector UHOR_10021:C-terminal HA tag, minus signal peptide, expressed from constitutive HSP70 promoter, clone 2; this work
Uh1254	Uh1041 [HSP70: <i>UHOR_10021-SP:HA</i> ]; zeo <sup>R</sup>	complemented with randomly integrated effector UHOR_10021:C-terminal HA tag, minus signal peptide, expressed from constitutive HSP70 promoter, clone 3; this work
Uh1255	Uh1041 [HSP70: <i>UhAvr1:HA</i> ]; cbx <sup>R</sup> zeo <sup>R</sup>	complemented with randomly integrated effector UHOR_10022:C-terminal HA tag, expressed from constitutive HSP70 promoter, clone 1; this work
Uh1256	Uh1041 [HSP70: <i>UhAvr1:HA</i> ]; cbx <sup>R</sup> zeo <sup>R</sup>	complemented with randomly integrated effector UHOR_10022:C-terminal

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Uh1257	Uh1041 [HSP70: <i>UhAvr1</i> -SP:HA]; cbx <sup>R</sup> zeo <sup>R</sup>	HA tag, expressed from constitutive HSP70 promoter, clone 4; this work complemented with randomly integrated effector UHOR_10022:C-terminal HA tag, minus signal peptide, expressed from constitutive HSP70 promoter, clone 4; this work
Uh1258	Uh1041 [HSP70: <i>UhAvr1</i> -SP:HA]; cbx <sup>R</sup> zeo <sup>R</sup>	complemented with randomly integrated effector UHOR_10022:C-terminal HA tag, minus signal peptide, expressed from constitutive HSP70 promoter, clone 6; this work
Uh1289	Uh364 ( <i>MAT-1</i> , $\Delta$ <i>UhAvr1</i> ); cbx <sup>R</sup>	single <i>UhAvr1</i> deletion, clone 37; this work
Uh1297	Uh364 ( <i>MAT-1</i> , $\Delta$ <i>UhAvr1</i> ); cbx <sup>R</sup>	single <i>UhAvr1</i> deletion, clone 106; this work
Uh1351	Uh364 ( <i>MAT-1</i> , <i>Avr1</i> [otef: <i>gfp</i> ]); zeo <sup>R</sup>	GFP expressed from strong constitutive <i>Ustilago</i> otef promoter; this work
Uh1353	Uh1289 [ <i>UhAvr1</i> : <i>gfp</i> ]; zeo <sup>R</sup>	$\Delta$ <i>UhAvr1</i> , replacing deletion by UHOR_10022:GFP chimer, clone 2; this work
Uh1354	Uh1289 [ <i>UhAvr1</i> : <i>gfp</i> ]; zeo <sup>R</sup>	$\Delta$ <i>UhAvr1</i> , replacing deletion by UHOR_10022:GFP chimer, clone 3; this work
Uh1355	Uh1289 [ <i>UhAvr1</i> : <i>gfp</i> ]; zeo <sup>R</sup>	$\Delta$ <i>UhAvr1</i> , replacing deletion by UHOR_10022:GFP chimer, clone 4; this work
Uh1357	Uh1289 [otef: <i>UhAvr1</i> : <i>gfp</i> ]; zeo <sup>R</sup> cbx <sup>R</sup>	$\Delta$ <i>UhAvr1</i> , randomly integrated effector UHOR_10022:GFP chimer driven from strong otef promoter, clone 1; this work
Uh1358	Uh1289 [otef: <i>UhAvr1</i> : <i>gfp</i> ]; zeo <sup>R</sup> cbx <sup>R</sup>	$\Delta$ <i>UhAvr1</i> , randomly integrated effector UHOR_10022:GFP chimer driven from strong otef promoter, clone 2; this work
Uh1359	Uh1289 [otef: <i>UhAvr1</i> : <i>gfp</i> ]; zeo <sup>R</sup> cbx <sup>R</sup>	$\Delta$ <i>UhAvr1</i> , randomly integrated effector UHOR_10022:GFP chimer driven from strong otef promoter, clone 3; this work
Uh1361	Uh1289 [HSP70: <i>UhAvr1</i> :HA]; zeo <sup>R</sup> cbx <sup>R</sup>	$\Delta$ <i>UhAvr1</i> , randomly integrated effector UHOR_10022:C-terminal HA tag chimer, driven from strong HSP70 promoter, clone 1; this work
Uh1362	Uh1289 [HSP70: <i>UhAvr1</i> :HA]; zeo <sup>R</sup> cbx <sup>R</sup>	$\Delta$ <i>UhAvr1</i> , randomly integrated effector UHOR_10022:C-terminal HA tag chimer, driven from strong HSP70 promoter, clone 2; this work
Uh1363	Uh1289 [HSP70: <i>UhAvr1</i> -SP:HA]; zeo <sup>R</sup> cbx <sup>R</sup>	$\Delta$ <i>UhAvr1</i> , randomly integrated effector UHOR_10022:C-terminal HA tag chimer minus SP, driven from strong HSP70 promoter, clone 1; this work
Uh1369	Uh1289 [HSP70: <i>UhAvr1</i> ]1; zeo <sup>R</sup> cbx <sup>R</sup>	$\Delta$ <i>UhAvr1</i> , randomly integrated wild type effector UHOR_10022 ORF, driven from strong HSP70 promoter, clone 1; this work
Uh1370	Uh1289 [HSP70: <i>UhAvr1</i> ]4; zeo <sup>R</sup> cbx <sup>R</sup>	$\Delta$ <i>UhAvr1</i> , randomly integrated wild type effector UHOR_10022 ORF, driven from strong HSP70 promoter, clone 4; this work
Uh1371	Uh1289 [HSP70: <i>UhAvr1</i> ]9; zeo <sup>R</sup> cbx <sup>R</sup>	$\Delta$ <i>UhAvr1</i> , randomly integrated wild type effector UHOR_10022 ORF, driven from strong HSP70 promoter, clone 9; this work
Uh1372	Uh1289 [complete <i>UhAvr1</i> gene]1; zeo <sup>R</sup> cbx <sup>R</sup>	$\Delta$ <i>UhAvr1</i> , randomly integrated complete wild type effector UHOR_10022 gene; transformant 1; this work
Uh1373	Uh1289 [complete <i>UhAvr1</i> gene]2; zeo <sup>R</sup> cbx <sup>R</sup>	$\Delta$ <i>UhAvr1</i> , randomly integrated complete wild type effector UHOR_10022 gene; transformant 2; this work

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Uh1374	Uh1289 [complete <i>UhAvr1</i> gene] <sup>3</sup> ; zeo <sup>R</sup> cbx <sup>R</sup>	$\Delta$ <i>UhAvr1</i> , randomly integrated complete wild type effector UHOR_10022 gene; transformant 3; this work
<b>World-wide field isolates</b>		
Uh795	<i>MAT-1 UhAvr1</i>	unknown
Uh798	<i>MAT-2 UhAvr1</i>	unknown
Uh805	<i>MAT-1 Uhavr1</i>	Kenya
Uh811	<i>MAT-1 Uhavr1</i>	Ethiopia
Uh813	<i>MAT-1 UhAvr1</i>	Iran
Uh815	<i>MAT-2 Uhavr1</i>	Canary Island
Uh818	<i>MAT-1 Uhavr1</i>	Spain
Uh820	<i>MAT-2 Uhavr1</i>	Tunisia
Uh822	<i>MAT-1 Uhavr1</i>	Canada
Uh1273	<i>MAT-1 UhAvr1</i>	ICARDA Azerbaijan
Uh1278	<i>MAT-1 Uhavr1</i>	Hama Hamra, Syria
Uh1283	<i>MAT-1 UhAvr1</i>	Turkey
Uh2001-246	<i>MAT-1 Uhavr1</i>	Turkey

Uh, *U. hordei*; Um, *U. maydis*. All mutants were generated in the Uh364 background. R, resistant to the indicated antibiotic: hyg, hygromycin B; zeo, zeomycin / zeocin; cbx, carboxin; integrative complementing plasmids are in between square brackets.  $\Delta$ , deletion mutant, indicating specific gene or region.

38. Linning R, Lin D, Lee N, Abdennadher M, Gaudet D, et al. (2004) Marker-based cloning of the region containing the *UhAvr1* avirulence gene from the basidiomycete barley pathogen *Ustilago hordei*. *Genetics* 166: 99-111.
102. Kronstad JW, Leong SA (1989) Isolation of two alleles of the b locus of *Ustilago maydis*. *Proc Natl Acad Sci U S A* 86: 978-982.