

Table S1. Origin of the diversity panel

Breeder	Abbreviation	Country	Number of lines
UHOH, Landessaatzuchtanstalt (720)	UHOH	DE	172
HegeSaat GmbH & Co. KG	HegeSaat	DE	135
Nordsaat Saatzucht GmbH	Nordsaat	DE	89
DANKO Hodowla Roslin Sp. z o.o.	DANKO	PL	53
Pflanzenzucht Oberlimpurg	POZ	DE	25
Lantmännern SW Seed B.V.	Lantmännern	SE	18
Field Crop Development Centre (Canada)	Canada	CA	16
DSP Delley semences et plantes SA	DSP	CH	16
RAGT 2n S.A.S.	RAGT	FR	16
Hodowla Roslin Strzelce sp. z o.o. Grupa IHAR	Hodowla Roslin	PL	13
Saatzucht Streng-Engelen GmbH & Co. KG	SZ Streng- Engelen	DE	12
Northern Seed LLC (USA)	Northern Seed	US	12
KWS LOCHOW GMBH	KWS LOCHOW	DE	10
Florimond Desprez Veuve & Fils S.A.S.	Florimond	FR	9
Lemaire-Deffontaines S.A.	Lemaire-Deffontaines	FR	9
Getreidezüchtung Peter Kunz	Kunz	CH	8
P.H. PETERSEN SAATZUCHT GmbH	Petersen Saatzucht	DE	7
Agri Obtentions	Agri Obt.	FR	7
NARDI Fundulea (Romania)	NARDI	RO	7
Saatzucht Donau GesmbH. & CoKG	SZ Donau	AT	6
Ghent University (Belgium)	Uni Ghent	BE	5
Saatzucht Josef Breun GmbH & Co. KG	SZ Breun	DE	3
Sejet Planteforædling I/S	Sejet	DK	2
Deutsche Saatveredelung AG	DSV-Saaten	DE	1
Fr Strube Saatzucht GmbH & Co. KG	Strube	DE	1
JKI	JKI	DE	1
SECOBRA Saatzucht GmbH	SECOBRA	DE	1
Caussade Semences S.A.	Caussade	FR	1
Russian Federation	Russian Fed.	RU	1
Sum			656

Table S2. Characteristics of the experimental sites Bohlingen (BOH), Hohenheim (HOH), Oberer Lindenhof (OLI), and Pflanzenzüchtung Oberlimpurg (PZO) over a long term mean of 30 years from 1961-1990.

Location	Latitude	Longitude	Altitude (m)	Mean annual precipitation (mm)	Mean annual temperature (°C)
BOH	47°43'31.4" N	8°54'24.6" E	400	805	9.0
HOH	48°42'52.9" N	9°11'15.5" E	400	691	8.5
OLI	48°28'27.6" N	9°18'15.6" E	707	805	6.8
PZO	49°12'10.5" N	9°27'56.6" E	244	841	9.1

(Source: Agrarmeteorologie Baden-Württemberg)

Table S3. Race designation and virulence phenotype of German isolates used for field inoculations

Pathogen Race	Virulence
Stem rust (<i>Puccinia graminis</i> f. sp. <i>tritici</i>)	
TKTTF	<i>Sr 5,6,7b,8a,9a,9b,9d,9e,9g,10,-,17,21,-,30,-,36,38,McN,Tmp</i>
TKPTF	<i>Sr 5,6,7b,8a,9a,-,9d,9e,9g,10,-,17,21,-,30,-,36,38,McN,Tmp</i>
MMMTF	<i>Sr 5,-,7b,-,9a,-,9d,-,9g,10,11,17,-,-,-,36,38,McN,Tmp</i>
MRRTF	<i>Sr 5,6,7b,-,9a,9b,9d,-,9g,10,11,17,-,-,-,36,38,McN,Tmp</i>
MRMTF	<i>Sr 5,6,7b,-,9a,-,9d,-,9g,10,11,17,-,-,-,36,38,McN,Tmp</i>
Yellow rust (<i>Puccinia striiformis</i>)	
Warrior (PstS7)	<i>Yr 1,2,3,4,-,6,7,-,9,-,-,17,-,25,-,32,Sp,AvS,Amb</i>
Kranich (PstS8)	<i>Yr 1,2,3,-,-,6,7,8,9,-,-,17,-,25,-,32,-,AvS,Amb</i>
Warrior(-) (PstS10)	<i>Yr 1,2,3,4,-,6,7,-,9,-,-,17,-,25,-,32,Sp,AvS,-</i>
Triticale2015 (PstS13)	<i>Yr -,2,-,-,6,7,8,9,-,-,-,-,-,AvS,-</i>