

Table S1. List of 453 wheat genotypes used in this study, including their serial number, genotype name, region of collection/origin, and agro-climatic zone (Mexico, Semi-arid, Rainfed, Rainfed/Arid, Australia, or China).

G	Genotype	Region	Climate Zone
G1	AANAJ-17	Punjab (Irrigated)	Semi-arid
G2	UJALA-16	UJALA-16	Semi-arid
G3	ZINCOL-16	NARC variety also for punjab	Semi-arid
G4	FATEH JANG-16	Punjab(Rainfed)	Rainfed
G5	T9 (T. aestivum)	Punjab before Partition	Semi-arid
G6	BORLAUG-16	NARC variety also for punjab	Semi-arid
G7	GALAXY-13	Punjab (irrigatd	Semi-arid
G8	SHAHKAR-13	KPK	Rainfed
G9	PIRSABAK-13	KPK	Rainfed
G10	HAMAL-13	KPK	Rainfed
G11	BENAZIR-13	Sindh	Semi-arid
G12	NIA SAARANG	Sindh	Semi-arid
G13	NIFA LALMA	KPK	Rainfed
G14	PUNJAB-11	Punjab (Irrigated)	Semi-arid
G15	MILLAT-11	Punjab (Irrigated)	Semi-arid
G16	NARC-11	NARC variety also for punjab	Semi-arid
G17	DHARABI-2011	Mexico	Mexico
G18	NIA SUNDER 2011	Sindh	Semi-arid
G19	AARI-11	Punjab (irrigated)	Semi-arid
G20	BARSAT 2010	KPK	Rainfed/Arid
G21	BARS-09	Mexico	Mexico
G22	FAISALABAD-08	Punjab (irrigatd/rainfed	Semi-arid
G23	LASANI-08	Punjab (irrigated)	Semi-arid
G24	MIRAJ-8	Punjab (Southern)	Semi-arid
G25	SEHER-06	Punjab (irrigated)	Semi-arid
G26	SHAFQAQ-06	Punjab (irrigated)	Semi-arid
G27	TD-I (2004)	Sindh/punjab also approved	Semi-arid
G28	TD-2	Sindh	Semi-arid
G29	GA-2002		
G30	AS-2002	Punjab	Semi-arid
G31	SH-2002	Punjab (Irrigated)	Semi-arid
G32	CHAKWAL-50	Punjab (rainfed)	Rainfed
G33	MANTHARKAUZ		
G34	AUQAB 2000	Punjab (irrigated)	Semi-arid
G35	BHAKKAR-2000	Punjab (Arid zone)	Rainfed
G36	CHENAB-2000	Punjab (Irrigated)	Semi-arid
G37	MH 97	Mexico	Mexico
G38	CHAKWAL 97	Punjab (rainfed)	Rainfed
G39	KOHISTAN 97	Punjab	Semi-arid
G40	PUNJAB 96	Punjab (irrigated)	Semi-arid
G41	KOHSAR 95	Punjab	Semi-arid
G42	BORLAUG 95	Mexico	Mexico
G43	PARWAZ 94	Punjab	Semi-arid
G44	TATARA (1993)	Sindh	Semi-arid
G45	INQILAB 91	Punjab (Irrigated)	Semi-arid
G46	SOGHAT-90	Mexico	Mexico
G47	CHAKWAL-86	Punjab (rainfed)	Rainfed
G48	PUNJAB-85	Punjab	Semi-arid
G49	FAISALABAD-83	Punjab	Semi-arid

G50	KOHINOOR-83	Punjab	Semi-arid
G51	PAK-81	Punjab/KPK	Semi-arid
G52	PUNJAB-81	Punjab	Semi-arid
G53	CHENAB-79	Punjab	Semi-arid
G54	BAHAWALPUR-79	Punjab (Southern)	Semi-arid
G55	JAUHAR-78	Punjab	Semi-arid
G56	PUNJAB-76	Punjab	Semi-arid
G57	MEXIPAK-65	Punjab	Semi-arid
G58	WATAN	Punjab	Semi-arid
G59	KAUZsJUP	Mexico	Mexico
G60	OASIS F-86	Mexico	Mexico
G61	PBW-343	Indian Variety	Semi-arid
G62	HUW 234	Mexico	Mexico
G63	PASTORPFAU	Mexico	Mexico
G64	PEWEEsINIA66	mexico	Mexico
G65	GOSHAWK'S	Mexico	Mexico
G66	BT 2549	Punjab (Rainfed)	Rainfed
G67	CROW-s-FR316	Mexico	Mexico
G68	ERA	Mexico	Mexico
G69	CHIRYA-3	Mexico	Mexico
G70	EAGLEEMB16	Mexico	Mexico
G71	HARTOG	Mexico	Mexico
G72	PAVON 76	Mexico	Mexico
G73	PBW 343*2/KHVAKI	CIMMYT Mexico	Mexico
G74	PBW 343*2/CHAPIO	Mexico	Mexico
G75	NR-429NARC	NARC variety also for punjab	Semi-arid
G76	INQ-91*2/KHVAKI	Punjab (Irrigated)	Semi-arid
G77	SNI/TRAP	Mexico	Mexico
G78	TRAP#1	Punjab	Semi-arid
G79	PARULA	Mexico	Mexico
G80	SONOITA	Mexico	Mexico
G81	NING-8319	China	China
G82	HARRIER 17	Mexico	Mexico
G83	PRLs	Mexico	Mexico
G84	WBLL1*2	Mexico	Mexico
G85	2KIRITATI	Punjab	Semi-arid
G86	1PFAU	Mexico	Mexico
G87	2PFAU	Mexico	Mexico
G88	1WHEAR	Mexico	Mexico
G89	5WHEAR	Mexico	Mexico
G90	INQALAB91*2	Punjab	Semi-arid
G91	1SUNCO	Mexico	Mexico
G92	2SUNCO	Mexico	Mexico
G93	WHEATEARCGSS00Y00153T	Mexico	Mexico
G94	DOLLARBIRDWE	Mexico	Mexico
G95	KIRITATICGSS96B00169T	Mexico	Mexico
G96	3PFAU	Mexico	Mexico
G97	PGO/SER	Mexico	Mexico
G98	KINGBIRD#2	Mexico	Mexico
G99	KINGBIRD#1	Mexico	Mexico
G100	T1 (T. durum)	Punjab before Partition	Semi-arid
G101	1TAM200	Mexico	Mexico
G102	2TAM200	Mexico	Mexico

G103	YANG87	Mexico	Mexico
G104	BLUE SILVER	Punjab	Semi-arid
G105	LU-26	Punjab	Semi-arid
G106	LYP-73	Punjab	Semi-arid
G107	PARI-73	Punjab	Semi-arid
G108	HD 2169	Punjab	Semi-arid
G109	AS2002/WL711	Punjab (Irrigated)	Semi-arid
G110	V-87094/CHK86	Punjab	Semi-arid
G111	2INQ91	Punjab	Semi-arid
G112	1V-04179	Punjab	Semi-arid
G113	2V-04179	Punjab	Semi-arid
G114	3V-04179	Punjab	Semi-arid
G115	4V-04179	Punjab	Semi-arid
G116	6V-04179	Punjab	Semi-arid
G117	7V-04179	Punjab	Semi-arid
G118	SNI	Mexico	Mexico
G119	CON.s	Mexico	Mexico
G120	HD2236	Mexico	Mexico
G121	PB81	Mexico	Mexico
G122	V-11183, àö-ç-“√Ñ-“√“RF	Mexico	Mexico
G123	13352-RFPRL	Mexico	Mexico
G124	V-15265T	Mexico	Mexico
G125	V-15267T.	Mexico	Mexico
G126	13348-RFVORB	Mexico	Mexico
G127	GAMDOW-6	Mexico	Mexico
G128	LAKTA-1I	Mexico	Mexico
G129	PF 70402	Mexico	Mexico
G130	NEELKANTs	Mexico	Mexico
G131	PB-96	Punjab	Semi-arid
G132	NAX-1	Australia	Australia
G133	NAX-2	Australia	Australia
G134	WAX-2		
G135	MAYA	Mexico	Mexico
G136	WL711	Mexico	Mexico
G137	SOKOLL	Mexico	Mexico
G138	PRL/2*	Mexico	Mexico
G139	MILAN	Mexico	Mexico
G140	FRET2*2	Mexico	Mexico
G141	TRCH	Mexico	Mexico
G142	UQAB2000	Punjab	Semi-arid
G143	5CROC-1	Mexico	Mexico
G144	6CROC-1	Mexico	Mexico
G145	JAWAHIR-1	KPK	Rainfed
G146	1SERI.1B*2	Mexico	Mexico
G147	2SERI.1B*2	Mexico	Mexico
G148	AWSEQ-4	Mexico	Mexico
G149	1WBLL1*2	Punjab	Semi-arid
G150	BAJ #1	Mexico	Mexico
G151	TUKURU	Mexico	Mexico
G152	PASTOR	Mexico	Mexico
G153	SLVS	Mexico	Mexico
G154	122526BWP	Punjab (Southern)	Semi-arid
G155	SERI.	Mexico	Mexico

G156	PUB94.15.1.12/WBLL1	Mexico	Mexico
G157	VOROBAY	Mexico	Mexico
G158	JNRB.5	Mexico	Mexico
G159	SOKOLL/WESTONIA	Mexico	Mexico
G160	KACHU/SAUAL*2	Mexico	Mexico
G161	KRONSTAD	Mexico	Mexico
G162	SAAR	Mexico	Mexico
G163	WAXWING/	Mexico	Mexico
G164	KACHU/SAUAL/4	Mexico	Mexico
G165	HUHWAI	Mexico	Mexico
G166	PBW 343*2/KONK	Mexico	Mexico
G167	PR-111	KPK	Rainfed
G168	11C022BARI	Punjab (Rainfed)	Rainfed
G169	V-12266ATTILA	Mexico	Mexico
G170	NRL-1130		
G171	TW96095	Thul Bhakar	Semi-arid
G172	13248FRET2*2	Mexico	Mexico
G173	FRET2/WBLL1	Mexico	Mexico
G174	WBLLI*2/VIVITSI//T.	Mexico	Mexico
G175	REH	Mexico	Mexico
G176	CROC_1	Mexico	Mexico
G177	WHEAR/KIRITATI	Mexico	Mexico
G178	MELON	Mexico	Mexico
G179	TRCH/5/REH/HARE	Punjab	Semi-arid
G180	KVZ/PPR47.89C	Mexico	Mexico
G181	CS/TH.SC	Mexico	Mexico
G182	D67	Mexico	Mexico
G183	EGA BONNIE ROCK	Mexico	Mexico
G184	KACHU #1	Mexico	Mexico
G185	VORB/4/D67.	Mexico	Mexico
G186	ATTILA*2	Mexico	Mexico
G187	FRANCOLIN #1*	Mexico	Mexico
G188	6PFAU	Mexico	Mexico
G189	BAJ #1*2	Mexico	Mexico
G190	HUIRIVIS#1	Mexico	Mexico
G191	ND643	Mexico	Mexico
G192	13BT017FRET2*	Mexico	Mexico
G193	13BT034V89A038	Mexico	Mexico
G194	14154BECARD/QUAIU #1	Mexico	Mexico
G195	14153MUTUS*2	Mexico	Mexico
G196	14170SUP152	Mexico	Mexico
G197	13167KACHU #1	Mexico	Mexico
G198	V-14057FAU	Punjab	Semi-arid
G199	V-15249SOKOLL	Mexico	Mexico
G200	V-15210SERI.	Mexico	Mexico
G201	HYT 60-7KACHU/2	Mexico	Mexico
G202	HYT 27-11QUAIU*2	Mexico	Mexico
G203	HYT 27-21SWSR22T.	Mexico	Mexico
G204	HYT 60-57WBLL1*2	Mexico	Mexico
G205	V-13348VORB	Mexico	Mexico
G206	V-14154BECARD	Mexico	Mexico
G207	V-15082SH88	Punjab	Semi-arid
G208	V-15100LR229	Punjab	Semi-arid

G209	V-16005WBLL*2	Punjab	Semi-arid
G210	V-15166MUNAL 1	Mexico	Mexico
G211	V-15168WAXWING*2	Mexico	Mexico
G212	V-15174KAUZ	Mexico	Mexico
G213	V-15203 WHEAR	Mexico	Mexico
G214	V-15212MUNAL*2	Mexico	Mexico
G215	V-15216WBLL1*2	Mexico	Mexico
G216	V-15291KIRIPATI	Mexico	Mexico
G217	HYT-20-19HAHN	Mexico	Mexico
G218	HYT-55-40SAUAL	Mexico	Mexico
G219	HYT-55-33KACHU	Mexico	Mexico
G220	AZRITW 1432	Punjab	Semi-arid
G221	AZRITW1578	Bhakar	Semi-arid
G222	AZRITW1579	Bhakar	Semi-arid
G223	AZRITW1581	Bhakar	Semi-arid
G224	RARI15-1711	Punjab (Rainfed)	Rainfed
G225	RARI15-1725	Punjab (Southern)+E285	Semi-arid
G226	RARI16-1154	Punjab (Rainfed)	Rainfed/Arid
G227	BARI16C038	Punjab (Rainfed)	Rainfed
G228	BARI16C039	Punjab (Rainfed)	Rainfed
G229	BARI13FJ20	Punjab (Rainfed)	Rainfed
G230	NARCNR-520	NARC variety also for punjab	Semi-arid
G231	NARCNR-521	NARC variety also for punjab	Semi-arid
G232	NARCNR-523	NARC variety also for punjab	Semi-arid
G233	NARCNR-525	NARC variety	Semi-arid
G234	NARCNR-529	Narc variety	Semi-arid
G235	V-16024	Punjab	Semi-arid
G236	V-16120WBLL1	Mexico	Mexico
G237	V-16150SUP152	Mexico	Mexico
G238	V-16157BABAX	Mexico	Mexico
G239	V-16159SOKOLL	Mexico	Mexico
G240	V-16163ISENGRAIN	Mexico	Mexico
G241	V-16164PRL	Mexico	Mexico
G242	V-16293BAS NO 1	Mexico	Mexico
G243	V-16282WBLLI	Mexico	Mexico
G244	V-17151MUCUYCMSS07Y01083T	Mexico	Mexico
G245	V-17154TRCH	Mexico	Mexico
G246	V-17157TACUPETO F2001	Mexico	Mexico
G247	V-17174BCN	Mexico	Mexico
G248	V-17175CROC_1	Mexico	Mexico
G249	V-17177WBLL1*2	Mexico	Mexico
G250	V-17179SOKOLL	Mexico	Mexico
G251	V-17180D67.	Mexico	Mexico
G252	V-17183SERI.	Mexico	Mexico
G253	V-17189NADICMSS06B00734T	Mexico	Mexico
G254	HYT-30-26ATTILA*2	Punjab	Semi-arid
G255	HYT-30-2WAXWING	Mexico	Mexico
G256	HYT-30-19KACHU	Mexico	Mexico
G257	TWS-15105	Thul Bhakar	Semi-arid
G258	TWS-15137	Thul Bhakar	Semi-arid
G259	TWS-15145	Punjab (Arid zone)	Rainfed
G260	TWS-15159	Thul Bhakar	Semi-arid
G261	15FJ05	Punjab (Rainfed)	Rainfed

G262	BFT-1705	Punjab	Semi-arid
G263	172185		
G264	172190		
G265	NS-85	KPK	Rainfed
G266	PGMB-15-30	Mexico	Mexico
G267	NING MAI	China	China
G268	T2 (T. durum)	Punjab before Partition	Semi-arid
G269	T3	Punjab before Partition	Semi-arid
G270	T4 (T.sphaerococcum)	Punjab before Partition	Semi-arid
G271	T5 (T.sphaerococcum)	Punjab before Partition	Semi-arid
G272	T6 (T.sphaerococcum)	Punjab before Partition	Semi-arid
G273	T7 (T.sphaerococcum)	Punjab before Partition	Semi-arid
G274	T8 (T. aestivum)	Punjab before Partition	Semi-arid
G275	JOUHAR-16	Punjab (Southern)	Semi-arid
G276	T10 (T. aestivum)	Punjab Before Partition	Semi-arid
G277	T13 (T. aestivum)	Punjab before Partition	Semi-arid
G278	T14 (T. aestivum)	Punjab before Partition	Semi-arid
G279	T15 (T. aestivum)	Punjab before Partition	Semi-arid
G280	T16 (T. aestivum)	Punjab before Partition	Semi-arid
G281	T17 (T. aestivum)	Punjab before Partition	Semi-arid
G282	T18 (T. aestivum)	Punjab before Partition	Semi-arid
G283	T19 (T. aestivum)	Punjab before Partition	Semi-arid
G284	T20 (T. aestivum)	Punjab before Partition	Semi-arid
G285	T22 (T. aestivum)	Punjab before Partition	Semi-arid
G286	T24 (T. aestivum)	Punjab before Partition	Semi-arid
G287	T25 (T. aestivum)	Punjab before Partition	Semi-arid
G288	C-245	Punjab	Semi-arid
G289	C-258	Punjab	Semi-arid
G290	14151KACHU	Mexico	Mexico
G291	C-273	Punjab	Semi-arid
G292	SITE	Mexico	Mexico
G293	C-518	Punjab	Semi-arid
G294	LOCAL TALL	Punjab	Semi-arid
G295	LOCAL WHITE	Punjab	Semi-arid
G296	BOUNI WHEAT	Punjab	Semi-arid
G297	BABAX	Mexico	Mexico
G298	1KACHU	Mexico	Mexico
G299	SAUAL/MUTUS*2	Mexico	Mexico
G300	NL971	Mexico	Mexico
G301	BECARD	Mexico	Mexico
G302	C-288	Punjab	Semi-arid
G303	NELOKI	Mexico	Mexico
G304	T.DICOCCONCI9309	Mexico	Mexico
G305	Chakwal 86	Punjab (rainfed)	Rainfed
G306	Pasban-90	Punjab	Semi-arid
G307	Tandojam-83	Sindh	Semi-arid
G308	Marvi-2000	Sindh	Semi-arid
G309	Khyber-87	KPK	Rainfed
G310	Seher-2006	Punjab (Irrigated)	Semi-arid
G311	CHENAB2000	Punjab	Semi-arid
G312	Miraj-08	punjab	Semi-arid
G313	Bathoor-08	KPK	Rainfed
G314	AARI-2010	Punjab (irrigated)	Semi-arid

G315	BARS-2009	Punjab	Semi-arid
G316	Dera-98	KPK	Rainfed
G317	Nasir-2k	KPK	Rainfed
G318	Janbaz	KPK	Rainfed
G319	PBW343		
G320	Pakhtunkhwa-15	KPK	Rainfed
G321	Gold-16	Punjab	Semi-arid
G322	Jauhar-16	KPK	Rainfed
G323	Ihsan-16	Punjab	Semi-arid
G324	V-15306MUTUS/2*	Mexico	Mexico
G325	BROOKTON	Mexico	Mexico
G326	KUKRI	Mexico	Mexico
G327	DRYSDALE	Mexico	Mexico
G328	ALONDRA	Mexico	Mexico
G329	CARAZINHO	Mexico	Mexico
G330	BAXTER	Mexico	Mexico
G331	SUNSTATE	Mexico	Mexico
G332	EXCALIBUR	Mexico	Mexico
G333	WYALKATCHEM	Mexico	Mexico
G334	SUNCO	Mexico	Mexico
G335	WESTONIA	Mexico	Mexico
G336	GLADIUS	Mexico	Mexico
G337	Kohsar – 95	Punjab	Semi-arid
G338	UFAQV	Punjab	Semi-arid
G339	IQBAL2000	Sindh	Semi-arid
G340	MEHRAN-89	KPK	Semi-arid
G341	FAISALABAD-85	Punjab	Semi-arid
G342	TJ-83	Sindh	Semi-arid
G343	SA-75	Mexo	Mexico
G344	CHENAB-70	Punjab	Semi-arid
G345	K13_SA-42	Punjab	Semi-arid
G346	M03_WL-711S	Mexico	Mexico
G347	M07_FRET-1		
G348	M09_WH-542	Mexico	Mexico
G349	M15_KARIEGA	Mexico	Mexico
G350	M17_BOB-WHITE_S	Mexico	Mexico
G351	BAVIACORA-M-92	Mexico	Mexico
G352	MILANCM75113	Mexico	Mexico
G353	CHIRYA-I	Mexico	Mexico
G354	FRONTANA	Mexico	Mexico
G355	TRAP-1JUP	CIMMYT Mexico	Mexico
G356	PBW-343x2_KURUKU	Mexico	Mexico
G357	1PVN	Mexico	Mexico
G358	3PVN	Mexico	Mexico
G359	SITE-7	Mexico	Mexico
G360	YANAC	Mexico	Mexico
G361	1KIRITATI	Punjab	Semi-arid
G362	4KIRITATI	Mexico	Mexico
G363	V-04179	Punjab	Semi-arid
G364	Saussi	sindh	Semi-arid
G365	V-15306MUTUS_2	Mexico	Mexico
G366	NL-750	NARC variety also for punjab	Semi-arid
G367	Saline	Punjab	Semi-arid

G368	Mian	sindh	Semi-arid
G369	PASBAN-90INIA-66_A	Punjab (Irrigated)	Semi-arid
G370	KANZ	Mexico	Mexico
G371	SERI	Mexico	Mexico
G372	ZAD-2	Mexico	Mexico
G373	D01_SERI	Mexico	Mexico
G374	D11_SERI82	Mexico	Mexico
G375	D21_WBLL1x2	Punjab	Semi-arid
G376	F05_2WBLL1x2	Punjab	Semi-arid
G377	F19_PBW343x2	Punjab	Semi-arid
G378	F23_WBLL1	WBLL1/KUKUNA//TACUPETO F2001/3/BAJ #1*2/4/KINGBIRD #1	
G379	Pak-2013NARC	NARC variety also for punjab	Semi-arid
G380	NRL-1130	KPK	Rainfed
G381	J15_V-99346	KPK	Rainfed
G382	J19_PR-110	KPK	Rainfed
G383	L03_13248FRET2x2	Mexico	Mexico
G384	Long-grain	Punjab	Semi-arid
G385	L11_PR-112	KPK	Rainfed
G386	PR-106	KPK	Rainfed
G387	N11_HYPT(P-403)	Mexico	Mexico
G388	N13_HYPT(P-409)	Mexico	Mexico
G389	N15_HYPT(P-415)	Mexico	Mexico
G390	N17_HYPT(P-430)	Mexico	Mexico
G391	N19_HYPT(P-434)	Mexico	Mexico
G392	N21_HYPT(P-435)	Mexico	Mexico
G393	N23_HYPT(P-16)	Mexico	Mexico
G394	P01_NRYT(P-20)	NARC variety also for punjab	Semi-arid
G395	P03_NRYT(P-22)	NARC variety also for punjab	Semi-arid
G396	P05_NRYT(P-35)	NARC variety also for punjab	Semi-arid
G397	BAJ-1_3_KIRITATI	Mexico	Mexico
G398	F06_KAUZ	Mexico	Mexico
G399	F10_NR-443		
G400	F12_NR-457	NARC variety also for punjab	Semi-arid
G401	F14_NR-453	NARC Variety	Semi-arid
G402	F16_NR-487	NARC Variety	Semi-arid
G403	F18_12FJ26	Punjab (rainfed)	Rainfed
G404	F20_12FJ01	Punjab (Rainfed)	Rainfed
G405	F22_14C040	Punjab (Rainfed)	Rainfed
G406	H02_14C036	Punjab (Rainfed)	Rainfed
G407	H04_UOS-1	Punjab	Semi-arid
G408	H06_UOS-2	Punjab	Semi-arid
G409	H10_IV-1		
G410	H14_SA-12		
G411	C-271	Punjab	Semi-arid
G412	P15_TD-1		
G413	J06_14225MUTUSx2	Mexico	Mexico
G414	J10_14168ITP40	Mexico	Mexico
G415	J14_14227FRNCLN_NIINI-1	Mexico	Mexico
G416	J16_13338UFAQ_	AARI Pakistan	Semi-arid
G417	L02_V-13165WBLL1x2	Mexico	Mexico
G418	L08_V-14124KACHU-1	Mexico	Mexico
G419	L16_V-15229OAX93	Mexico	Mexico
G420	N02_15C42	Punjab (Rainfed)	Rainfed

G421	N04_13FJ20	Punjab (Rainfed)	Rainfed
G422	N06_13FJ29	Punjab (Rainfed)	Rainfed
G423	Punjab (Rainfed)	Punjab (Rainfed)	Rainfed
G424	N12_HYT-60-7KACHU_2	Mexico	Mexico
G425	N20_HYT-80-44	Mexico	Mexico
G426	P02_V-14170SUP152	Mexico	Mexico
G427	P06_V-15070TOBARITOM-97	Mexico	Mexico
G428	A21_HYT-20-6QUAIU-1x2	Mexico	Mexico
G429	E03_BARI13FJ29	Punjab (Rainfed)	Rainfed
G430	E05_NARCN-520	NARC variety also for punjab	Semi-arid
G431	E07_NARCN-521	NARC variety also for punjab	Semi-arid
G432	I19_NR-522	NARC variety also for punjab	Semi-arid
G433	I21_NR-527	NARC variety	Semi-arid
G434	K11_17C089	Punjab (Rainfed)	Rainfed
G435	K15_15FJ03	Punjab (Rainfed)	Rainfed
G436	K23_172118		
G437	22-T-aestivum	Punjab before Partition	Semi-arid
G438	T24-T-aestivum	Punjab before Partition	Semi-arid
G439	C10_8A-Selection	Punjab before Partition	Semi-arid
G440	C12_9D-Selection	Punjab before Partition	Semi-arid
G441	C16_C-228	Punjab	Semi-arid
G442	C20_C-247	Punjab	Semi-arid
G443	C22_C-248	Punjab	Semi-arid
G444	E02_C-256	Punjab	Semi-arid
G445	E06_C-269	Punjab	Semi-arid
G446	E16_C-591	Punjab	Semi-arid
G447	Bakhtawar-92	Sindh	Semi-arid
G448	H03_Zarghoon	Sindh	Semi-arid
G449	H11_Kaghan-93	KPK	Rainfed
G450	J07_Suleman-96	KPK	Rainfed
G451	Fakhr-e-Sarhad	KPK	Rainfed
G452	L15_Durum-97	KPK	Rainfed
G453	Bhittai	Sindh	Semi-arid

Table S2. Analysis of variance for nitrogen regime, genotype, and genotype × nitrogen interaction

Trait	Nitrogen regime		Genotype		Genotype × Nitrogen	
	Df	F_value	df	F_value	df	F_value
NRT	1	287.34**	452	10.57**	452	9.71**
NBP	1	17.11**	452	1.77**	452	1.56**
TRL	1	8.71**	452	3.61**	452	3.42**
RD	1	19.36**	452	1.22**	452	1.02 ns
RBF	1	2.31 *	452	8.68**	452	7.92**
RNA	1	1.94 *	452	1.52**	452	1.31**
RV	1	163.90**	452	15.93**	452	15.36**
TRSA	1	6.44*	452	5.57**	452	4.27**
RFW	1	1478.81**	452	13.57**	452	10.63**
SFW	1	3625.29**	452	4.00**	452	4.21**
RDW	1	20670.96**	452	164.10**	452	134.11**
SDW	1	60882.62**	452	97.81**	452	92.54**

* $P \leq 0.05$; ** $P \leq 0.01$; ns = not significant.moderate