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Traverse: A New High Yielding and Fusarium Head Blight Tolerant Spring Wheat

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'Traverse' is an F_4 derived hard red spring wheat cultivar selected from within the three-parent cross SD3305/KS91W005-1-4//SD8089, which was created in spring 1997 at Brookings, S.D. Traverse was developed and released by the South Dakota Agricultural Experiment Station and tested as SD3687. Traverse was named after Lake Traverse, which spans a portion of the South Dakota and Minnesota border.

Origin and breeding history:

During Winter 1997–1998, F_1 seeds of the three-parent population were sown at an off-season nursery near Yuma, Ariz. In Spring 1998, early yield testing was initiated with F_2 seeds that were returned from Arizona and sown in unreplicated trials at Aurora and South Shore, S.D. Spaced-planted nursery plots were simultaneously sown at Aurora to facilitate selection of individual plants from each F_2 population. Based on high grain yield of this F_2 population at both locations, a head from 20 individual plants was selected from the corresponding spaced-planted nursery plot, threshed singly, and grown as independent $F_{2:3}$ head-rows in Arizona during Winter 1998–1999. Seed of a single selected $F_{2:4}$ head-row was returned from Arizona and again sown in unreplicated yield trials at Aurora and South Shore in 1999. Prior to harvest of all $F_{2:4}$ yield trial plots at Aurora, 20 individual plant selections were collected from those plots chosen for advancement, based on yield and test weight measurements, and then threshed singly and sown as $F_{4:5}$ head-rows in Arizona during Winter 1999–2000. One of these 20 $F_{4:6}$ sister lines was selected for continuation within the program based on within-row uniformity, plant height, and minimal lodging. The seed was harvested in Arizona and again sown at Aurora and South Shore during Spring 2000 as two-replication tests. Based on grain yield, test weight, plant height, heading date, and disease resistance; and flour extraction rates and mixograph tolerance scores over all locations in 2000, the line was advanced and included in the replicated multi-location Preliminary Yield Trials (PYT) in 2001. At this point, the line was designated SD3687. Based on its agronomic and disease resistance performance in 2001, SD3687 was promoted to and included in the AYT from 2002 through 2005. Likewise, it was tested in SDSU Crop Performance Testing (CPT) trials from 2003 to 2005 and in Uniform Regional Spring Wheat Nursery (URSWN) trials in 2004 and 2005. For large-scale testing of quality traits, SD3687 was included in the 2005 Wheat Quality Council (WQC) trial.

Agronomic characteristics:

On a statewide basis, the yield potential of Traverse is generally higher than other varieties developed by the SDSU hard red spring wheat program; though in some instances, Briggs, Granger, and Oxen remain competitive.

On average, Traverse is 1 to 2 inches shorter than Granger and at least 2 inches taller than Briggs. Its test weight is similar to Oxen and Russ. Traverse heading date is similar to Briggs, Granger, and Walworth.

Testing at the USDA Spring Wheat Quality Laboratory in Fargo, ND, indicates the milling and baking quality traits of Traverse are similar to those of Oxen and Russ. During development, Traverse was found to be moderately resistant to resistant during leaf and stem rust screening tests, as well as moderately resistant to *Fusarium* head blight.

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Table 1. A comparison of yield averages between Traverse and other varieties tested in South Dakota, 2004–2006.

	Location Yield Averages (Bu/A) at 13% moisture														State Yield Avg. (Bu/A)	
	Brookings		South Shore		Spink Co.		Selby		Brown Co.		Wall		Ralph			
Variety (Hdg.)*	2006	3-Yr	2006	3-Yr	2006	3-Yr	2006	3-Yr	2006	3-Yr	2006	3-Yr	2006	3-Yr	2006	3-Yr
Forge (-1)	53	50	45	47	67	60	51	47	49	57	38	34	34	42	48	48
Briggs (0)	53	57	47	54	63	67	52	51	56	64	33	32	33	39	48	52
Granger (0)	51	55+	46	53	65	65	61+	52	53	63	35	33	32	40	49	52
Traverse (0)	**58**	**63**	**53**	**59**	**65**	**66**	**57**	**53**	**62**	**69**	**39**	**32**	**32**	**40**	**52**	**55**
Walworth (0)	52	50	41	45	66	61	50	47	54	59	35	33	34	40	47	48
Oxen (2)	52	48	48	46	71	61	55	47	51	61	36	33	37	42	50	48
Russ (2)	45	49	43	47	53	56	50	43	56	61	35	32	33	41	45	47
Trial avg. :	49	51	44	49	62	61	49	46	54	61	35	32	32	40		

* Heading, the relative days to heading, compared to the variety Briggs.

Table 2. A comparison of bushel weight (BW), height (HT), lodging (LDG), and grain protein (PRT) averages between Traverse and other varieties tested in South Dakota, 2006.

	Location Averages - Bushel weight, height, and lodging score														
	Brookings			South Shore			Spink Co.			Selby			Brown Co.		
Variety (Hdg.)*	BW lb	HT in	LDG **	BW lb	HT in	LDG **	BW lb	HT in	LDG **	BW lb	HT in	LDG **	BW lb	HT in	LDG **
Forge (-1)	65	33	1	61	31	1	59	34	1	62	31	1	60	26	1
Briggs (0)	62	33	1	59	30	1	59	33	1	61	31	1	63	26	1
Granger (0)	62	35	1	60	33	1	58	37	1	62	34	1	62	30	1
Traverse (0)	**61**	**35**	**1**	**59**	**33**	**1**	**58**	**35**	**1**	**59**	**33**	**1**	**61**	**28**	**1**
Walworth (0)	62	33	1	59	30	1	57	33	1	61	31	1	61	27	1
Oxen (2)	62	32	1	60	30	1	58	32	1	62	31	1	58	27	1
Russ (2)	62	35	1	60	34	1	57	35	1	60	34	1	63	30	1
Test avg. :	63	33	1	60	31	1	59	33	1	61	31	1	62	28	1

* Heading, the relative days to heading, compared to the variety Briggs.
** Lodging score: 0= all plants erect, 3= 50% of plants lodged at 45°-angle, 5= all plants flat.

Table 3. Origin, variety traits, and disease reactions for selected HRS wheat entries tested in 2006.

				Rust			Fusarium	
Variety	Origin	(Hdg)*	Ldg Res	Stripe	Stem	Leaf	Head Blight	PVP** Status
Forge	SD-97	-1	G#	MS+	MR+	MS+	MS+~	Yes
Briggs	SD-02	0	G	MR	R	MR	M~	Yes
Granger	SD-04	0	G	MR	R	MR	M~	Yes
Traverse	**SD-06**	**0**	**G**	**MR**	**R**	**MR**	**MR~**	**Yes*** **
Walworth	SD-01	0	G	S	R	MS	M~	Yes
Oxen	SD-96	2	G	MR	R	MS	MS~	Yes
Russ	SD-95	2	G	MR	R	MS	MS~	Yes

* Heading, the relative difference in days to heading, compared to Briggs.
\# E= excellent, G= good, VG= very good, F= fair, P= poor.
\+ R= resistant, MR= moderately resist., MS= mod. susceptible, S= susc., VS= very susc..
~ Indicates variety exhibits a consistent tolerance to head blight in grain yield and quality.
** Plant variety protection (PVP), title V, certification option — to be sold by variety name only as a class of certified seed.
*** PVP application pending or anticipated.

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