

A new HRS wheat from SDSU: **Granger**

Karl Glover, leader, spring wheat breeding project
Robert Hall, Extension agronomist-crops, leader, crop testing

Pedigree and breeding history

'Granger' is an F₄ derived line from the two-parent cross 'SD8070/SD3165' made at Brookings, S.D., in the fall of 1993. SD8070 was developed from the cross 'Guard'/'Sharp' and SD3165 originated from the cross 'Butte 86'/3/Mexico Dwarf/Baca/Vona/4/PR2375.

The F₁ plants were grown at Yuma, Ariz., during the winter of 1994-1995. Individual F₂ plant selections were made at Brookings, S.D., in 1995 and were grown again at Yuma the following winter (1995-96) as plant rows. Plant rows at Yuma were harvested individually and used to sow F_{2:4} yield trials at Aurora and South Shore, S.D., in 1996.

Based on data collected from the 1996 yield trials, individual plant selections from within the population were advanced once again to the Yuma nursery and sown as F_{4:5} lines during the winter of 1996-97. The population was selected for advancement based on grain yield, grain volume weight, and bread-making characteristics. Individual plants were visually selected for resistance to prevalent foliar pathogens (i.e., leaf and stem rust). Two single plant rows from this population were selected at Yuma and brought back to South Dakota for further testing as F_{4:6} lines during the 1997 growing season.

Based on the yield performance, grain volume weight, bread-making, and disease resistance characters, only one of the lines from this population was promoted to its first year of replicated statewide yield trials in 1998. At this point, the line was given the experimental designation of SD3546. SD3546 was tested within the South Dakota State University Spring Wheat Breeding Program Advanced Yield Trials from 2000 through 2003. It was also tested in 2001 and 2002 by our state Crop Performance Trial (CPT) group. It was included in the Uniform Regional Spring Wheat Nursery from 2001 to 2003.

SD3546 was tested by the Wheat Quality Council (WQC) in 2003.

Granger was released by the South Dakota Agriculture Experiment Station in 2004. Its name honors the National Grange, this nation's oldest agricultural organization founded in 1867. A royalty of \$.30 per bushel will be charged on the sales of registered and certified seed of Granger. Protection under the U.S. Plant Variety Protection Act for Granger is pending.

Performance results

Yield results for Granger compared to other popular varieties commonly grown in South Dakota are shown in Table 1; while a similar comparison in regard to lodging resistance, disease reactions, and state-wide performance results for bushel weight, grain protein content, and plant height are indicated in Table 2. In 2004, Granger yielded 3 bu less than Briggs; but 3 bu better than Forge, Reeder, Russ, and Walworth (Table 1). Over the most recent 3-year period Granger yielded 1 bu less than Briggs; but 1 to 2 bu better than Forge, Oxen, Reeder, Russ, or Walworth. Only Granger and Briggs were in the top yield group at 100% of all the test locations for the past 3 years. This high level of yield performance is partly the result of a very good combination of disease reactions, as indicated in Table 2.

Major strengths and unique attributes of 'Granger'

- Consistently high yield potential
- Intermediate level of Fusarium head blight resistance
- High stem rust resistance
- Moderate leaf rust resistance
- Very large seed size
- Exceptional milling and baking quality

Table 1. Yield comparison of Granger to other popular varieties at several locations in South Dakota, 2003-2004.

Variety	(Hdg)*	Brookings		So. Shore		Miller		Spink Co.		Selby		Brown Co.	
		Bu/A	Bu/A	Bu/A	Bu/A	Bu/A	Bu/A	Bu/A	Bu/A	Bu/A	Bu/A	Bu/A	Bu/A
		2004	3-yr	2004	3-yr	2004	3-yr	2004	3-yr	2004	3-yr	2004	3-yr
Forge	(-1)	47	53	49	43	58	.	65	53	51	50	67	50
Briggs	(0)	68	57	61	48	63	.	72	54	57	51	72	54
Granger	(0)	65	55	55	46	51	.	71	57	50	50	76	53
Walworth	(0)	52	54	46	41	58	.	63	50	52	49	65	49
Oxen	(2)	52	48	48	42	62	.	65	55	52	45	76	53
Russ	(2)	51	53	49	44	59	.	62	52	40	46	72	51
Reeder	(3)	49	51	50	45	61	.	66	53	41	46	74	51
**Test avg:		57	51	52	43	57	.	65	52	49	46	72	50

Table 1. Yield comparison of Granger to other popular varieties (continued).

Variety	(Hdg.)*	Wall		Bison		Ralph		State avg		State top yield percentage	
		Bu/A 2004	Bu/A 3-yr	Bu/A 2004	Bu/A 3-yr	Bu/A 2004	Bu/A 3-yr	Bu/A 2004	Bu/A 3-yr	9 Loc 2004	6 Loc 3-yr
Forge	(-1)	36	30	31	.	57	.	51	47	22	83
Briggs	(0)	36	27	28	.	52	.	57	49	67	100
Granger	(0)	34	29	30	.	55	.	54	48	22	100
Walworth	(0)	37	31	28	.	57	.	51	46	22	50
Oxen	(2)	37	31	27	.	57	.	53	46	33	83
Russ	(2)	38	30	29	.	57	.	51	46	11	83
Reeder	(3)	34	30	30	.	57	.	51	46	11	83
**Test avg:		35	28	29	.	55	.				

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

**Average for the 2004 Crop Performance Test trials; not all varieties are reported.

Table 2. A comparison of lodging resistance, disease reactions, and bushel weight, protein, and height averages for Granger to other popular varieties in 2004.

Variety	(Hdg.)*	Origin	Ldg.# resis.	----- Disease reaction+ -----				Fusarium head blight	PVP** status	--State avg--		
				Stripe	Rust Leaf	Stem				Bu wt, lb	Prot %	Ht, in.
Forge	(-1)	SD-97	G	MR	MS	R	M~	Yes	58	14.2	34	
Briggs	(0)	SD-02	G	MR	R	R	MS	Yes	59	15.2	34	
Granger	(0)	SD-04	G	R	R	R	M	***	59	14.7	36	
Walworth	(0)	SD-01	G	S	MS	R	MS	Yes	58	14.3	33	
Oxen	(2)	SD-96	G	MR	MR	R	MS~	Yes	56	14.6	32	
Russ	(2)	SD-95	G	R	MR	R	MS~	Yes	57	14.9	35	
Reeder	(3)	ND-99	VG	MR	MS	R	MS~	Yes	58	15.0	34	

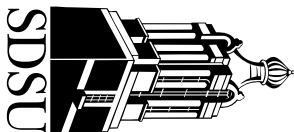
* Heading, the relative difference in days to heading, compared to Briggs.

E=excellent, G=good, VG=very good, F=fair, P=poor, + R=resistant, MR=moderately resistant, M=intermediate, MS=moderately susceptible, S=susceptible.

~ 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.



South Dakota State University
College of Agriculture and Biological Sciences
Cooperative Extension Service

