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SDSU

SOUTH DAKOTA STATE UNIVERSITY
Agricultural Experiment Station
U.S. Department of Agriculture

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"Select" is an F_4 derivation from a single spike within an F4 population (Briggs/FN1500-118) that was originally created in spring 2001 at Brookings, South Dakota. Select was developed and released by the South Dakota Agricultural Experiment Station and tested as SD3948. Select was released for its high level of resistance to *Fusarium* head blight compared to many other cultivars developed by the SDSU-HRSW breeding program as well as its yield potential, high test weight, grain protein content, and early heading date compared to most HRSW cultivars currently in production.

Origin and Breeding History

During winter 2001-2002, F_1 seeds of the two-parent population were sown at an off-season nursery near Yuma, Ariz. In spring 2002, 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 the F_2 population. Based on high grain yield of this F_2 population at both locations, a head from 20 individual plants were selected from the spaced-planted nursery plot, threshed singly, and grown as independent $F_{2:3}$ head-rows in Arizona during winter 2002–2003. 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 spring 2003. 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. Selections were then threshed singly and sown as $F_{4:5}$ head-rows in Arizona during winter 2003–2004. A single head-row was selected from among the 20 for continuation within the program based on within-row uniformity, plant height, and minimal lodging. The $F_{4:6}$ seed was harvested in Arizona and again sown at Aurora and South Shore during spring 2004 as two-replication tests. Based on grain yield, test weight, plant height, heading date, and disease resistance, along with its flour extraction rates and mixograph tolerance scores in 2004, the line was advanced and included in the replicated multi-location preliminary yield trials in 2005. At this point, the line was designated SD3948. Based on agronomic and disease resistance performance in 2005, SD3948 was promoted to and tested in the advanced yield trial from 2006–2010. Likewise, SD3948 was tested in both SDSU Crop Performance Testing (2007–2010) and the Uniform Regional Spring Wheat Nursery trials (2006–2009). For large-scale testing of end-use quality traits, Select was included in the 2009 Wheat Quality Council trial.

Agronomic Characteristics

On a statewide basis over years 2008–2010, grain yield of Select was generally similar to Brick, Briggs, and Granger, though all were less productive than Traverse. Select's test weight and protein content are both higher than those of Traverse. Heading date of Select is earlier than most others, but similar to Brick. Select is approximately 2 inches shorter than Granger and Traverse, and 1 inch shorter than Briggs and Brick. Testing at the USDA Spring Wheat Quality Laboratory in Fargo, N.D., indicated that most milling and baking quality traits of Select are similar to those of Brick and Granger. Select was found to exhibit resistant to moderately resistant leaf and stem rust resistance reactions and was nearly as resistant to *Fusarium* head blight as Brick.

Table 1a. Yield averages (2008–2010) of four common varieties compared to "Select" at six eastern South Dakota locations, sorted by 3-yr average.

Variety, Heading [1]	Eastern Yield Averages by Location - Bu/a																	Variety Average Bu/a		
	Brookings			South Shore			Frankfort			Warner			Miller		Selby					
	2010	2-Yr	3-Yr	2010	2-Yr	3-Yr	2010	2-Yr	3-Yr	2010	2-Yr	3-Yr	2010	2-Yr	2010	2-Yr	3-Yr	2010	2-Yr	3-Yr
Traverse, 2	53	59	55	68	76	76	43	55	61	65	73	76	50	50	74	65	58	59	63	65
Granger, 2	56	59	55	64	66	70	37	45	52	57	65	67	47	47	67	59	52	55	57	59
Briggs-Ck, 2	48	53	51	60	67	70	34	50	55	59	64	68	46	44	69	61	53	53	57	59
Brick, 0	43	50	50	59	65	68	41	54	58	57	61	66	49	47	71	61	52	53	56	59
Select, 1	**44**	**52**	**49**	**54**	**62**	**68**	**31**	**50**	**54**	**60**	**66**	**69**	**43**	**44**	**73**	**62**	**53**	**51**	**56**	**59**
Test avg. :	50	55	52	63	67	69	39	53	57	58	65	69	48	44	69	62	54	54	58	60

Table 1b. Yield averages (2008–2010) of four common varieties compared to 'Select' at three western South Dakota locations, sorted by 3-yr variety average.

Variety, Heading [1]	Western Yield Averages by Location - Bu/a								Variety Average Bu/a		
	Bison			Ralph		Wall					
	2010	2-Yr	3-Yr	2010	2-Yr	2010	2-Yr	3-Yr	2010	2-Yr	3-Yr
Traverse, 2	34	33	32	36	44	16	33	38	29	36	35
Granger, 2	33	32	32	35	44	10	29	36	26	35	34
Briggs-Ck, 2	32	30	30	35	43	12	31	35	26	35	33
Brick, 0	36	31		33	42	14	29		27	34	
Select, 1	**32**	**31**	**32**	**29**	**38**	**8**	**27**	**32**	**23**	**32**	**32**
Test avg. :	26	24	29	29	39	15	29	34			

[1] Heading – days later than Brick; check variety for maturity.
Shaded values do not differ significantly from to the top yield value within a column.

Table 2. Grain protein averages of four common spring wheat varieties compared to "Select" at six eastern South Dakota locations, sorted high to low by variety average.

Variety, Heading [1]	2010 Protein Averages by Location						Variety Average
	Brookings	S. Shore	Frankfort	Miller	Warner	Selby	
	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Briggs-Ck, 2	15.7	15.0	16.5	15.9	15.8	16.6	15.9
Granger, 2	15.5	15.1	16.3	16.4	15.4	15.7	15.7
Select, 1	**15.5**	**15.2**	**16.1**	**16.0**	**14.8**	**15.8**	**15.6**
Brick, 0	15.6	15.2	15.9	15.8	15.3	15.5	15.5
Traverse, 2	14.8	15.1	15.5	15.1	14.6	14.4	14.9
Test avg. :	15.3	15	16.1	16	15.2	15.6	15.5

[1] Heading- days later than Brick, the check variety for maturity.
Shaded values do not differ significantly from to the top grain protein value within a column.

Table 3. Origin, traits, and disease reactions in 2010 of four common spring wheat varieties compared to 'Select', sorted early to late maturity by relative heading [1].

Variety, Heading Variety	Origin	Rel Hdg [1]	Rust [2] Stripe	Stem	Leaf	Fusarium Head Blight [3]	PVP Status [4]
Brick	SD-08	0	-	R	R-MR	1-R	Yes
Select	**SD-09**	**1**	**MR**	**R-MR**	**R-MR**	**2-MR**	**Pdg**
Briggs	SD-02	2	MR	MR	R	4-MS	Yes
Granger	SD-04	2	MR	MR	R-MR	3-MR	Yes
Traverse	SD-06	2	MR	MR	R	3-MR	Yes

[1] Heading- days later than Brick, the check variety for maturity.
[2] Rusts: R= resistant and MR= moderately resistant.
[3] Fusarium head blight: 1-R= resistant, 2 to 3-MR= moderately resistant, and 4-MS=moderately susceptible.
[4] Yes, No, or pending (Pdg).

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