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Expedition: A High Milling-quality and Winter Hardy Hard Red Winter Wheat

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

EXPEDITION

A HIGH MILLING-QUALITY AND WINTER HARDY HARD RED WINTER WHEAT

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Origin and breeding history

Expedition was developed by the South Dakota Agricultural Experiment Station and released to seed producers in August 2002 based on its excellent winter survival and high grain yield potential in South Dakota and the northern Great Plains. Its name honors the bicentennial of the Lewis and Clark expedition that traveled through South Dakota.

Expedition was selected from the cross Tomahawk/Bennett made during 1993. The cross was advanced to the F_3 generation as a bulk sample. Expedition was derived as an $F_{3:4}$ head row selected in 1997. It was evaluated as SD97457 in the South Dakota Early Yield Trial (EYT) nursery in 1998. It was advanced beyond the Preliminary Yield Trial (PYT) to the South Dakota Advanced Yield Trial (AYT) in 1999 due to superior performance. It was tested in the South Dakota Crop Performance Testing (CPT) Variety Trial between 2001 and 2003 and in the Northern Regional Performance Nursery during 2001 and 2002.

The South Dakota Foundation Seed Stocks Division (Plant Science Department, South Dakota State University) had Foundation Seed of Expedition available to seed producers for planting during Fall 2002. Seed classes will be Breeder, Foundation, Registered, and Certified. Expedition is protected under the title V provision of the US Plant Variety Protection Act.

Characteristics

Expedition is awned, white-glumed, early maturing (similar to Jagger), and semidwarf (similar to Alliance). The flag leaf is recurved and twisted at the boot stage, and the foliage is green at anthesis. The spike is tapered, inclined, and mid-dense. The glume size is medium, and the glume shoulder has a wanting shape. The beak is medium in length with an acuminate tip. Kernels are dark amber to light red, hard textured, and elliptical in shape with a collarless midsized brush, rounded cheeks, and a shallow crease.

Agronomic performance and quality

Replicated testing of Expedition in the South Dakota CPT in 2001- 2003 (Tables 1, 2, and 3) showed that its yield was similar to that of Wesley and higher than that of Harding, Arapahoe, Alliance, and Nekota, and 1 bu less than Jagalene. Test weight of

Table 1. A comparison of Expedition yield (bu/a) averages with other popular varieties at seven western South Dakota locations, 2001-2003.

	Wall		Bison		Hayes		Martin		Sturgis		Oelrichs		Kennebec	
	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr
	bu/a													
Alliance	44	37	53	.	54	.	69	55	44	.	71	55	73	.
Arapahoe	36	36	53	.	57	.	68	59	46	.	65	55	78	.
Crimson	42	37	53	.	38	.	60	50	40	.	69	54	66	.
Expedition	39	35	55	.	58	.	68	56	44	.	72	57	82	.
Harding	39	36	53	.	46	.	65	53	40	.	68	54	70	.
Jagalene	35	.	55	.	62	.	68	.	44	.	77	.	89	.
Nekota	42	36	51	.	52	.	60	57	42	.	70	56	68	.
Tandem	43	39	52	.	49	.	68	57	42	.	66	55	65	.
Wesley	44	38	52	.	62	.	71	61	41	.	65	55	80	.
Average:	41	36	52	.	52	.	65	55	43	.	67	54	75	.

Table 2. A comparison of Expedition yield averages with other popular varieties at five eastern South Dakota locations along with state averages,2001-2003.

	Brookings		Highmore		Platte		Pierre		Tripp Co.		Statewide Averages 2003		
	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr	Yield	BuWt	Prot.#
	bu/a										bu/a	lb	pct
Alliance	71	67	50	38	55	.	37	.	41	47	55	58	13.2
Arapahoe	85	73	57	43	60	.	38	.	45	42	57	59	13.7
Crimson	85	70	48	37	55	.	42	.	47	41	54	61	14.4
Expedition	79	67	51	35	64	.	37	.	46	48	58	60	13.5
Harding	88	68	54	38	55	.	38	.	42	44	55	60	14.1
Jagalene	90	.	58	.	65	.	33	.	46	.	60	61	13.3
Nekota	79	66	49	35	62	.	34	.	49	43	55	60	12.9
Tandem	75	68	52	39	51	.	35	.	45	46	54	61	13.9
Wesley	83	72	55	38	66	.	36	.	43	45	58	59	14.0
Average:	83	70	53	38	62	.	36	.	46	45	56	60	13.5

* Relative difference in days to heading, compared to the variety Expedition.
\# Brookings, Highmore, Wall, Platte, Pierre, Kennebec, and Tripp County locations.

Expedition in 2003 was similar to that of Nekota and superior to that of Wesley, Alliance, Harding, and Arapahoe. Its test weight was 1 lb less than Crimson, Jagalene, and Tandem.

Expedition has good baking and excellent milling quality characteristics.

Disease resistance

Expedition is moderately resistant to stem rust and moderately susceptible to leaf rust. Field disease ratings of reaction to Fusarium head blight from 2000 to 2004 indicated that Expedition is moderately susceptible to this disease, similar to Arapahoe and better than Wesley and Nekota. Expedition is susceptible to tan spot, wheat streak mosaic virus, and the Great Plains biotype of Hessian fly. It has exhibited intermediate reaction to wheat soil-borne mosaic virus.

Table 3. A comparison of Expedition variety traits and disease reactions with other popular winter wheat entries tested in 2003.

			Traits#				*Disease Reaction+*					
	*(Hdg.)**	*Origin*	*Ldg Res*	*End use Qlty*	*Wntr Hardy Rtg*	*Cole-optile Pct##*	*Wht Strk Msc*	*Tan Spot*	*Str*	*Rust$ Lf*	*Stm*	*PVP**
Expedition	(0)	SD-02	F	EB	G-E	88	S	MS	MS	MS	R	Yes
Alliance	(2)	NE-93	G	AB	G	76	MS	VS	MR	S	MS	Yes
Nekota	(2)	NE/SD-94	G	GB	G	87	MS	MR	S	S	MR	No
Wesley	(2)	NE-98	E	AB	G-E	79	S	MR	MR	MS	R	No
Arapahoe	(3)	NE-88	F	GB	G-E	83	S	S	MS	MR	MR	Yes
Jagalene	(3)	AW-02	E	-	G	92	MS	MR	MR	MR	MR	Yes
Tandem	(4)	SD-97	F-G	EB	G	112	S	S	MR	S	MR	Yes
Crimson	(5)	SD-97	G	GB	G-E	110	MR	R	MR	S	MS	Yes
Harding	(5)	SD-99	F-G	AB	E	100	MR	MR	MS	MR	MR	Yes

* Relative difference in days to heading, compared to Expedition.

\# E= exc., A= accept., F= fair, G= good, P= poor & B= baking.

Percent of Harding (3-1/4" long).

\+ R= resistant, MR= moderately resist., MS= mod. susceptible, S= susc., VS= very susc.

$ Rusts: Stripe (str), leaf (lf), and stem (stm).

** Plant variety protection (PVP), title V, certification option - to be sold by variety name only as a class of certified seed.

SDSU

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