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2009 Winter Wheat Variety Yield Results and Planting Tips

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2009 turned out to be mixed bag for winter wheat production in South Dakota. Some areas in the west and central part of the state did not get much rain in the fall. Dry conditions in these areas delayed germination, setting back seedling development and resulting in thin stands. The Wall, Martin, and Pierre locations were within this dry region. At Martin, a combination of thin stands and downy brome weed pressure adversely affected plant development and yield. Yield results from Martin are not included in this report. Most locations in the eastern part of the state had adequate moisture in the fall to get winter wheat off to a good start. Weather conditions remained cool and wet for most of the growing season in the western part of the state. These conditions slowed down crop development and delayed harvest. Two locations (Sturgis and Bison) were not harvested in time for the results to be included in this publication. Yield results from the two locations will be included in the publication EC774 – 2009 Crop Performance Results, which will be available at the end of the year.

Yields from harvested Crop Performance Testing locations averaged 62 bu/A statewide.

- The top-performing varieties West River in 2009 were Overland, Expedition, Smoky Hill, Settler CL, and Wahoo.
- The top-performing varieties East River in 2009 were Smoky Hill, Overland, Wendy, Expedition, Darrell, and Wesley.
- The varieties with the best statewide average yields in 2009 were Expedition, Overland, Smoky Hill, Settler CL, Darrell, and Wahoo.

Tables 1, 2, 3, and 4 give the characteristics and performance of winter wheat varieties tested in South Dakota. Use them to select a variety with the agronomic characteristics suitable for your area and production system. When considering yield, look for varieties that have performed well at locations near your farm over the past three years. The intensive managed sites (IMS) at Brookings and Winner had fungicides applied to them, whereas the regular CPTs at those locations did not. Brooking had 4 oz/acre of Folicur applied at heading. At Winner, 5 oz/acre (half rate) of Stratego plus 1 gal/acre 6-16-6 was applied with the herbicide in the spring.

WINTER WHEAT PRODUCTION TIPS

Winter wheat planting season is around the corner. Here are some tips that will set the crop for success in 2010:

1. Choose a variety with good agronomic characteristics that is both recommended for your area and, on average, performed well in locations near your farm in the last few years.

2. Direct seed into standing stubble. The standing stubble traps snow and the trapped snow insulates wheat seedlings against cold temperatures, reducing risk of winterkill. Seeding winter wheat into broadleaf crops stubble is recommended to reduce the risk of insect, disease, and weed problems in the rotation. Seeding into wheat stubble should be avoided, as this can increase the risk of disease carryover to the following season. If planting winter wheat into a fallow field, it is important to minimize the number of tillage operations just before planting. Plowing and other deep-tillage operations can reduce seedbed firmness, dry the topsoil, and bury protective residues, thus increasing the risk of winter kill.

3. Control weeds now. Controlling grassy weeds and volunteer wheat crop two weeks prior to planting winter wheat will provide a break in the life cycle of wheat curl mite and help to control wheat streak mosaic and other diseases.

4. Plant on time. In South Dakota the recommended time to plant winter wheat is Sept. 15 through Oct. 10. Wheat plants should be well established before freezing to attain maximum cold tolerance and to accumulate enough energy reserves for the following spring. Planting wheat too early may produce excessive fall growth, reducing amounts of soil moisture and nutrients. Early planted wheat may act as a host for leaf curl mites that transmit wheat streak mosaic virus and also increase the risk of root and crown rot diseases. Research from western South Dakota has shown that grain yield is decreased and that the crop suffers substantial winter injury when planting is later than Oct. 15.

5. Don't plant too deep or too shallow. Plant winter wheat at a depth of 1.5 to 2 inches in a firm seedbed. Planting deeper than 2 inches reduces emergence and can result in weak, spindly seedlings with a poor ability to survive the winter. For those direct seeding, a uniform depth of 1 to 1.5 inches under optimum moisture conditions will give a good stand. If it is necessary to plant deeper to get to moisture, growers should choose a variety with a longer coleoptile (Table 4). Make sure there is good soil-to-seed contact, especially under drier conditions. If soil cover over the seed is poor, there is risk of exposing the crown and adversely affecting winter survival.

6. Plant the right amount of seed. The recommended seeding rates are 22 pure live seeds per square foot (approximately 960,000 seeds/acre). If you have a poor seedbed or are planting later than the recommended dates, increase seeding rate to 28 pure live seeds per square foot. However, properly managed winter wheat has a tremendous ability to tiller and can compensate for thin stands.

7. Test soils and apply fertilizer based on soil test results and yield expectations. Research has shown that phosphorus helps winter survival by stimulating root growth and tillering in the fall. Therefore, if soil test results indicate low phosphorus, application of the required rate is recommended.

Table 1. Winter wheat yield results - West River Locations, 2007 – 2009 (Bu/A)

Variety, Heading [1]	Location Yield Avg. (Bu/a at 13% moist.)										Western		State	
	Kennebec		Wall		Hayes		Winner				Yield Avg. bu/a		Yield Avg. bu/a	
							CPT		IMS*					
	2009	3-Yr	2009	3-Yr	2009	3-Yr	2009	3-Yr	2009	3-Yr	2009	3-Yr	2009	3-Yr
**SD06069, -	65	.	57	.	50	.	73	.	81	.	65	.	66	.
Smoky Hill, 5	61	.	43	.	50	.	81	.	81	.	63	.	66	.
**SD05118, -	64	.	48	.	51	.	80	.	73	.	63	.	65	.
**SD06158, -	64	.	53	.	46	.	72	.	78	.	63	.	65	.
Expedition, 1	62	60	39	57	55	64	75	63	86	.	63	.	65	.
Overland, 5	60	69	51	62	51	60	73	67	79	.	63	.	64	.
Settler CL, 4	60	.	45	.	57	.	77	.	83	.	64	.	63	.
Wahoo, 4	70	67	53	59	49	60	74	59	76	.	64	.	63	.
Darrell, 6	60	60	46	56	54	62	70	57	75	.	61	.	63	.
NuDakota~W, 4	58	63	42	59	47	58	84	72	78	.	62	.	62	.
Wesley, 3	59	62	43	59	46	58	73	61	74	.	59	.	62	.
**SD06163, -	63	.	44	.	54	.	69	.	73	.	61	.	62	.
Fuller, 3	53	.	38	.	46	.	81	.	80	.	60	.	62	.
**SD05W018, -	51	.	45	.	47	.	69	.	72	.	57	.	62	.
Wendy~W, 0	46	56	42	61	52	63	77	64	72	.	58	.	62	.
Art, 1	47	.	37	.	50	.	77	.	76	.	57	.	61	.
Millennium, 5	59	67	50	58	50	59	73	64	71	.	61	.	61	.
Infinity CL, 4	58	.	49	.	55	.	73	.	76	.	62	.	61	.
Hawken, 4	52	60	39	58	47	58	75	65	81	.	59	.	61	.
**SD03164-2, -	48	.	43	.	48	.	72	.	78	.	58	.	61	.
Radiant, 5	62	.	56	.	56	.	59	.	65	.	60	.	60	.
Striker, 5	61	.	46	.	54	.	69	.	69	.	60	.	60	.
Lyman, 4	53	71	41	54	50	60	76	66	67	.	57	.	60	.
Harding, 6	63	66	51	54	50	59	65	57	64	.	59	.	60	.
Hatcher, 3	46	55	49	58	45	56	75	61	77	.	58	.	59	.
Jagalene, 4	53	48	36	54	46	55	71	52	84	.	58	.	59	.
Arapahoe, 4	59	66	46	56	51	59	72	61	67	.	59	.	59	.
Alice~W, 0	53	56	38	56	47	56	71	61	75	.	57	.	59	.
Jerry, 6	58	58	55	53	51	55	60	51	58	.	56	.	58	.
AP503CL2, 4	54	.	35	.	49	.	64	.	76	.	56	.	57	.
Test avg. :	57	61	45	57	50	59	73	61	75	.	60	.	62	.
High avg. :	70	71	57	62	57	64	84	72	86	.	65	.	66	.
Low avg. :	46	48	35	53	45	55	59	51	58	.	56	.	57	.
#LSD (0.05):	8	9	5	NS	6	4	10	8	9		5		3	
##TPG-value :	62	62	52	53	51	60	74	64	77		60		63	
###C.V. :	10	7	7	8	8	8	10	9	9		13		13	

[1] Heading- days earlier or later (- or +) than Expedition, the check variety (Ck) for maturity.

* Indicates intensive management study (IMS).# If the difference between two varieties within a column equals or exceeds the LSD value, the difference is significant; if not, the difference is nonsignificant (NS) at the 0.05 level of probability.

Minimum value required for variety to qualify for the top performance group (TPG).

+ Indicates values within a column that qualify for the TPG.

###A measure of experimental error, 15% or less is best for yield.

** Indicates breeding lines from the SDSU breeding program.

Table 2. Winter wheat yield results - East River Locations, 2007 - 2009 (Bu/A)

Variety, Heading [1]	Location Yield Avg. (Bu/a at 13% moist.)												Eastern Yield		State	
	Brookings				Selby		Platte		Onida		Pierre		Yield Avg. bu/a		Yield Avg. bu/a	
	CPT		IMS*													
	2009	3-Yr	2009	3-Yr	2009	3-Yr	2009	3-Yr	2009	3-Yr	2009	3-Yr	2009	3-Yr	2009	3-Yr
SD06069, -	75	.	86	.	78	.	68	.	48	.	43	.	66	.	66	.
Smoky Hill, 5	66	.	84	.	77	.	81	.	49	.	48	.	68	.	66	.
SD05118, -	72	.	85	.	79	.	79	.	48	.	40	.	67	.	65	.
SD06158, -	70	.	79	.	84	.	75	.	47	.	50	.	68	.	65	.
Expedition, 1	71	65	84	.	70	71	83	75	49	61	46	50	67	.	65	.
Overland, 5	65	68	73	.	73	78	79	78	52	66	50	58	65	.	64	.
Settler CL, 4	63	.	74	.	69	.	72	.	51	.	46	.	63	.	63	.
Wahoo, 4	54	60	63	.	75	68	81	68	49	59	48	52	62	.	63	.
Darrell, 6	72	64	73	.	76	66	73	65	52	61	43	46	65	.	63	.
NuDakota~W, 4	67	67	73	.	75	71	71	73	46	62	42	50	62	.	62	.
Wesley, 3	68	63	66	.	75	67	83	73	49	63	46	50	65	.	62	.
SD06163, -	67	.	72	.	74	.	83	.	43	.	44	.	64	.	62	.
Fuller, 3	68	.	83	.	72	.	69	.	47	.	41	.	63	.	62	.
SD05W018, -	75	.	81	.	74	.	71	.	46	.	48	.	66	.	62	.
Wendy~W, 0	66	65	79	.	77	73	79	71	48	62	48	51	66	.	62	.
Art, 1	78	.	76	.	77	.	72	.	45	.	36	.	64	.	61	.
Millennium, 5	62	64	73	.	72	73	73	73	47	61	41	51	61	.	61	.
Infinity CL, 4	65	.	78	.	69	.	68	.	48	.	37	.	61	.	61	.
Hawken, 4	64	68	74	.	74	65	70	68	50	61	42	45	62	.	61	.
SD03164-2, -	71	.	78	.	63	.	80	.	44	.	44	.	63	.	61	.
Radiant, 5	60	.	75	.	83	.	52	.	51	.	43	.	61	.	60	.
Striker, 5	67	.	77	.	78	.	60	.	37	.	38	.	60	.	60	.
Lyman, 4	69	71	81	.	67	76	73	71	45	59	38	49	62	.	60	.
Harding, 6	63	63	73	.	77	72	65	66	44	58	40	51	60	.	60	.
Hatcher, 3	58	60	77	.	68	59	66	64	51	57	37	43	60	.	59	.
Jagalene, 4	50	50	68	.	70	55	76	60	51	58	45	49	60	.	59	.
Arapahoe, 4	64	65	73	.	71	70	71	67	44	59	34	46	60	.	59	.
Alice~W, 0	68	62	79	.	62	61	67	62	46	60	39	48	60	.	59	.
Jerry, 6	62	60	73	.	76	72	64	61	45	55	33	37	59	.	58	.
AP503CL2, 4	68	.	70	.	64	.	68	.	41	.	39	.	58	.	57	.
Test avg. :	66	63	76	.	73	68	72	68	47	60	42	49	63	.	62	.
High avg. :	78	71	86	.	84	78	83	78	52	66	50	58	68	.	66	.
Low avg. :	50	50	63	.	62	55	52	60	37	55	33	37	58	.	57	.
#LSD (0.05):	12	11	9		10	14	9	12	6	8	7	10	4		3	.
##TPG-value :	66	60	77		74	64	74	66	46	58	43	48	63		63	.
C.V. :	13	9	9		9	7	9	9	10	8	11	9	12		13	.

[1] Heading- days earlier or later (- or +) than Expedition, the check variety (Ck) for maturity.

* Intenive management study (IMS).

Note: Additional table footnotes in Table 1.

Table 3. Western, eastern, and statewide winter wheat grain protein averages in 2009. Table sorted by state protein average.

Variety, Heading [1]	Protein average by region		
	West	East	State
	%	%	%
Art, 1	16.1	14.2	14.8
Wesley, 3	15.6	14.0	14.5
Harding, 6	15.7	13.9	14.4
Arapahoe, 4	15.3	13.9	14.3
Jerry, 6	15.2	13.9	14.3
SD03164-2, -	15.6	13.7	14.3
Striker, 5	15.0	13.9	14.2
Lyman, 4	15.0	13.9	14.2
Hawken, 4	14.9	13.9	14.2
SD06163, -	15.9	13.4	14.1
Wendy~W, 0	14.9	13.8	14.1
Wahoo, 4	14.7	13.8	14.1
SD06069, -	14.8	13.8	14.1
Jagalene, 4	14.6	13.8	14.0
Fuller, 3	14.7	13.6	13.9
Smoky Hill, 5	14.7	13.5	13.9
SD05118, -	14.7	13.5	13.8
Millennium, 5	14.3	13.5	13.8
NuDakota~W, 4	14.6	13.4	13.8
Alice~W, 0	15.0	13.2	13.7
Radiant, 5	14.1	13.5	13.7
Expedition, 1	14.6	13.3	13.7
Darrell, 6	14.7	13.1	13.5
Overland, 5	14.3	13.2	13.5
SD06158, -	14.7	13.0	13.5
AP503CL2, 4	14.4	13.1	13.5
SD05W018, -	14.3	13.0	13.3
Settler CL, 4	13.8	12.9	13.1
Infinity CL, 4	13.9	12.8	13.1
Hatcher, 3	13.9	12.8	13.1
Test avg. :	14.8	13.5	13.9
High avg. :	16.1	14.2	14.8
Low avg. :	13.8	12.8	13.1
#LSD (.05):	0.3	0.5	0.4
## TPG-value :	15.8	13.7	14.4
### C.V. :	2.0	6.0	5.0

[1] Heading- days earlier or later (- or +) than Expedition, the check variety (Ck) for maturity.

Note: Additional table footnotes in Table 1.

Table 4: Origin, variety traits, and disease reactions for winter wheat entries for 2008

Variety	Rel Hdg [1]	Origin	Ldg Res#	Winter Hardy Rtg#	End-Use Qlty#	Coleoptile Length##	Wheat Streak Mosaic+	Disease / Reactions				PVP Status**
								Tan-Spot+	Rust Stripe+	Rust Leaf+	Rust Stem+	
Alice~W	0	SD-06	G	G	EB	78	MR	MS	-	MS	MR	Yes
Wendy~W	0	SD-04	E	E	GN	67	MS	R	MR	MS	MR	Yes
Art	1	AP-08	E	G	-	-	S	MR	R	R	MR	Yes
Expedition	1	SD-02	F	G-E	GB	88	S	MS	MS	S	R	Yes
Fuller	3	KS-07	F-G	G	AB	-	MS	MR	-	MR	MR	Pdg
Hatcher	3	CO-04	G	F-G	GB	89	S	-	MS	MS	MR	Yes
Wesley	3	NE-98	E	G-E	GB	79	S	MR	MR	MS	R	No
AP503CL2	4	AP-08	E	G-E	-	-	MS	MR	MR	S	MR	Yes
Arapahoe	4	NE-88	F	G-E	GB	83	S	S	MS	MR	MR	Yes
Hawken	4	AP-07	E	G	AB	-	MS	MR	MR	MR	MR	Yes
Infinity CL	4	NE-05	G	G	AB	-	S	-	MR	MR	MR	Yes
Jagalene	4	AP-02	E	G	AB	92	MS	MR	MR	S	MR	Yes
Lyman	4	SD-08	F	G	AB	90	S	MR	MS	R	R	Pdg
NuDakota~W	4	AP-06	E	G-E	AB	-	MR	MR	MR	MS	MR	Yes
Settler CL	4	NE-08	G	G	AB	-	S	-	MS	MS	MR	Pdg
Wahoo	4	NE/WY-01	G	G	AB	91	S	-	MR	MS	R	Yes
Millennium	5	NE-99	G	F-G	AB	78	S	MS	MR	MR	MR	Yes
Overland	5	NE/SD-07	G	E	AB	89	-	-	R	R	R	Pdg
Radiant	5	CAN-05	E	G-E	AB	-	R	-	S	S	-	-
Smoky Hill	5	WPB-07	G	G	EB	-	MS	MR	R	R	MR	Yes
Striker	5	WB-09	E	E	-	-	-	MS	MR	R	MR	Yes
Darrell	6	SD-06	G	G	EB	89	MR	MS	-	MS	R	Yes
Harding	6	SD-99	F-G	E	AB	100	MR	MR	MS	MR	MR	Yes
Jerry	6	ND-01	F	E	GB	92	MS	-	MR	MR	R	No
SD03164-2	-	SD-	-	-	-	-	-	-	-	-	-	-
SD05118	-	SD-	-	-	-	-	-	-	-	-	-	-
SD05W018	-	SD-	-	-	-	-	-	-	-	-	-	-
SD06069	-	SD-	-	-	-	-	-	-	-	-	-	-
SD06158	-	SD-	-	-	-	-	-	-	-	-	-	-
SD06163	-	SD-	-	-	-	-	-	-	-	-	-	-

[1] Heading- days earlier or later (- or +) than Expedition, the check variety (Ck) for maturity.

~ W, Hard white wheat variety.

E= exc., A= accept., F= fair, G= good, P= poor, B= baking, N=noodles.

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

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

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

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Winter Wheat Variety Recommendations for Fall 2009

Recommendations are based on information from the South Dakota Crop Performance Testing (CPT) Program and regional land-grant university nurseries. Variety performance depends on genetics and the environment. Environmental factors like temperature, moisture, plant pests, soil fertility, soil type, and management practices affect variety performance. The performance of recommended varieties in response to environmental conditions is generally better than that of other varieties. The better performance of a recommended variety, however, cannot always be guaranteed due to its complex response to the environment. Variety recommendations, including crop adaptation area (CAA) where each is most suited, pertinent information for successful production are listed below:

PVP Plant variety protection has been issued or is anticipated; seed sales are restricted to classes of certified seed.
pc Plant into protective cover.
* In 2009, this variety was very susceptible to *Fusarium* Head Blight (Head scab) and Crown rot diseases..

WINTER WHEAT

Recommended		**Acceptable/Promising**	
Variety	*CAA*	*Variety*	*CAA*
Alice (white) PVP	1pc, 4pc, 5, 6, 7pc	Arapahoe PVP	1pc, 3, 4pc, 5, 6, 7pc
Expedition PVP	1pc, 4, 5, 6, 7pc	Darrell PVP	1pc, 4, 5, 6,7 pc
Harding PVP	1pc, 2pc, 4, 7	Hatcher PVP	5, 6, 7pc
Millennium PVP	1pc, 4pc, 5, 6, 7pc	Hawken PVP	3, 4pc, 5, 6
Nu Dakota PVP	5, 6, 7pc	Lyman PVP	1pc, 3, 4pc, 5, 6, 7pc
Overland PVP	1pc, 3, 4pc, 5, 6, 7pc	Smoky Hill PVP	5, 6, 7pc
Wendy (white) PVP	5, 6, 7pc	Wesley *	5, 6, 7pc