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2010 Winter Wheat Variety Yield Results and Planting Tips

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Conditions were very dry for planting last September for the western and central part of the state. And while there were good rains in early October, the cold temperatures led to a slow start for the wheat. Fortunately November was warmer than average, which allowed most locations to get decent fall growth. The northwest part of the state suffered a hard freeze on May 8th causing some freeze injury to the crop. Spring and early summer conditions were wet for most of the state, favoring increased disease pressure. The north central part of South Dakota was dry in June, which caused some drought stress in those areas. Harvest was hampered by rainy and humid conditions in July and early August. This made it difficult to get the grain dry enough to harvest and frequent rains on the ripe grain caused lower test weights in some areas.

Yields from the Crop Performance Testing Program averaged 59 bu/A statewide, ranging from 28 bu/A at Bison to 84 bu/A at Selby. The results for Winner and Martin are not reported due to heavy weed pressure at Winner and high yield variation at Martin. Locations with higher than ideal trial variation ($CV > 14$) were Bison (dry fall, freeze injury), Kennebec (cheatgrass), Brookings non-intensive (disease pressure) and Beresford (storm damage). The top performing varieties at East River locations in 2010 were Expedition, Art, Settler CL, Overland and Lyman; while Hatcher, Lyman, Wesley, Camelot, Millennium and Wahoo did the best in West River locations. The varieties Overland, Expedition, Smoky Hill, Lyman, Wendy, Millennium, Wesley and Darrell had the best three-year statewide average yields.

2011 variety recommendations are included in this publication. Changes include: dropping NuDakota (not tested in 2010) and Arapahoe (poor yield performance) from the recommendations moving Harding down from the recommended to the acceptable/promising list, moving Lyman and Smoky Hill up from the acceptable/promising to the recom-

mended list and adding Art and Settler CL to the acceptable/promising list.

Tables 1, 2 and 3 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 Selby had fungicide (Pro-saro 6.5 fl oz/A) applied to them when the variety Expedition was flowering, whereas the regular CPT's at those locations did not.

2010 Winter Wheat Disease Summary

Winter wheat disease pressure in 2010 came mainly from root rot and scab as well as bacterial leaf streak/black chaff diseases. Leaf rust was slow to arrive and hence did not cause major losses in most of the state. Stripe rust arrived early and with some surprising varietal reactions due to a major race change in that pathogen. In table 3, the 2010 stripe rust reactions are underlined to indicate the major differences over prior years' ratings. Wheat scab (fusarium head blight) was a problem for susceptible varieties such as Wesley, where high levels of vomitoxin in the grain are likely. Bacterial diseases once again were a major occurrence on wheat leaves and heads. Not a lot is known about the yield or quality impact of bacterial leaf diseases but with the widespread and severe nature of the problem, it's likely that some yield and/or test weight losses occurred due to damaged flag leaves. Wheat viral diseases were prevalent in 2010 including wheat streak mosaic, barley yellow dwarf, and a couple of emergent diseases – high plains disease and triticum mosaic – which are vectored by the wheat curl mite.

Recommended varieties for 2011

Recommended:

Variety	Crop Adaptation Area
Alice (white) ^{PVP}	1 ^{pc} , 4 ^{pc} , 5, 6, 7 ^{pc}
Expedition ^{PVP}	1 ^{pc} , 2 ^{pc} , 4 ^{pc} , 5, 6, 7 ^{pc}
Lyman ^{PVP}	1 ^{pc} , 2 ^{pc} , 3, 4 ^{pc} , 5, 6, 7 ^{pc}
Millennium* ^{PVP}	1 ^{pc} , 4 ^{pc} , 5, 6, 7 ^{pc}
Overland ^{PVP}	1 ^{pc} , 3, 4 ^{pc} , 5, 6, 7 ^{pc}
Smoky Hill* ^{PVP} (non title V)	5, 6, 7 ^{pc}
Wendy* (white) ^{PVP}	5, 6, 7 ^{pc}

Acceptable/Promising:

Variety	Crop Adaptation Area
Art ^{PVP}	1 ^{pc} , 2 ^{pc} , 3, 4 ^{pc}
Darrell ^{PVP}	1 ^{pc} , 4 ^{pc} , 5, 6, 7 ^{pc}
Harding* ^{PVP}	1 ^{pc} , 2 ^{pc} , 4, 7
Hatcher* ^{PVP}	5, 6, 7 ^{pc}
Hawken* ^{PVP}	3, 4 ^{pc} , 5, 6
Settler CL* ^{PVP}	5, 6, 7 ^{pc}
Wesley*	5, 6, 7 ^{pc}

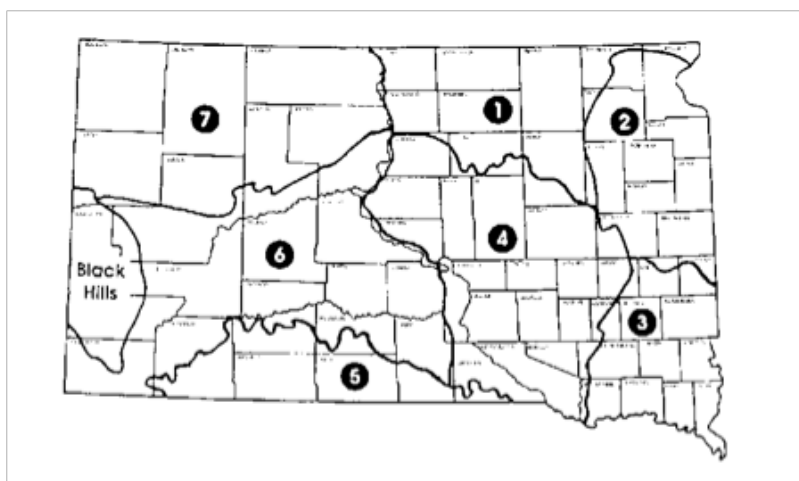
* Varieties susceptible to Fusarium Head Blight (Scab): Harding, Hatcher, Hawken, Millennium, Settler CL, Smoky Hill, Wesley, Wendy. Varieties moderately resistant to Fusarium Head Blight (scab): Lyman

^{PVP} U.S. Plant Variety Protection applied for and/or issued; seed sales of these varieties are restricted to classes of certified seed.

^{pc} Plant into protective cover.

Crop Adaptation Areas for South Dakota

(Revised 1992)



Winter Wheat Production Tips

Winter wheat planting season is around the corner. Here are some tips that will set the crop for success in 2011:

1. Choose a variety with good agronomic characteristics that is recommended for your area, and that, 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 winter-kill. 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 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 3). 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 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. Hard winter wheat yield results - West River Locations, 2008 – 2010 (bu/A).

Variety	Location Yield Avg. (bu/a at 13% moist.)										West Yield Avg. (bu/a)		State Yield Avg. (bu/a)	
	Bison		Sturgis		Wall		Hayes		Kennebec		2010	3-Yr	2010	3-Yr
	2010	3-Yr	2010	3-Yr	2010	3-Yr	2010	3-Yr	2010	3-Yr				
Alice (white)	30	34	70	55	42	52	71	64	32	54	49	52	60	57
Wendy (white)	26	40	71	50	28	51	78	70	25	50	45	52	60	60
Arapahoe	30	34	67	53	33	50	68	64	36	60	47	52	58	57
Art	28	--	72	--	30	--	72	--	35	--	47	--	62	--
Boomer	31	--	60	--	37	--	66	--	25	--	44	--	57	--
Camelot	29	--	72	--	48	--	74	--	32	--	51	--	60	--
Darrell	26	36	70	57	38	52	76	69	43	61	50	55	58	60
Expedition	27	38	73	57	46	55	79	71	27	55	50	55	64	62
Fuller	23	32	69	53	28	48	70	64	32	53	44	50	59	58
Harding	20	33	62	52	28	49	70	64	33	60	43	51	53	56
Hatcher	31	36	73	61	51	55	72	62	36	51	53	53	59	58
Hawken	25	35	64	51	45	54	78	66	40	57	50	52	59	58
Jagalene	25	32	62	51	40	51	65	60	34	49	45	49	56	55
Jerry	26	32	65	52	33	50	65	60	34	55	45	50	54	54
Lyman	34	40	72	57	31	48	78	67	45	64	52	55	62	60
Millennium	28	35	72	57	40	55	75	67	39	62	51	55	60	60
Overland	29	37	74	59	43	60	75	67	28	59	50	57	63	63
Radiant	28	--	67	--	39	--	63	--	19	--	43	--	51	--
Settler CI	24	33	70	50	41	54	78	71	25	53	47	52	62	58
Smoky Hill	25	34	66	53	36	53	77	70	38	60	48	54	60	61
Striker	28	--	61	--	36	--	68	--	21	--	43	--	56	--
Wahoo	34	40	74	59	38	55	76	66	31	60	51	56	60	59
Wesley	29	36	73	58	42	54	76	66	41	58	52	54	59	60
SD05118-1	33	37	72	55	35	53	74	67	34	63	50	55	62	62
Test Average	28	36	69	55	38	53	72	66	32	57	48	53	59	59
High Yield	34	40	74	61	51	60	79	71	45	64	53	57	64	63
Low Yield	20	32	61	50	28	48	63	60	21	49	43	49	51	54
LSD (0.05)#	5.7	NA	4.2	4.2	3.2	3.1	5.8	4.5	8.0	12.8	--	--	--	--
TPG value##	29	NA	71	55	48	57	74	67	37	58	--	--	--	--
C.V.###	14.2	20.6	4.3	9.6	6.0	6.7	5.6	8.4	17.4	12.8	--	--	--	--

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).

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

Bolded yields indicate values within a column that qualify for the top performance group (TPG).

Table 2. Hard winter wheat yield results - East River Locations, 2008 - 2010 (bu/A).

Variety	Location Yield Avg. (bu/a at 13% moist.)														East Yield Avg. (bu/a)		State Yield Avg. (bu/a)	
	Selby			Brookings			Beresford		Onida		Pierre		Platte		2010	3-Yr	2010	3-Yr
	IMS*	2010	3-Yr	IMS*	2010	3-Yr	2010	3-Yr	2010	3-Yr	2010	3-Yr	2010	3-Yr				
Alice (white)	93	89	74	72	52	66	53	--	59	62	60	49	56	63	67	63	60	57
Wendy (white)	90	80	80	84	65	71	61	--	53	61	65	51	56	71	69	67	60	60
Arapahoe	85	84	76	80	57	65	48	--	50	57	57	45	61	66	65	62	58	57
Art	91	85	--	86	60	--	60	--	57	--	64	--	64	--	71	--	62	--
Boomer	88	89	--	88	63	--	50	--	50	--	45	--	48	--	65	--	57	--
Camelot	92	87	--	75	56	--	51	--	51	--	63	--	52	--	66	--	60	--
Darrell	87	81	78	79	49	68	45	--	53	61	51	47	56	66	63	64	58	60
Expedition	96	91	79	85	68	73	61	--	56	63	63	51	65	77	73	69	64	62
Fuller	94	91	80	81	64	72	53	--	57	62	60	50	53	63	69	65	59	58
Harding	83	79	76	69	56	65	43	--	48	54	50	47	54	61	60	61	53	56
Hatcher	77	83	76	74	58	66	48	--	55	58	55	46	57	64	63	62	59	58
Hawken	77	81	76	85	55	69	50	--	57	60	59	45	59	66	65	63	59	58
Jagalene	84	81	72	82	52	57	45	--	58	64	50	51	54	67	63	62	56	55
Jerry	81	80	77	77	63	64	38	--	49	54	44	35	47	58	60	58	54	54
Lyman	87	89	79	85	64	71	49	--	55	58	56	47	66	69	69	65	62	60
Millennium	82	83	78	81	59	65	49	--	53	60	61	50	63	70	66	65	60	60
Overland	92	79	79	88	66	70	52	--	61	67	60	55	64	75	70	69	63	63
Radiant	82	65	--	86	45	--	39	--	50	--	39	--	37	--	55	--	51	--
Settler CI	93	85	72	88	69	69	59	--	57	60	57	47	62	68	71	63	62	58
Smoky Hill	101	96	84	79	47	69	54	--	54	62	57	54	58	73	68	68	60	61
Striker	91	79	--	82	63		55	--	51	--	45	--	46	--	64	--	56	--
Wahoo	86	83	75	74	62	65	54	--	52	57	56	49	57	67	65	63	60	59
Wesley	85	73	74	84	64	69	45	--	58	63	48	48	59	70	64	65	59	60
SD05118-1	95	92	84	92	70	77	47	--	50	62	49	46	55	71	69	68	62	62
Test Average	88	84	77	82	59	68	50	--	54	60	54	48	54	68	66	64	59	59
High Yield	101	96	84	92	70	77	61	--	61	67	65	55	66	77	73	69	64	63
Low Yield	77	65	72	69	45	57	38	--	49	54	39	35	37	58	55	58	51	54
LSD (0.05) #	11.1	11.4	5.8	7.8	11.4	6.2	10.6	--	6.3	4.3	6.7	4.0	6.2	5.3	--	--	--	--
TPG value ##	90	85	79	85	59	71	51	--	55	63	58	51	60	72	--	--	--	--
C.V. ###	8.9	9.6	9.3	6.7	13.6	11.4	14.8	--	8.4	8.8	8.7	10.3	7.8	9.7	--	--	--	--

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).

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

* IMS = Intensive Management Study

Bolded yields indicate values within a column that qualify for the top performance group (TPG).

Table 3. Origin, agronomic traits and disease reactions for winter wheat entries for 2010.

Variety	Origin (Year) ¹	Relative Heading ²	Lodging Resist ³	Test Weight	Protein Percent	Height Inches	End-use Qlty ³	Winter Hardy Rtg ³	Coleoptile Percent ⁴	Wheat Streak Mosaic ⁵	Tanspot ⁵	Rust ⁵			FHB (Scab) Rating ⁷	PVP Status ^{**}
												Stripe ⁶	Leaf	Stem		
Alice ~W	SD (06)	-1	G	55.6	12.7	31	EB	G	78	MR	MS	<u>R</u> -MR	MR	MR	3	Yes
Wendy ~W	SD (04)	-1	E	56.6	13.1	29	GN	E	67	MS	MR	MR- <u>MS</u>	MS	MR	5	Yes
Art	AP (08)	0	E	56.3	13.3	32	-	G	-	MS	MS	R- <u>MR</u>	R	MR	3	Yes
Expedition	SD (02)	0	F	56.4	12.4	33	GB	G-E	88	S	S	<u>MR</u> -MS	MS	R	3	Yes
Fuller	KS (07)	0	E	55.6	12.9	31	AB	P-F	-	MS	MS	MR	MR	MS	3	Yes
Hatcher	CO (04)	2	G	55.3	12.4	32	GB	F-G	89	MS	S	<u>MR</u> -MS	MS	MS	5	Yes
Smoky Hill	WB (07)	2	G	55.5	12.4	33	EB	F-G	-	S	MR	R- <u>S</u>	R	MR	5	Yes
Lyman	SD (08)	2	F	56.9	13.4	35	AB	G	-	MS	MR	<u>R</u> -MS	R	R	2	Yes
+Camelot+	NE (08)	2	G	55.6	12.8	35	EB	G	-	MS	MR	<u>MS</u> -MR	R	MR	5	Yes
Wesley	NE (99)	2	E	54.7	13.1	31	GB	G-E	79	S	MR	MR	S	R	4	No
Arapahoe	NE (88)	3	F	56.2	13.0	38	GB	G-E	83	S	MS	R-MS	MR	MR	2	Yes
Hawken	AP (07)	3	E	55.6	13.2	31	AB	G	-	MS	MR	<u>MR</u> -MS	R	MR	4	Yes
Jagalene	AP (01)	3	E	54.9	12.6	34	AB	G	92	MS	MR	MR	S	MR	5	Yes
Settler CL	NE (08)	3	G	56.7	12.2	32	AB	G	-	MS	MS	MS	MS	MR	5	Yes
Wahoo	NE (01)	3	G	54.4	12.6	36	AB	G	91	S	MR	MR	MS	R	5	Yes
Millennium	NE (00)	4	G	57.1	12.6	38	AB	F-G	78	S	MS	MR	MR	MR	5	Yes
Overland	NE (06)	4	G	56.9	12.2	35	FB	E	89	MS	MR	R- <u>MR</u>	R	MS	3	Yes
Striker	WB (09)	4	E	56.1	13.0	32	-	E	-	-	MR	MR	MS	MR	5	Yes
+Boomer+	WB (09)	5	-	55.0	13.3	34	AB	E	-	-	MS	<u>MR</u> -MS	MR	R	5	Yes
Darrell	SD (06)	5	G	56.4	12.6	37	EB	G	89	MR	MS	MR	MS	R	3	Yes
Harding	SD (99)	5	F-G	56.9	13.5	40	AB	E	100	MR	MR	<u>MR</u> -MS	MR	MR	4	Yes
Radiant	CN (05)	5	E	54.3	12.6	38	AB	G-E	-	R	MR	<u>MR</u> -S	S	S	2	-
Jerry	ND (01)	5	F	56.1	13.2	40	GB	E	92	MS	MR	<u>R</u> -MR	MS	R	3	No

+New variety+ to the 2010 CPT

~ W, Hard white wheat variety.

¹ AP=Agripro, CN=Canada, CO=Colorado, KS=Kansas, NE=Nebraska, ND=North Dakota, SD=South Dakota, WB=WestBred

² Heading, the relative difference in days to heading, compared to Expedition.

³ E= excellent., A= acceptable, F= fair, G= good, P= poor; B= baking, N=noodles.

⁴ Percent of Harding (3-1/4" long).

⁵ R= resistant, MR= moderately resist., MS= mod. susceptible, S= susc., VS= very susc.

⁶ Major race change in stripe rust caused unusual reactions for some varieties. 2010 ratings underlined

⁷ 1= tolerant, 5=susceptible

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



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