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Winter Wheat Yield and Comments -- 2001

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WINTER WHEAT
Yields and Comments — 2001

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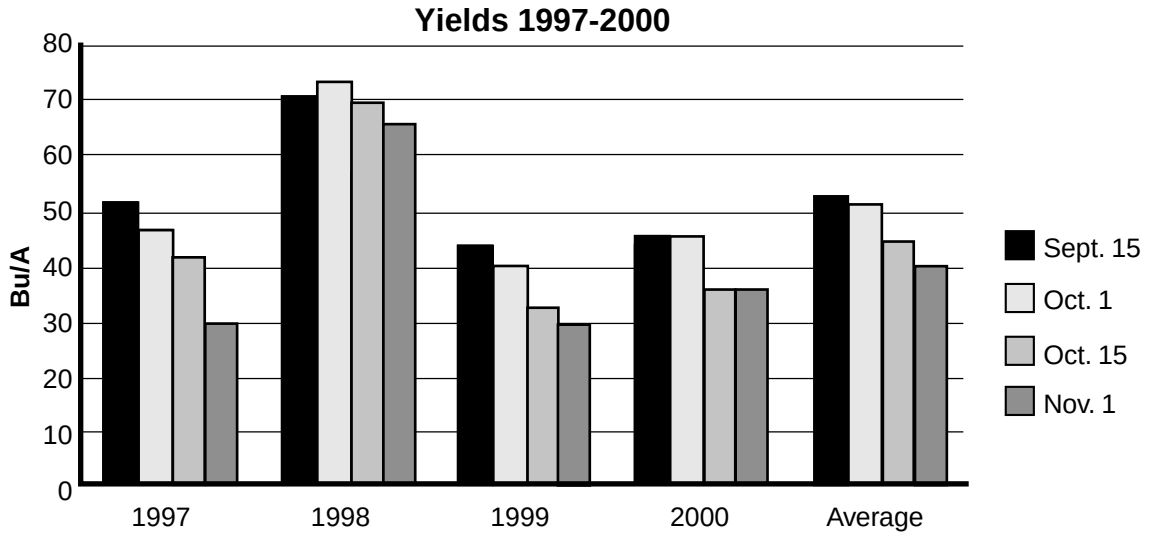
Winter Wheat Date-of-Planting Is Important

No-till, date-of-planting studies supported by the South Dakota Wheat Commission were conducted for four years at two locations in western South Dakota. Seven popular varieties were tested at each planting date. It was determined that planting date makes a greater difference in grain yield than does variety. The first two planting dates of September 15 and October 1 always had the highest yields. The latest planting date of November 1 always had the lowest average yield.

The planting date of winter wheat in the fall has a significant effect on the spring growth and the yield of the crop the next season. The later-planted wheat has less fall growth, or in the case of the November planting, no growth. The lack of fall growth results in slower development of the crop in early spring and delays the grain-fill period until the hotter portion of the summer. The first two planting dates had more average fall growth and were able to start development earlier in the spring and make use of the moisture and cool growing conditions early in the summer.

The seeding rates appeared to be less important than planting date. The higher rates of seeding appeared to increase the grain yields at the two later planting dates. However, increasing the seeding rate can not compensate for an earlier planting date.

Figure 1. Planting date of winter wheat significantly affects yield.



Aphids on Early-Planted Winter Wheat

Green bugs were a big problem for grain sorghum producers in central South Dakota during the summer of 2001. Green bugs and bird cherry oat aphids can be significant problem on winter wheat that is planted early in the fall.

Research was conducted on dates-of-planting and the use of a seed treatment insecticide to control the aphids. A summary of the three years of data indicates that planting winter wheat in central South Dakota after September 10 decreases the chances significantly of aphids feeding on the wheat and infecting it with barley yellow dwarf virus.

The use of an insecticide on earlier planting dates prior to September 10 reduced the feeding of the aphids. If producers need to start planting in late August to provide adequate ground cover to prevent wind erosion of the soil, it is recommended that they consider using a seed treatment insecticide.

New Varieties

Wahoo Hard Red Winter Wheat (NE94654) –
Joint release between Nebraska and Wyoming in 2001. Wahoo is a cross between Arapahoe/Abilene// Arapahoe. Wahoo has been in the top-yield group frequently in the crop performance trial plots, with similar yields to Alliance during 2000 and 2001.

Characteristics:

- Reported to have lower protein than Arapahoe.
- Pounds per bushel similar to Arapahoe but lower than Millennium and Alliance.
- Straw strength similar to Arapahoe but less than Wesley.
- Similar in maturity to Arapahoe and slightly later than Wesley.
- Winter hardiness similar to Abilene with a moderately long coleoptile (53mm).
- Moderately resistant to stem and leaf rust and susceptible to leaf spotting diseases.
- Considered a good replacement for Arapahoe in dry-land, winter-wheat producing areas of Nebraska, Wyoming, and possibly South Dakota.

Jerry Hard Red Winter Wheat (ND9257) –
Jerry is a cross between Roughrider, Arapahoe, and an NDSU experimental line.

Characteristics:

- White-chaffed.
- Similar in maturity to Roughrider.
- Better lodging resistance than Roughrider.
- Similar in winter hardiness to Roughrider.

Jerry averaged 16, 5, and 2 percent higher in grain yield than Roughrider, Seward, and Ransom, respectively, in North Dakota testing.

Jerry has only been in South Dakota crop performance trial plots during 2001. The yields have been excellent when compared to more winter hardy varieties; however, it generally does not yield as well as the less winter-hardy, recommended varieties unless there is a need for the cold tolerance. Jerry is a good-quality wheat with flour protein similar to Roughrider and bread-baking performance equal to Roughrider.

Poor survival of winter wheat was caused by dry fall conditions.

The 2001 winter wheat crop suffered historic crop losses according to the South Dakota Agricultural Statistics Service. Much of the winter wheat in South Dakota was planted into dry soil in the fall of 2000 and did not germinate until rains were received the first week of November. The soil temperatures went from almost 60F the last week in October to freezing by the end of the first week of November.

Normally, winter wheat germinates and emerges from the soil to produce a minimum of 3 to 5 leaves in the fall. The fall growth allows the plants to develop crowns that store energy from photosynthesis in the form of starch and sugars for use by the plants during winter and spring growth. The larger the wheat plant crowns the more energy that is stored and the more vigorous the growth of the plants in the spring. The desirable fall growth and development of the wheat plant crowns did not occur in the fall of 2000.

Seeds that germinated during the first week of November had to live over winter and through early spring on their stored energy. The germination process, which converts starches in the seeds to usable energy sources by enzymes (amylases), used up the stored energy in the seeds, and by late spring the wheat seedlings were very weakened. In many cases the seeds that germinated in the fall did not survive. The seedlings that emerged in the spring did not develop the necessary brace roots that feed the plants during the summer.

The poorest winter wheat fields were destroyed and planted to alternative crops. The better fields that remained produced wheat, but stands were very thin and annual weeds were abundant even in fields that were sprayed with herbicides earlier in the season.

There were some good yields in wheat fields that had enough rain to start the plants in the fall and did not winter kill from lower soil temperatures during late December when many areas had little snow cover.

WINTER WHEAT

Recommended

Variety	Crop Adaptation Area
Alliance @	3, 4, 5, 6
Arapahoe @	1*, 3, 4, 5, 6, 7*
Crimson@	1, 2, 3, 4, 6, 7
Harding@	1, 2, 4, 7
Nekota	1*, 3, 4, 5, 6, 7*
Tandem@	1*, 3, 4, 5, 6, 7*
Wesley	1*, 3, 4, 5, 6, 7*

Acceptable/Promising

Variety	Crop Adaptation Area
Millennium@	1*, 4, 5, 6, 7*
Rose	1, 2, 3, 4, 6, 7
TAM 107 @	4, 5, 6
Windstar@	1*, 3, 4, 5, 6, 7*
2137 @	1*, 3, 4, 5, 6, 7*

@ Plant Variety Protection (PVP) applied for or received; seed sales are restricted to classes of certified seed.
* Plant into protective cover

Figure 2. Crop Adaptation Areas for South Dakota
(revised 1992)

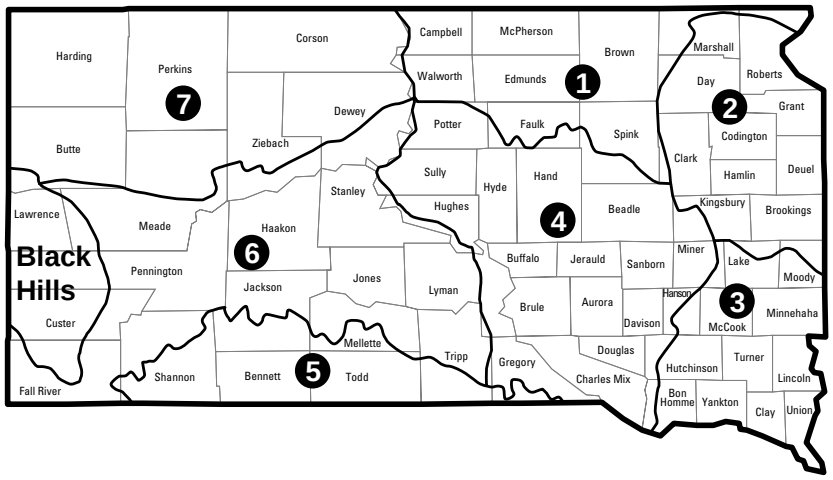


Table 1. Characteristics of Hard Winter Wheat Varieties Tested in South Dakota.

Variety	Origin and Year Released		*Rust Reaction		Wheat Streak Mosaic	Tan-Spot	Straw Strength	Plant Height (Inches)	Winter Hardiness	S Shoot Rating 1-9	Maturity	PVP
			Leaf	Stem								
Alliance	NE	93	S	MR	MS	VS	Good	28	F-Good	1	Early 2	Yes
Arapahoe	NE	88	S	MR	S	S	Fair	30	Good-Ex	4	Med 3	Yes
Crimson	SD	97	S	MR	MR	R	Fair-G	36	Good-Ex	8	Late 5	Yes
Harding	SD	00	MR	MR	MR	MR	Fair-G	31	Excellent	4	Late 5	Yes+
Jagger	KS	94	S	MS	MR	R	Good	27	Poor	2	Early 0	Yes
Millennium	NE	00	MS	MR	T	--	Good	30	F-Good	4	Med 4	Yes+
Nekota	SD/NE	94	S	MR	S	MR	Good	28	Good	3	Early 2	No
Rose	SD	81	S	MR	MS	R	Good	36	Good-Ex	8	Late 5	No
Scout – 66	NE	66	S	MS	S	MR	Poor	34	F-Good	9	Early 2	No
Seward	ND	87	S	MR	S	S	Good	37	Good-Ex	6	Late 7	No
Siouxland	NE	84	S	MR	S	MR	Good	32	Good	7	Med 3	Yes
TAM 107	TX	84	S	MS	MR	S	Excellent	27	Poor-Fair	4	Early 0	Yes
Tandem	SD	97	S	MR	S	S	Fair-G	31	Good	7	Med 4	Yes
Trego(W)	KS	99	MR	MR	S	--	F-Good	--	F-Good	--	Med 3	Yes+
Vista	NE	92	S	MR	MS	VS	Fair	29	Good	1	Early 2	Yes
Wahoo	NE/WY	01	MR	MR	S	--	Good	28	Good	--	Med 3	Yes+
Wesley	NE-USDA	99	--	MR		MR	Excellent		--	--	--	No
Windstar	NE	96	MS	MR	S	VS	Good	30	Good	6	Late 5	Yes
2137	KS	95	MS	S	MR	R	Excellent	28	F-Good	4	Med 3	Yes

*** S = Susceptible MS = Moderately Susceptible MR = Moderately Resistant Maturity = Heading Date + PVP—Applied for/Expected**
S – Shoot length of 9 = longest, 1 = shortest

Table 2. Hard red winter wheat variety performance testing yield averages 1999-2001

Variety	Brookings		Watertown		Highmore		Selby		Britton		Wall		Martin		Sturgis		Oelrichs		Tripp Co.	
	2001	3 yr.	2001	3 yr.	2001	3 yr.	2001	3 yr.	2001	3 yr.	2001	3 yr.	2001	3 yr.	2001	3 yr.	2001	3 yr.	2001	3 yr.
Alliance	70*	•	54*	•	36*	61	35*	58*	42*	•	36	52	46	64	69	•	52	82	58	62
Arapahoe	71	•	66	•	40	56	32	50	47	•	40	50	47	62	66	•	57	79	59	59
Crimson	67	•	57	•	31	51	28	46	36	•	41	51	49	59	62	•	52	69	52	54
Culver	57	•	54	•	29	58	40	50	43	•	36	47	50	61	66	•	52	76	48	56
Harding	54	•	67	•	29	50	39	50	40	•	42	48	44	52	64	•	53	68	62	58
Hondo	45	•	55	•	27	55	25	46	41	•	40	47	48	61	59	•	55	76	45	52
Jagger	29	•	26	•	18	52	24	42	24	•	33	44	42	55	67	•	57	82	45	56
Jerry~W	81	•	73	•	37	•	31	•	53	•	35	•	54	•	60	•	46	•	61	•
Millennium	79	•	54	•	34	61	36	54	47	•	46	48	49	59	68	•	58	76	54	59
Nekota	62	•	59	•	31	54	40	50	44	•	36	41	50	55	63	•	54	76	52	59
Ransom	74	•	79	•	37	52	29	47	54	•	42	49	48	53	62	•	49	62	58	52
Rose	62	•	51	•	29	47	30	42	27	•	29	46	47	53	62	•	46	66	50	48
Scout 66	41	•	47	•	30	44	30	39	31	•	41	44	44	51	57	•	52	61	49	48
Tam-107	37	•	37	•	14	50	31	47	25	•	30	42	48	63	61	•	51	79	48	55
Tandem	70	•	49	•	34	52	38	52	47	•	40	49	49	59	61	•	55	69	61	58
Trego~W	72	•	45	•	26	•	29	•	33	•	35	•	49	•	68	•	51	•	52	•
Vista	66	•	61	•	31	58	37	49	35	•	44	53	48	60	66	•	56	74	55	56
Wahoo	69	•	33	•	35	•	30	•	36	•	43	•	53	•	69	•	59	•	59	•
Wesley	70	•	55	•	33	62	30	54	42	•	38	50	50	61	71	•	55	82	61	67
Windstar	70	•	75	•	31	54	31	43	50	•	39	52	43	57	64	•	52	76	55	57
2137	36	•	29	•	22	59	31	52	24	•	34	50	47	61	64	•	50	80	44	61

***** The coefficient of variation for these test locations exceeded 15%. This indicated there was an unacceptable amount of experimental error in these trials. The high amount of experimental error was the result of winter kill among the test varieties. Therefore, exercise caution when using the yield results from these locations in variety selection.

Ask your Extension agronomy educator . . . if you have questions or need further information about interpreting and applying this material to your specific cropping operation.

More unbiased, research-based information from South Dakota State University about agricultural production in South Dakota is available via the internet at . . .

Plant Science Department
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