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agronomy news

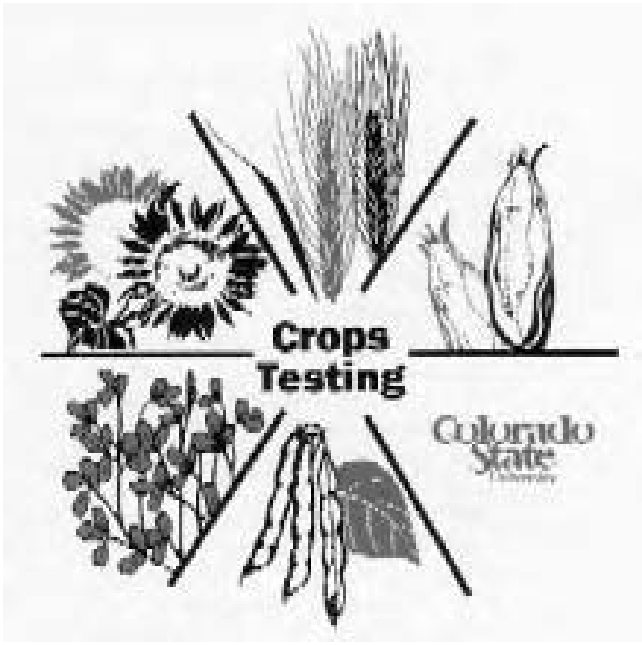
1998 Wheat Results

Good information at the right time equals better variety decisions.

INSIDE THIS ISSUE:

VARIETY AND ON-FARM TEST RESULTS

Colorado State University provides timely variety performance information to Colorado wheat producers in hopes that the information will lead to better variety decisions. About 3 million acres of winter wheat are planted annually in Colorado, producing a crop that is generally valued at $300 million or more. Experience indicates that increases in yield of 20% or more can result from wise selection of varieties. The winter wheat variety decision in Colorado may be worth as much as $60 million annually!



Moist planting conditions in the fall of 1997 led to good plant stands with the exception of dry planting conditions in parts of Adams, Arapahoe, Washington and Lincoln counties. The October blizzard covered most of eastern Colorado, providing fall moisture to counties that had experienced dry planting conditions, and had a

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Wheat Trials

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profound effect on the 1997/98 cropping season. Neither mites nor Russian wheat aphids were found in most of eastern Colorado. Wheat streak mosaic, vectored by the wheat curl mite, was equally absent in 1998. Drought conditions prevailed through the spring in parts of Adams, Arapahoe, Washington, and Lincoln counties, leading to below average yields. However, wheat yields in southeastern Colorado were well above normal and elsewhere yields were at or near normal. Jointed

1998 Irrigated Wheat Variety Performance

	Location***						Averages			
	Rocky Ford		Walsh		Yuma		1998			3-Yr
Variety*	Yield	Test Wt	Yield	Test Wt	Yield	Test Wt	Yield	Test Wt	% Yield of TAM 107	1996/97/98
	bu/ac	lb/bu	bu/ac	lb/bu	bu/ac	lb/bu	bu/ac	lb/bu		bu/ac
QAP7406	116.4	58.6	86.4	60.7	98.9	56.3	100.6	58.5	111	------
QAP7501	116.5	59.3	81.4	59.7	97.7	57.3	98.5	58.8	109	86.6 [2]
Yuma	119.6	59.1	85.7	60.2	89.5	55.6	98.2	58.3	109	85.1 [3]
QAP7510	115.3	59.6	80.8	60.3	96.8	57.2	97.7	59.0	108	87.3 [1]
Yumar	109.3	58.8	77.7	60.2	101.1	57.8	96.0	58.9	106	------
2137	109.8	58.5	79.1	59.8	98.5	57.5	95.8	58.6	106	------
Arlin	116.9	59.4	73.1	60.9	94.1	57.3	94.7	59.2	105	------
T81	107.0	60.2	76.2	60.4	98.2	57.7	93.8	59.4	104	------
Prairie Red**	110.2	58.2	73.1	59.3	95.8	56.9	93.1	58.1	103	------
Agri. Laredo	113.8	59.1	66.1	59.7	96.0	57.9	92.0	58.9	102	80.4
Agri. Rowdy	108.8	58.9	81.3	60.7	86.0	56.9	92.0	58.8	102	81.3
Halt	107.0	58.2	69.2	59.8	94.9	55.9	90.4	58.0	100	75.6
TAM 107	100.6	58.9	72.7	59.3	97.8	57.5	90.4	58.5	100	83.1 [5]
Custer	102.5	59.8	69.8	59.3	98.1	58.2	90.1	59.1	100	83.2 [4]
TAM 110	108.4	59.2	66.9	59.6	94.4	56.6	89.9	58.5	99	------
Akron	92.1	58.0	81.6	59.4	95.5	57.4	89.7	58.2	99	82.2 [6]
Jagger	92.3	58.4	68.4	59.7	96.9	56.3	85.9	58.1	95	78.5
Means	**108.6**	**59.0**	**75.9**	**59.9**	**95.9**	**57.1**	**93.5**	**58.7**		
CV%	9.7		8.4		8.7					
$LSD_{(.3)}$	8.7		4.8		6.0					

* Varieties ranked by the average yield over three locations in 1998.
** Tested as CO940623-R3 and also TAM 107-R3
*** Rocky Ford and Yuma grain yields are adjusted to 12% moisture contents.
[1.....6] Variety rank based on 3-Yr average yields.

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Direct questions and comments to:
Gloria Blumanhourst
Phone: 970-491-6201
Fax: 970-491-2758
E-Mail:
gbluman@lamar.colostate.edu

Wheat Trials

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goatgrass and other weeds were less problematic in 1998 than in previous years, although wild rye infestations were serious in some areas.

Colorado winter wheat variety trials are conducted according to moisture group, with different varieties in each group, except for some varieties that are common to all three groups. In 1998, **lower moisture** variety trials were harvested at Orchard (formerly Briggsdale), Sheridan Lake, Lamar, Walsh, and Cheyenne Wells (new trial location added in 1997/98). Successful **higher moisture** trials were conducted at Burlington and Ovid. Problems were encountered at Bennett (due to field irregularities only data from two replicates could be used), Akron (severe drought led to large yield variation that could not be attributed to variation among varieties or replications), and Genoa (most plant emergence occurred in early spring). Three successful **irrigated**

1998 High Moisture Wheat Variety Performance

	Location***										Averages			
	Akron		Bennett		Burlington		Genoa		Julesburg		1998			3-Yr
Variety*	Yield	Test Wt	Yield	Test Wt	Yield	Test Wt	Yield	Test Wt	Yield	Test Wt	Yield	Test Wt	% Yield of TAM 107	1996/97/98
	bu/ac	lb/bu	bu/ac	lb/bu	bu/ac	lb/bu	bu/ac	lb/bu	bu/ac	lb/bu	bu/ac	lb/bu		bu/ac
Akron	46.9	56.8	72.1	59.4	52.3	56.2	45.6	54.2	66.1	59.9	56.6	57.3	106	50.7 [1]
QAP7406	50.6	55.8	68.4	59.5	52.9	54.9	45.1	53.7	60.1	59.5	55.4	56.7	104	------
Jagger	51.3	56.0	64.0	57.7	58.5	54.8	41.6	52.8	55.7	58.1	54.2	55.9	102	48.1 [6]
H1881	41.6	54.3	68.1	57.0	55.8	53.6	35.1	51.1	68.4	59.4	53.8	55.1	101	------
Alliance	37.5	55.5	64.6	59.3	55.2	55.4	44.3	53.3	66.6	58.7	53.6	56.4	100	49.3 [3]
TAM 107	47.6	55.8	66.2	57.7	55.2	55.8	42.7	53.2	55.4	59.6	53.4	56.4	100	50.4 [2]
G12017	47.1	54.4	69.2	58.4	50.2	54.5	40.3	52.4	60.1	59.1	53.4	55.8	100	------
Halt	42.1	54.4	58.0	57.7	57.2	55.2	41.8	53.5	67.2	59.6	53.3	56.1	100	48.3 [4]
TAM 110	37.0	56.4	63.1	58.2	57.4	55.4	44.2	52.5	61.9	59.4	52.7	56.4	99	------
2137	39.7	55.3	63.6	58.3	56.4	55.0	44.1	53.4	59.3	59.8	52.6	56.4	99	------
Yuma	37.8	56.0	64.9	58.4	52.1	54.5	38.9	53.1	66.9	59.4	52.1	56.3	98	47.5
QAP7510	38.5	56.7	56.6	58.6	57.3	57.2	42.6	54.3	63.8	60.0	51.8	57.4	97	------
Yumar	44.8	58.3	61.9	59.0	50.6	54.8	37.8	53.3	58.4	61.0	50.7	57.3	95	48.2 [5]
QAP7501	44.6	56.7	58.4	58.6	54.2	55.7	42.4	54.3	53.3	59.7	50.6	57.0	95	------
AgriPro Laredo	42.8	56.1	58.5	57.8	55.4	57.2	40.7	53.7	54.2	59.6	50.3	56.9	94	42.0
Arapahoe	39.2	56.0	62.9	57.7	49.3	53.6	38.5	52.8	59.6	58.7	49.9	55.8	93	42.4
Prairie Red**	30.5	56.4	59.7	57.7	56.9	55.5	40.8	52.8	58.7	59.1	49.3	56.3	92	------
G1594	40.9	56.3	55.8	59.9	50.7	57.3	37.7	53.9	57.1	60.4	48.4	57.6	91	------
Arlin	40.2	58.2	61.7	58.6	54.5	58.8	35.6	53.3	48.6	59.5	48.1	57.7	90	44.9
T834	38.8	56.4	58.6	58.4	54.4	56.1	37.8	52.6	50.4	59.5	48.0	56.6	90	------
Prowers	37.4	57.9	59.5	61.3	41.6	55.4	36.8	54.3	63.8	61.5	47.8	58.1	90	------
Sandy	38.0	58.2	63.2	59.6	40.3	55.4	41.2	55.0	56.2	61.3	47.8	57.9	89	47.2
AgriPro Ogalalla	33.5	57.3	55.5	59.2	50.1	57.6	31.5	53.6	62.3	60.6	46.6	57.7	87	41.0
Lamar	37.7	56.9	57.1	60.1	43.3	55.7	38.3	55.4	55.1	60.4	46.3	57.7	87	46.0
G1878	34.2	58.8	49.4	60.6	51.7	58.9	39.6	54.8	54.0	61.5	45.8	58.9	86	------
Wichita	22.5	44.1	49.4	59.0	35.1	56.7	32.8	54.3	49.1	60.0	37.8	54.8	71	37.0
Means	**40.1**	**56.0**	**61.2**	**58.8**	**51.9**	**55.8**	**39.9**	**53.5**	**58.9**	**59.8**	**50.4**	**56.8**	**94**	
CV%	18.1		6.4		10.3		10.3		16.2					
LSD (.3)	5.5		4.1		4.0		3.0		6.9					

* Varieties ranked by the average yield over five locations in 1998.
** Tested as CO940623-R3 and also TAM 107-R3.
*** Bennett and Genoa grain yields are adjusted to 12% moisture content.
[1.....6] Variety rank based on 3-Yr average yields.

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Wheat Trials

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winter wheat variety trials were conducted at Rocky Ford, Yuma, and Walsh. A randomized complete block field design with four replicates is used in all trials. Four 12 inch-spaced rows, 50 feet long, are harvested from each plot. All trials are seeded at 600,000 seeds/acre, except for the irrigated trials that are planted at 750,000 seeds/acre.

All lower moisture trials were excellent in 1998 with average yields of 53 bu/ac and average test weights of 59 lb/bu. In the higher moisture trials, low fall and spring precipitation at Bennett, Genoa, and Akron caused low yields and test weights at these locations. Hail reduced yields at the Yuma irrigated trial but very good results were obtained at Rocky Ford where the variety, Yuma, averaged 120 bu/ac. Summary performance results are provided below for each moisture group. Variety planting suggestions, based on these trial results, are found in the revised "Decision Tree for Winter Wheat Variety Selection in Colorado." The on-farm test results should also be consulted before making a variety selection as Halt, Prowers, and Yumar, three varieties resistant to the Russian wheat aphid, were compared to TAM 107 in 20 eastern Colorado on-farm tests. Note that the new name for TAM 107-R3, to be released this fall, is '**Prairie Red**'.

1998 Low Moisture Wheat Variety Performance

	Location***										Averages			
	Briggsdale		Cheyenne Wells		Lamar		Sheridan Lake		Walsh		1998			3-Yr
Variety*	Yield	Test Wt	Yield	Test Wt	Yield	Test Wt	Yield	Test Wt	Yield	Test Wt	Yield	Test Wt	% Yield of TAM 107	1996/97/98
	bu/ac	lb/bu	bu/ac	lb/bu	bu/ac	lb/bu	bu/ac	lb/bu	bu/ac	lb/bu	bu/ac	lb/bu		bu/ac
Alliance	48.1	59.0	55.4	59.2	81.3	61.8	63.6	57.9	51.5	56.6	60.0	58.9	104	62.0 [1]
TAM 107	48.9	57.0	49.8	58.1	78.9	60.7	57.6	57.0	53.3	57.2	57.7	58.0	100	52.9 [4]
Yuma	49.0	58.5	50.8	58.5	77.1	62.2	53.3	56.8	52.7	57.3	56.6	58.7	98	51.3 [6]
Akron	45.9	59.7	47.8	58.6	76.1	61.5	55.6	57.3	54.1	56.4	55.9	58.7	97	58.1 [2]
TAM 110	45.8	57.8	51.7	58.0	78.5	60.9	53.0	57.6	50.4	56.7	55.9	58.2	97	54.6 [3]
Windstar	44.9	58.0	48.8	58.4	76.6	61.6	55.6	57.9	50.6	54.6	55.3	58.1	96	49.2
G12017	44.1	59.4	46.0	59.1	77.8	61.6	55.6	57.5	49.7	54.2	54.6	58.4	95	------
T812	44.0	59.0	47.2	59.5	74.8	61.9	52.6	59.1	50.7	57.1	53.9	59.3	93	------
Sandy	48.2	60.3	48.2	58.7	69.7	63.2	56.4	57.2	43.9	57.3	53.3	59.3	92	50.2
Prairie Red**	46.0	58.3	47.7	57.9	65.7	61.3	57.0	57.9	49.7	55.6	53.2	58.2	92	------
Lamar	44.8	59.9	47.7	59.8	73.2	63.0	55.8	58.5	44.3	57.0	53.1	59.6	92	48.6
Niobrara	45.6	57.1	50.3	57.0	67.6	60.1	52.8	57.2	48.7	55.8	53.0	57.5	92	51.6 [5]
Halt	49.9	58.4	47.2	58.5	70.0	61.5	50.0	57.9	46.7	56.9	52.8	58.6	91	50.6
Prowers	45.0	60.6	49.4	60.5	68.7	62.0	55.4	59.4	43.5	57.5	52.4	60.0	91	48.6
2137	42.0	58.7	41.9	59.1	71.2	61.2	53.6	59.1	48.0	54.9	51.3	58.6	89	------
Baca	43.7	59.5	49.1	60.1	63.3	61.7	51.7	58.7	46.2	57.5	50.8	59.5	88	48.1
Arlin	43.6	59.1	44.1	59.7	68.7	63.0	45.0	58.6	51.1	59.9	50.5	60.1	88	45.4
Pronghorn	42.4	58.8	49.5	59.0	63.6	61.3	53.1	57.9	43.7	56.4	50.5	58.7	87	47.0
Yumar	41.1	59.3	42.8	59.1	65.6	62.7	51.7	58.3	49.3	57.0	50.1	59.3	87	49.2
Buckskin	43.0	59.7	46.8	58.5	61.7	61.3	52.7	57.9	45.4	55.1	49.9	58.5	87	48.1
G1878	36.4	59.9	42.3	59.7	64.4	62.7	50.4	57.7	48.6	59.6	48.4	59.9	84	------
Wichita	34.4	59.1	39.7	58.8	52.5	62.9	40.9	58.3	36.7	60.0	40.8	59.8	71	38.5
Means	**44.4**	**59.0**	**47.5**	**58.9**	**70.3**	**61.8**	**53.3**	**58.0**	**48.1**	**56.9**	**52.7**	**58.9**		
CV%	7.9		10.1		9.7		8.0		7.9					
LSD (.3)	2.8		3.5		5.9		3.2		2.8					

* Varieties ranked by the average yield over five locations in 1998.

**Tested as CO940623-R3 and also TAM 107-R3

*** Briggsdale, Cheyenne Wells Lamar, and Sheridan Lake grain yields are adjusted to 12% moisture content.

[1....6] Variety rank based on 3-Yr average yields.

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Wheat Trials

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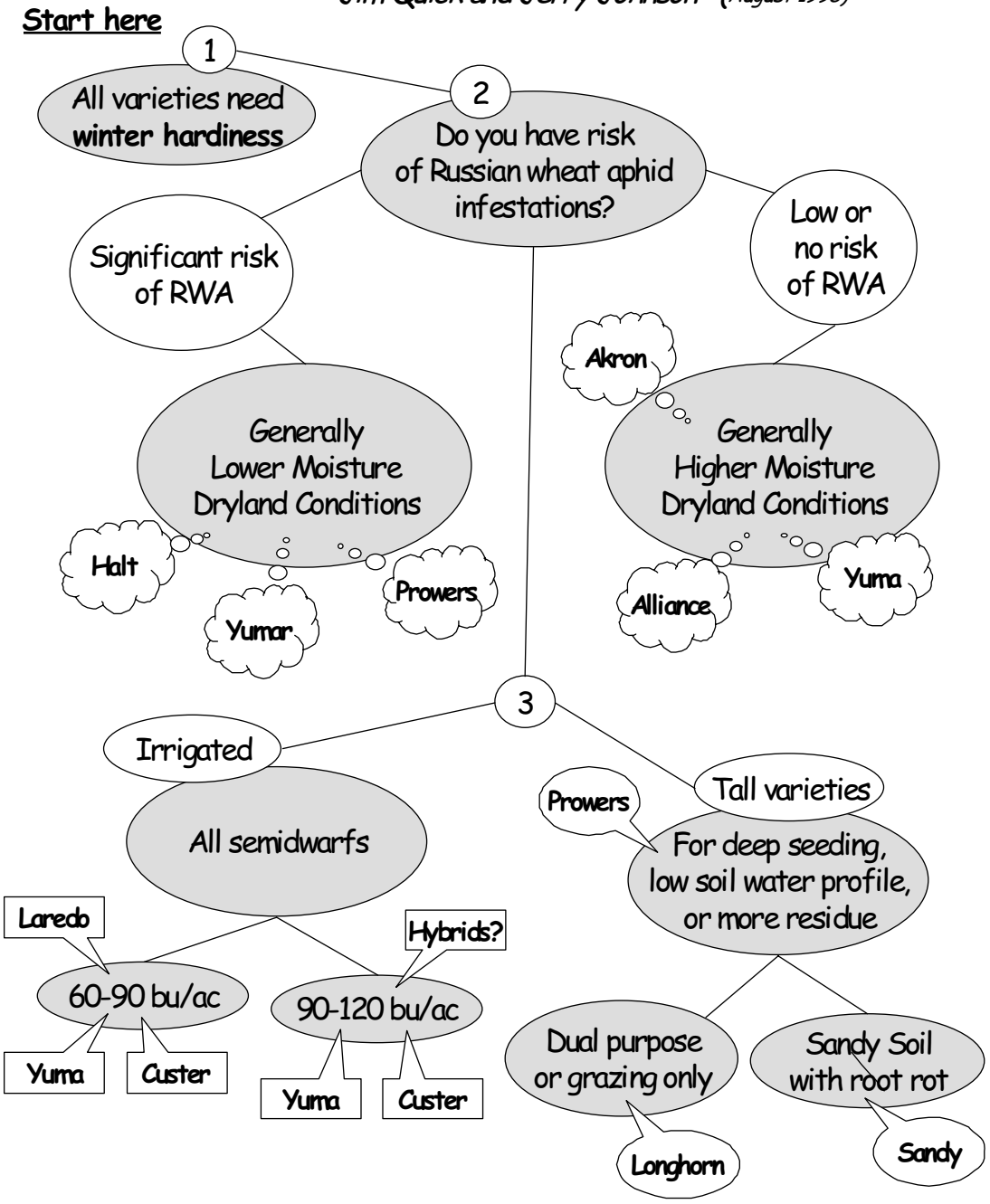
The best choice of a winter wheat variety in Colorado depends upon production conditions that vary across locations and years. Performance trial results are informative but cannot capture all the variation that needs to be taken into account in selecting the best variety for so many different production conditions.

The decision tree is our way of trying to combine many years of empirical knowledge of wheat variety performance with the quantitative performance of varieties compared in experimental conditions. Varieties listed in the decision tree are not recommendations of the authors nor CSU, but rather varieties that the authors think growers should consider for the production conditions specified in the tree.

Decision Tree for Winter Wheat Variety Selection in Colorado

Jim Quick and Jerry Johnson (August 1998)



Production conditions taken into account when formulating the decision tree include: stand establishment under dry conditions; winter hardiness; maturity; potential for spring frost damage; resistant to Russian wheat aphids; and yield performance across locations.

Production risks can be significantly reduced by planting more than one variety and it should be remembered that avoiding poor variety decisions may be as important as choosing the winner among winners. To reduce the risk of loss of yield due to environmental stresses, wheat producers should plant more than one variety.

James S. Quick, Professor and Jerry J. Johnson, Extension Crop Testing Specialist

On-farm Tests Compare RWA-resistant Varieties And Explore Phosphorus Fertilization

Good stands, low aphid pressure, and phosphourus fertilization provide comparison data for 1998.

In the fall of 1997, twenty-three eastern Colorado wheat producers planted collaborative on-farm tests in Baca, Prowers, Kiowa, Cheyenne, Kit Carson, Adams, Arapahoe, Washington, and Weld counties. The objective was to compare the performance of the newly-released, Russian Wheat Aphid-resistant varieties; Halt, Prowers, and Yumar, with the performance of Colorado's most popular, but susceptible variety, TAM 107. The varieties were planted by the collaborating growers in long, side-by-side, strips. Most producers planted additional varieties, e.g., Akron, beside the test strips.

Table 1. 1998 Collaborative On-Farm Test Results

Test County and Description	Variety			
	Halt	Prowers	TAM 107	Yumar
	bu/ac	bu/ac	bu/ac	bu/ac
Baca SE	28.7	32.9	32.9	
Baca SC	23.4	20.2	19.5	
Baca WC	26.6	28.9	29.7	25.6
Baca EC	51.4	48.7	57.7	53.5
Baca NC	64.8	66.2	64.5	
Prowers NE1	41.0	46.7	49.2	43.8
Prowers NC	37.8	42.0	42.6	
Prowers NE2	55.9	49.7	51.8	
Kiowa NE	54.3	47.1	55.2	53.7
Cheyenne NC	50.8	47.3	59.6	44.7
Cheyenne NE	43.3	39.0	45.1	47.7
Lincoln WC	28.6	17.0	27.0	27.6
Lincoln NC	36.9	46.4	40.8	41.3
Kit Carson NC	67.8	48.8	69.1	64.8
Washington SW	37.1	31.9	36.8	32.8
Adams SE	16.7	14.0	13.2	11.6
Adams CE	23.2	21.9	24.3	25.1
Weld SC	30.3	26.2	32.4	27.8
Weld NE	30.8	41.0	34.1	31.8
Weld NW	22.4	16.1		18.3

Most of Colorado had good fall seeding conditions that led to good plant stands. However, parts of Adams, Arapahoe, Washington and Lincoln counties suffered from dry fall planting conditions and dry spring growing conditions as well. The October blizzard provided late fall moisture and resulted in the disappearance of Russian wheat aphids and mites. Without the wheat curl mite, there was little or no wheat streak mosaic disease.

The results reflect the yield potential of the Russian wheat aphid resistant varieties without any aphid pressure. Note that not all varieties were planted in all locations (see Table 1). Table 2 summarizes average yield performance over the maximum number of test results with common varieties, e.g., 19 tests with Halt, TAM 107, and Prowers. As in previous years without Russian wheat aphid, Halt and TAM 107 yields were very similar. The average Prowers yield

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On-Farm Tests

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was 5 bu/ac lower than TAM 107 but many of the tests were conducted in locations where Prowers (and parent Lamar) would not be recommended for use. The average performance of Yumar was similar to Halt and TAM 107 without any RWA pressure and is expected to be significantly better than TAM 107 if RWA were present.

On four of the collaborative on-farm test sites (COFT), we compared phosphorus fertilizer application (based on CSU soil test recommendations) with no phosphorus fertilizer for each of the four test varieties. Three of the sites tested Low in phosphorus, and one tested Medium (Table 3). The Low testing sites have a high probability of getting a yield response to P fertilizer, and the Medium site has a moderate probability of yield increase.

We used 18-46-0 (DAP) to supply P except at the Baca County site where 10-34-0 was used. In all cases, a small amount of N was applied with the P fertilizer, in addition to any farmer applied N. Yields were significantly increased for all four varieties with an average yield increase of four bushels per acre (Table 4).

The fertilizer cost varied with the application rate and product used ($280/ton for 10-34-0 and $310/ton for 18-46-0). With the wheat price as low as it is this year, the yield increases due to P fertilizer were generally not enough to pay for the additional fertilizer (Table 5). On average across these test sites, a wheat price of $3.22/bu would be just enough to pay for the fertilizer without paying for the spreading costs (fuel, labor, etc.). However, there are additional benefits due to P fertilizer such as the additional N which reduces N fertilizer costs and the improved weed competition and subsequent reduction in herbicide costs. These benefits were not factored into these calculations. Each farmer should

Table 2. Average Variety Performance Over Locations

Group of tests with common varieties	Variety			
	Halt	Prowers	TAM 107	Yumar
	bu/ac	bu/ac	bu/ac	bu/ac
19 tests: Halt, Prowers, TAM 107	39.4	37.7	41.3	
14 tests: Halt, Prowers, TAM 107, Yumar	38.5	36.1	41.0	38.0

Table 3. Soil test P levels and P fertilizer recommendations.

Test Location	Sodium Bicarb Soil Test P (ppm)	Application Rate (lb P_2O_5/A)
Baca	4 (Low)	40
Lincoln	8 (Medium)	20
Morgan	4 (Low)	40
Prowers	4 (Low)	40

Table 4. Impact of P fertilizer on wheat yields.

Variety	With P Fertilizer	Without P Fertilizer	Increase
	bu/ac	bu/ac	bu/ac
Halt	34	30	4
Prowers	38	34	4
TAM 107	38	34	4
Yuma	37	31	6
Average	**36**	**32**	**4**

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On-Farm Tests

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weigh the costs and benefits of P fertilizer for their own conditions (soil fertility, weed population, and price).

Jerry J. Johnson, Extension Crop Testing Specialist and Jessica G. Davis, Associate Professor

Cooperative Extension Agents who make on-farm testing work:

Ron Jepson - Adams County; Tim Macklin - Baca County
Ron Meyer - Kit Carson County; George Ellicott - Kiowa County
Kurt Jones - Lincoln County; Bruce Bosley - Morgan County
Dick Scott - Prowers County; Jerry Alldredge - Weld County
Leonard Pruett - Southeast Area

Table 5. Economics of P fertilizer costs and wheat return.

Variety	Fertilizer Cost	Wheat Price Which Would Pay for Fertilizer
	($/A)	$/bu
Baca	$16.47	$4.22
Lincoln	$6.74	$1.73
Morgan	$13.48	$3.46
Prowers	$13.48	$3.46
Average	$12.54	$3.22

frequently asked question

Does Halt lose its resistance to RWA over time?

Several wheat producers have asked if Halt (or other RWA resistant wheat varieties) lose some or all of their resistance to RWA after a couple of years. The answer is no. Wheat is a self-pollinating crop and out-crossing under the most favorable circumstances will not surpass 3%. If Halt seed is mixed with seed of other non-resistant varieties and then grown out for seed, the resistance would be diluted. Presence of a few volunteer susceptible plants in a Halt field is not going to dilute the RWA resistance of Halt for many, many generations. Halt grown under normal production conditions without significant volunteer wheat in the same field will remain genetically pure for a long, long time. The resistance gene is as fixed in the Halt genome as the semi-dwarf characteristic and will not 'revert back' to some non-resistant form of the gene.

events

Manure Management Plans workshop, September 15, 1998, 8 a.m. to 5 p.m., Quality Inn, 1325 E. Third St., LaJunta, Colorado. $10 registration fee includes lunch at the Quality Inn. To get a registration form, contact Gloria Blumanhourst at (970) 491-6201 or gbluman@lamar.colostate.edu .

Certified Crop Advisers will earn four credits in Soil Fertility and Soil and Water Management for workshop participation. Soil and Water conservation Society Colorado Branch Annual Meeting will be conducted during lunch.

Wheat Pest Damage Control Begins With Fall Scouting

Detecting mites, grasshoppers and aphids in fall means early intervention and reduced impact on yield.

Several pests can affect wheat in the fall. These include Banks grass mite, brown wheat mite, grasshoppers, greenbug and other cereal aphids, Russian wheat aphid, and wheat curl mite.

Banks grass mite commonly moves into the margins of newly planted wheat fields from adjacent corn. This easily can result in the loss of several rows of plants, particularly if warm dry weather persists after crop emergence. Banks grass mite produces heavy webbing to protect colonies consisting of eggs, immatures, and adults. Colonies usually are found on the undersides of leaves. Damaged leaves first become yellow, then brown and necrotic. Heavy populations can kill small plants and reduce kernel size in larger plants.

Banks grass mite population densities are building rapidly in corn. If favorable conditions persist, newly planted wheat should be monitored closely for mite infestations. Banks grass mite can be controlled by applying a miticide, such as mimethoate, to affected areas of the field.

Brown wheat mite spends the summer in the soil as a white egg resistant to hot, dry conditions. In the fall, as cooler, wetter conditions return, these eggs start to develop and hatch after a 10-day incubation. Damaged leaves will be finely mottled and may have chlorotic tips. Heavily infested crops have a droughty appearance, or a yellowish to bronzed discoloration. Brown wheat mite is similar in size to Banks grass mite, but is dark brown and has much longer front legs. On warm, calm days brown wheat mites may be found on leaves, otherwise they can be found under soil or surface debris. Female brown wheat mites mature after feeding on wheat for about two weeks and then lay round, red eggs which give rise to further fall (one or two) and spring (two or three) generations. Both red and white eggs are placed on soil particles adjacent to wheat plants.

Brown wheat mite generally does not require treatment in the fall, but fields where fall activity is observed should be watched closely in the following spring.

Grasshoppers often pose a significant problem to newly-emerged winter wheat. We seem to be entering a period of greater grasshopper activity, particularly in the northeast part of the state, so some problems can be expected in wheat this fall. Because of small plant size, large insect size, and lack of other forage, grasshopper densities considered light to moderate in other crop situations pose a significant threat to newly emerged winter wheat. Consider an insecticide treatment if you observe densities of 10-40 per square yard in border areas or 3-15 per square yard within the field. If more severe infestations are expected, an additional option to consider is to double the seeding rate in the outer one to two drill rounds.

If adequate soil moisture is available to mobilize the chemical, then granular or liquid systemic insecticides can be applied to the outer one to two drill rounds at planting. Proper equipment (separate granule metering units or closed-system injector units for liquids) is necessary to insure operator safety and to avoid phytotoxicity. Granular and liquid

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Wheat Pests

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formulations of systemic insecticides may also provide some control of the other pests mentioned in this article. Field borders can also be sprayed with a residual insecticide just prior to crop emergence.

Since most grasshopper feeding will be in the field margins, treating the outer one to two drill rounds method should be sufficient to protect the entire field. See the *High Plains Integrated Pest Management Guide* for more details and for registered products.

Greenbug and other cereal aphids (see *Aphids in Small Grains*, Colorado State University service in Action 5.565) can affect wheat health directly, and indirectly through the transmission of viral diseases, particularly Barley Yellow Dwarf virus.

These aphids are generally not considered to be major fall pests of wheat in Colorado. Management options, apart from volunteer control, are limited to planting-time and foliar insecticide applications. Twenty to thirty aphids per stem or plant would be considered economic in the fall with most cereal aphid species, although greenbug infestations would be considered economically significant at about ½ that level.

Russian wheat aphid: (see Aphids in Small Grains, Colorado State University Service in Action 5.565) can attach and cause significant losses in wheat in the fall. This is not a common occurrence under our conditions, but is the major cause of Russian wheat aphid losses in winter wheat in Montana and southern Canada.

The significance of fall Russian wheat aphid infestations increases with the severity of the winter. Several Russian wheat aphid resistant wheats are available: replace 'TAM 107' with 'Halt', 'Lamar' with 'Prowers', and 'Yuma' with 'Yumar'. For susceptible varieties, our treatment guidelines suggest considering chemical control when 10-20% of the plants are infested.

Wheat curl mite: the vector of Wheat Streak Mosaic and High Plains diseases, is carried by winds to newly emerged winter wheat as summer hosts, such as corn and perennial grasses, start to dry down. These are wormlike mites that are visible only with the aid of a hand lens (at least 10x) or microscope. They are found on leaves, often in the spaces between veins. Infested leaves will have tightly rolled edges, while infested plants often display the stunting and chlorotic speckles or streaks typical of the Wheat Streak Mosaic and High Plains diseases. Problems are most common where volunteer wheat is abundant at planting and where wheat emerges before adjacent corn dries down.

Destruction of volunteer wheat and the maintenance of a two-week volunteer-free period prior to planting winter wheat in the fall is the most effective management practice for this mite and the disease that it vectors. Varietal resistance, such as that found in 'TAM 107', is available. There is some evidence for the existence of wheat curl mite biotypes that are unaffected by this resistance.

Minimizing Fall Pest Problems

Control volunteer wheat and barley. Although many grass species can be sources of these pests, volunteer wheat plants are the most important source of infestation for the new crop in the fall. Try to have a three week volunteer free period prior to emergence of all seedings.

Adjust planting dates. Plant as late as possible within the time period known to produce a good crop in your area. Spring grains should be planted as early as possible.

Produce a healthy, stress-free crop. These pests often get their start in stressed fields or portions of fields and cause relatively more damage to stressed plants. Use adequate fertilization. Plant certified, treated seed. Select a variety that is well adapted to local growing conditions.

Apply an insecticide treatment, if there is economic justification. See discussions of individual pests for guidelines. Foliar insecticides can be applied

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New Herbicides Labelled By Spring 1999 For Use In Wheat/Fallow

Products target brome, bindweed, and kochia.

Three herbicides for wheat/fallow use are scheduled for labelling by Spring 1999.

Maverick: Monsanto Chemical Co., experimental name MON 37500 . Registration for Maverick has been submitted and this product should be labeled by spring 1999. Maverick is a selective herbicide for use in wheat and will be labeled for control of annual brome species (in the Great Plains region - downy brome, cheatgrass, Japanese brome), as well as control of flixweed and pennycress, and suppression of blue mustard. Maverick provides most effective weed control when applied in the fall. The initial label will be for use in wheat/fallow rotations only, the label will probably be expanded to other crop rotations.

Paramount: BASF Chemical Co., experimental name BAS-514, chemical name quinclorac. Paramount is scheduled to be labeled in the fall of 1998 for use in fallow with roation to wheat, in crop sorghum. Paramount is effective for management of field bindweed and provides control of barnyardgrass and foxtail species. The Paramount label is expected to be expanded to wheat, and rotations that include millet and corn.

Starane: United Agri Products, chemical name flurosypyr. Starane will most likely be registered January of 1999. Starane is a phenoxy herbicide with a mode of action similar to 2,4-D or Banvel. Starane has excellent crop safety in wheat, barley, and oats. This new herbicide provides effective control of kochia, and will most probably be marketed as a pre-mix with 2,4-D or MCPA to expand the spectrum of broadleaf weeds that will be susceptible to this product.

Tim D'Amato, Research Associate

Wheat Pests

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either with aerial or ground equipment. Adequate aphid and mite control can often be a chieved with lower rates and spray volume than is necessary in the spring.

Certain systemic insecticides can be applied at planting as a seed treatment or as in-furrow granules or liquids. The drawback to this sort of treatment is that it must be applied before it is certain that there will be an economic infestation of a particular pest. Such treatments are best justified when there is a known risk of infestation with two or more pests. For example, a planting time treatment could be justified when planting near corn (Banks grass mite and wheat curl mite) and grasshoppers have been observed in the area. Early planting and planting near uncontrolled volunteer wheat or barley also are considered high risk factors.

See the High Plains Integrated Pest management Guide for insecticides and miticides registered for these uses. BE SURE TO READ, UNDERSTAND, AND FOLLOW ALL LABEL INSTRUCTIONS.

Frank Peairs, Professor

Plant Variety Protection Act Funds Reinforce Wheat Research

Funds from sales of certified seeds return to CSU to encourage further research and development efforts.

CSU has a proven track record in wheat-related research, which contributes to the total value of Colorado wheat production averaging an estimated $312 million annually and accounting for approximately 18,500 jobs. A new era in research, development, and distribution of wheat seed began in August, 1995 with the signing of an historic agreement involving proprietary protection for new wheat varieties developed at Colorado State University (CSU).

The agreement establishes a program designed to assure wheat producers to new and adapted wheat varieties, increase the importance of certified seed, and provide royalties for expanded wheat-related research at CSU. The Colorado Wheat Cultivar Program is a process that begins at CSU with the development of new wheat varieties. The Colorado Wheat Research Foundation (CWRF) moves the process forward by acquiring ownership of the varieties and applying for Plant Variety Protection. CWRF then coordinates distribution of registered seed to eligible certified seed growers, while the Colorado Seed Growers Association (CSGA) provides seed certification and marketing services to its participating members.

Colorado Wheat Research Foundation (CWRF) is a non-profit orporation developed by the Colorado Wheat Administrative Committee (CWAC) to further educational and scientific programs related to wheat.

Royalties from the sale of seed included in the Colorado Wheat Cultivar Program are collected by CWRF and net royalties are returned to CSU. Research and development of a new wheat variety can cost as much as $500,000. If a new variety released by CSU becomes popular, CWRF estimates that the program could generate $25,000-$100,000 from the royalties a year or two after release. The process comes full circle when CSU

Certification Applied For in 1998
Acreage by Wheat Type
Including varieties over 500 acres

Hard Red Spring Wheat		858
Hard Red Winter Wheat		23,532
Akron	6,937	
TAM 107	6,457	
Yuma	1,871	
Halt	1,741	
Lamar	1,391	
TAM 110	831	
Prowers	696	
Yumar	539	
Hard White Winter Wheat		484
Soft White Winter Wheat		262

Gil Waibel, Manager, Colorado Seed Growers Association

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PVPA

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utilizes those funds for the advancement of wheat-related research . . . successful research that has been, and will continue to be, beneficial to Colorado's wheat producers.

In 1995, Halt became the first variety included in the Colorado Wheat Cultivar Program. Halt was developed by CSU as the first winter wheat resistant to the Russian wheat aphid. Yumar and Prowers were added to the program in 1997. New wheat varieties developed by CSU, including 'Prairie Red' (RWA resistant TAM 107), will be offered to CWRF for exclusive acquisition and release. When CWRF accepts the variety, it becomes the owner of all proprietary rights to it.

CWRF intends to apply for a Certificate of Plant Variety Protection under the federal Plant Variety Protection Act (PVPA) for each new variety obtained from CSU. A certificate is usually valid for 20 years. The PVPA is violated if an unauthorized person advertises, sells, delivers, transfers title or possession of any variety of wheat seed covered by a certificate issued under the PVPA. The Act seeks to protect the owner of a variety from practices such as "brown bagging" or "farmer-to-farmer" sales of wheat as seed. In addition, the Colorado Seed Act makes it unlawful for seed of a variety protected by a PVPA certificate to be sold in an unauthorized manner, which is also punishable by a fine, imprisonment, or both. The PVPA is not violated when a person grows a crop of wheat of a protected variety and sells it into commercial markets, such as to grain elevators, and not for seed. Generally, there is no infringement if seed is produced by persons growing a crop on their own farm to be sold into commercial markets and not for seed. Seed can also be saved for planting on a person's own farm.

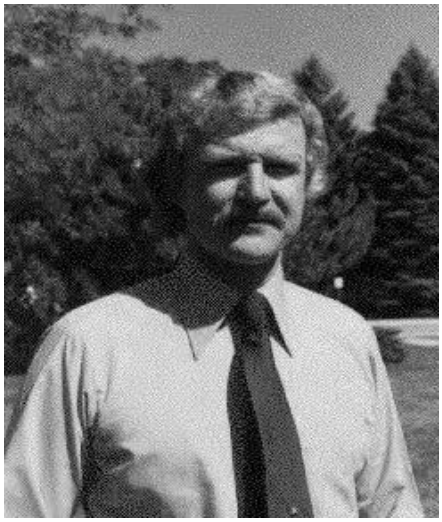
Seed of protected varieties included in the Colorado Wheat Cultivar Program will be made available by CWRF to persons qualified to grow certified seed. Participants must be members of the CSGA and meet the requirements of CSGA and state law to produce certified seed.

Darrell Hanavan, Executive Director of the Colorado Wheat Administrative Committee

news

John Shanahan is leaving our CSU Soil and Crop Extension group to accept a research agronomist position with the USDA-ARS at Lincoln, Nebraska. We will miss John's accumulated wisdom on the workings of Colorado State University, and his general enthusiasm for life. John and Shelly both have family in eastern Nebraska, and the family already has a new home lined up. John, Shelley, Alissa, Emily, and Katie Shanahan leave Fort Collins with our wishes for all the best life has to offer.

meet . . .



Dr. Mark A. Brick is professor in the Department of Soil and Crop Sciences at Colorado State University. His research interest is in the genetics and breeding of field (Pinto) beans, especially the genetics of disease resistance and drought tolerance. He teaches courses in plant breeding, experimental design, and seed production. He is an excellent resource for county agents and others with questions about dry bean production and breeding, or experimental design and on-farm testing.

Dr. Brick holds the Ph.D. in Plant Breeding from University of Minnesota, M.S. in Agronomy from University of Arizona, and B.S. in Crop Science from University of Wisconsin.

The ARDEC Holds Open House Sept. 25

Food, fun, entertainment for kids of all ages, and enticing exhibits are planned for the day.

What do hissing cockroaches, canola-based motor oil, electronic weather stations and a living museum have in common? They are all a part of the **Colorado State University's ARDEC Open House** held on **Friday, September 25, from 1-5 p.m. at the ARDEC.** Visitors can enjoy a free barbecue, a live country/bluegrass band, and discover some of the latest technology in agriculture. Parking and admission is free.

The open house will feature an insect petting zoo, including a spider tank, displays of bugs, and hissing cockroaches. A living museum shows a variety of weeds, different farming techniques and different crops on a small, easily understood scale.

Vegnet, an integrated pest management tool which relates the information from electronic weather stations (measuring microclimatic and macroclimatic weather variables) to disease development will be demonstrated.

Duane Johnson, Colorado State University Cooperative Extension's crop specialist who developed a canola-based motor oil, will demonstrate how the oil is made. He'll also display latest developments in alternative crops and their markets.

Other attractions at the open house include local craft demonstrations such as wheat weaving and an interactive touch-screen display featuring nutrition. Additional displays feature water quality, 4-H Youth development, vegetable pathology, remote sensing and new irrigation equipment, a plant disease clinic, and much more. For more information, contact Marissa Codey (970) 491-5271, or Reg Koll (970) 491-2405.

ARDEC is located at 4616 NE Frontage Road, north of Fort Collins.
- Exit 271 off of I 25 North, turn right (east) at stop sign
- At bottom of hill, turn left (north) on Frontage Road
- ARDEC is about 3 miles north on Frontage Road- beige buildings with
green roofs on right (east) side
- There will be a large yellow 'ARDEC Open House' sign at entrance.

Marissa Codey

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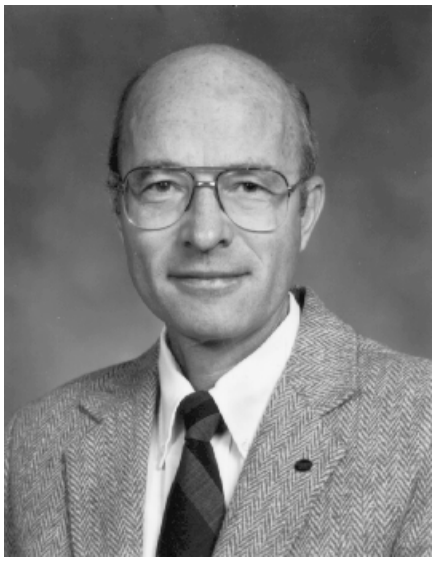
meet . . .

Dr. James S. Quick
is professor and head of the Department of Soil and Crop Sciences at Colorado State University. Dr. Quick's most current research projects include strong gluten cultivars and Russian wheat aphid-resistant germplasms. As a result of his research programs, twenty wheat cultivars and six germplasm lines have been developed.

His international experience includes consulting and study leaves in Australia, Canada, China, England, India, Mexico, Morocco,



Nepal, Spain, and Russia. Dr. Quick holds the Ph.D. and M.S. in Plant Breeding and Genetics from Purdue University, and the B.S. in Agronomy/Crop Science from North Dakota State University.

web sites

Have some fun and learn about wheat..,

http://www.colostate.edu/Depts/SoilCrop/extension/CropVar/wheat.html
CSU's Crops Testing page for 1998 Wheat Variety Performance.

http://www.colostate.edu/Depts/CoopExt/PUBS/CROPS/pubcrop.html
CSU's Cooperative Extension publications relevant to crops and soils.

http://www.ksu.edu/kscpt/
Kansas State University's Crop Performance page with 1998 Variety Trial Results.

http://www.usask.ca/agriculture/cropsci/winter_wheat/contents.htm
Winter Wheat Production Manual from Canada (University of Saskatchewan).

http://www.hpj.com/wsdocs/whearts/kwf_intr.htm
Kansas Wheat Farm Adventures. Ever wonder what life is like on a farm? Join these farm families in their daily activities.

http://www.hpj.com/
High Plains Journal on the net.

http://www.nal.usda.gov/
The National Agricultural Library (NAL), part of the Agricultural Research Service of the U.S.Department of Agriculture, is one of four National Libraries in the United States.

http://ianrwww.unl.edu/ianr/jgg/articles/compcult.htm
Is Your Wheat Variety Ready for the Competition? Article on wheat varieties and jointed goatgrass.

www.uidaho.edu/aberdeen/cereals/index.html
University of Idaho, Aberdeen Extension Cereals Program: "The Cereals Information Source".

http://www.colostate.edu/Depts/CoopExt/GPA/
CSU's Golden Plains Area Cooperative Extension page full of information. Excellent.

gopher://greengenes.cit.cornell.edu or http://wheat.pw.usda.gov/ggpages/germplasm.html
Database describes all commercial wheat cultivars in the U.S. and more.

http://ianrwww.unl.edu/ianr/agronomy/whttst/whttst.htm
University of Nebraska Wheat Variety Testing Homepage with 1998 Results available.

http://www.ianr.unl.edu/pubs/FieldCrops/
University of Nebraska's famous Nebsheets for Crop Production. Excellent information.

Cooperative Extension Service
United States Department of Agriculture
COLORADO STATE UNIVERSITY
Fort Collins, CO 80523

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