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Colorado State University
Knowledge to Go Places

Agricultural Experiment Station

College of Agricultural Sciences

Department of Soil and Crop Sciences

Cooperative Extension

MAKING BETTER

DECISIONS

2003 Colorado Winter Wheat Variety Performance Trials

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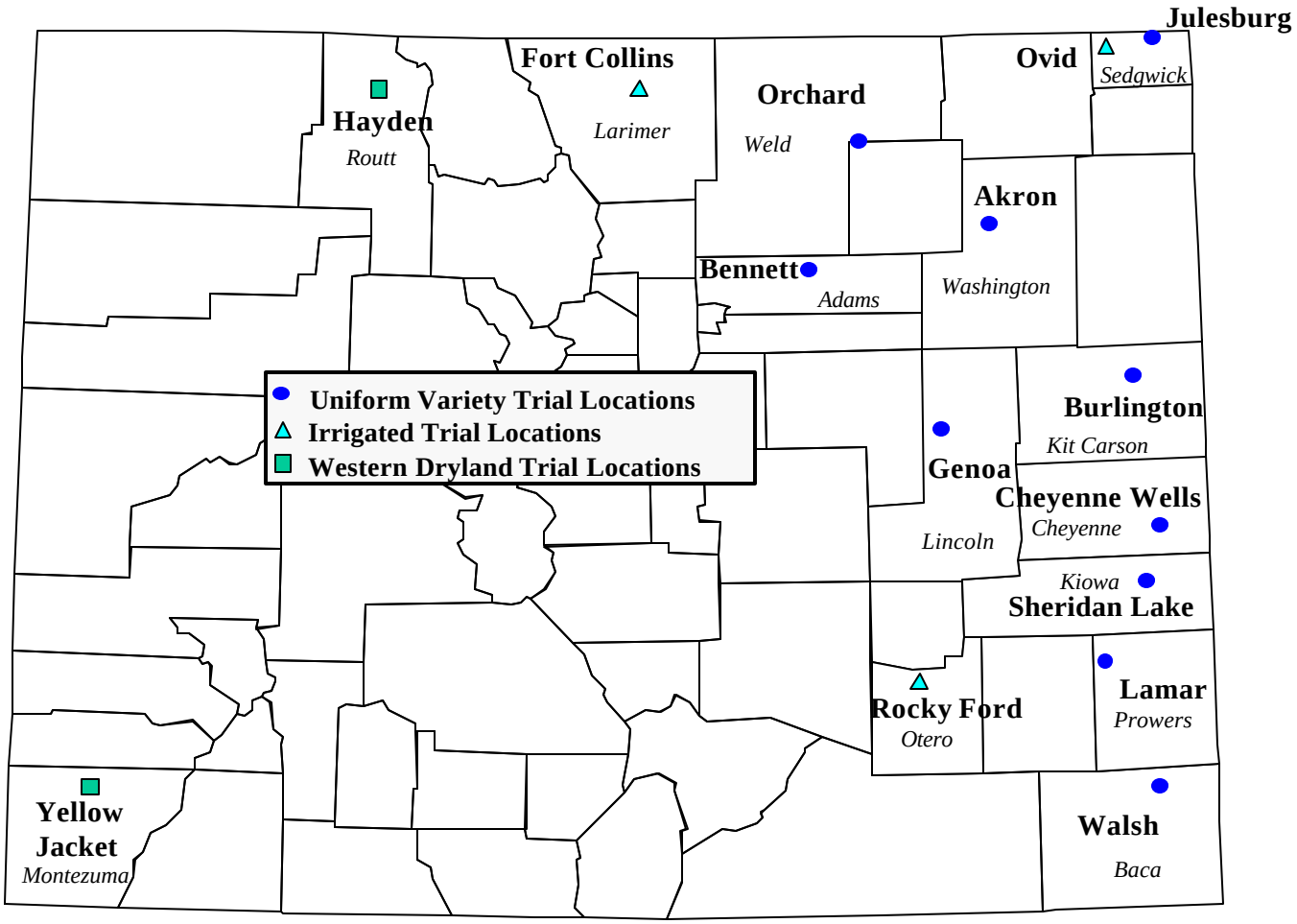
and Colorado State University

2003 Wheat
Variety Performance Trials



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EASTERN COLORADO WINTER WHEAT VARIETY PERFORMANCE TRIALS

Introduction

Making Better Decisions is a publication of Colorado State University. We are committed to providing the best information, in an appealing form, and in the most timely manner to Colorado wheat producers. Colorado State University conducts variety performance trials to obtain unbiased and reliable information for Colorado wheat producers to make better variety decisions. Good variety decisions can save Colorado wheat producers millions of dollars each year.

Immediately after harvest, and prior to fall planting, CSU's Crops Testing program publishes current trial results in different media forms:

1) Results are published in CWAC's *Wheat Farmer*.
2) Variety trial results are published on DTN (Data Transmission Network).
3) Variety trial results are available on the Crops Testing Internet page http://www.colostate.edu/Depts/SoilCrop/extension/CropVar/index.html.
4) Results are published in *From the Ground Up*, a Soil and Crop Science Extension publication.
5) E-mail copies of results are sent to Cooperative Extension agents and producers who request them.
6) Results are incorporated into the Colorado wheat variety performance database http://wheat.colostate.edu/vpt.html.

Trial Conditions and Methods - 2002/03

Colorado State University, with the support and cooperation of the Colorado wheat industry, conducts annual dryland (UVPT) and irrigated (IVPT) variety performance trials to obtain unbiased and reliable information for Colorado wheat producers to make better wheat variety decisions. Good variety decisions can return millions of dollars to Colorado wheat producers.

The dryland UVPT was comprised of 66 entries grown at 10 locations. Of the 66 entries in this trial, approximately half were named varieties and the other half were experimental lines. In addition to CSU varieties and experimental lines, the trial included public varieties from Nebraska, Oklahoma, Kansas, and Texas, and private varieties from Cargill-Goertzen and AgriPro. A randomized complete block design with three replicates was used in all trials. Dryland trials were seeded at 600,000 seeds per acre, planted in 9 inch-spaced rows at Akron, Burlington, and Julesburg and 12 inch-spaced rows at the other locations.

The irrigated IVPT was conducted at Rocky Ford, Ovid, and Fort Collins. The irrigated trials are managed for maximum yield and are seeded at 1.2 million seeds per acre with adequate fertilization to obtain or exceed 100 bushels per acre. The Ovid and Fort Collins trials were grown under sprinkler irrigation and the Rocky Ford trial was furrow-irrigated. All three irrigated trials provided excellent results. The Ovid trial was planted late to reflect results that might be obtained by planting winter wheat after harvesting corn in northeastern Colorado.

Planting conditions in the fall of 2002, following the severe drought, ranged from adequate to excellent except at the Bennett and Genoa locations where planting conditions were extremely dry. The trial at Bennett partially emerged after the late March (2003) snowstorm but resulting stands were highly variable. Emergence at Genoa was uniform but only about half the desired level. In spite of generally good emergence and top soil moisture conditions at the other locations, poor sub-soil moisture levels throughout eastern Colorado were prevalent. Adequate fall and winter precipitation was followed by a dry spring and moderate drought stress conditions at Walsh, Lamar, Sheridan Lake, Cheyenne Wells, Burlington, Genoa, and Orchard. The spring drought was aggravated by limited sub-soil moisture.

Russian wheat aphid pressure was higher this year than in recent years, especially in east-central and southeastern Colorado. A new Russian wheat aphid biotype was identified that overcomes the resistance in all RWA-resistant varieties released to date. Found in several places

in eastern Colorado, it is feared that this new biotype (denoted as "biotype B") will spread throughout the region and replace the original RWA biotype (denoted as "biotype A"). Russian wheat aphid damage was observed at Walsh, Bennett, and Fort Collins with sporadic infestations observed at several other locations. Wheat Steak Mosaic Virus and High Plains disease were not observed at any locations and slight Barley Yellow Dwarf Virus symptoms were only observed at one location. Stripe rust, which had been so severe in 2001, was observed at the dryland trials at Julesburg, Akron, Burlington, Genoa, and Orchard and the irrigated trials at Fort Collins and Ovid. Infestation levels at these locations were relatively light except at Akron (dryland) and Ovid (irrigated) where yields of some highly susceptible entries were reduced significantly. Leaf rust was observed at very low levels at some locations. Temperatures were quite moderate statewide throughout May and June except one brief high temperature event in late May. High temperatures began in early July and affected some of the more northern trials during the last two weeks of grain filling. Low grain protein content, indicative of low soil nitrogen levels, were observed in some parts of the state that had above average yields.

Hail played a major role in reducing yields in 2003. Trials at Walsh, Lamar, Sheridan Lake, Cheyenne Wells, Genoa, and Orchard were damaged, to varying degrees, by early and late June hail events. Several locations received hail twice. These hail events led to more severe shattering than in previous years. All locations were harvested in 2003 but the UVPT summary table of results only includes six of the ten locations as emergence, drought, and hail conditions did not permit reliable variety yield comparisons at Bennett, Lamar, Sheridan Lake, and Genoa.

Table 1. 2003 Trial Information.

Locations	Date of Planting 2002	Date of Harvest 2003	Soil Texture	Fertilization (lb/ac) Nitrogen N	Fertilization (lb/ac) Phosphorus P_2O_5	Type of Irrigation
Uniform						
Akron	9/23/02	7/10/03	Clay loam	70	0	None
Bennett	9/26/02	7/20/03	Sandy clay	36	18	None
Burlington	9/17/02	7/07/03	Silty clay loam	0	0	None
Cheyenne Wells	9/17/02	7/05/03	Silt loam	6	18	None
Genoa	9/19/02	7/18/03	Sandy clay	36	18	None
Julesburg	9/18/02	7/09/03	Silty clay loam	0	0	None
Lamar	9/18/02	7/02/03	Silt loam	46	18	None
Orchard	9/25/02	7/09/03	Sandy loam	50	18	None
Sheridan Lake	9/17/02	7/07/03	Silt loam	6	18	None
Walsh	9/23/02	7/01/03	Sandy clay loam	50	0	None
Irrigated						
Fort Collins	9/25/02	7/17/03	Clay loam	20	70	Sprinkler
Ovid	10/05/02	7/16/03	Silt loam	102	36	Sprinkler
Rocky Ford	9/16/02	7/02/03	Silty clay loam	118	75	Furrow

Description of winter wheat varieties.

NAME AND PEDIGREE	ORIGIN/CLASS	RWA	HD	HT	SS	ST	COL	WH	YR	LR	WSMV	TW	PC	MILL	BAKE	COMMENT
2137 W2440/W9488A//2163	KSU 1995 Hard red winter	S	6	5	2	5	4	3	9	7	4	4	7	4	6	Semidwarf, medium-early maturity. Good winterhardiness, good straw strength, good barley yellow dwarf virus tolerance, very susceptible to s rust and stripe rust.
Above TAM 110*4/FS2	CSU-TX 2001 Hard red winter	S	3	2	3	4	8	4	8	9	5	6	5	4	7	Clearfield* winter wheat developed cooperatively by CSU and Texas A& Amarillo. White chaff, early maturing semidwarf. Excellent dryland and irrigated performance record in Colorado. Marginal baking quality characteristics.
Akron TAM 107/Hail	CSU 1994 Hard red winter	S	5	5	6	3	8	3	8	8	9	6	7	7	6	Semidwarf, medium-early maturity, vigorous growth pattern, closes cano early in spring and competes well with weeds. Good dryland performanc record in Colorado.
Alliance Arkan/Colt//Chisholm sib	NEB 1993 Hard red winter	S	5	5	5	4	2	2	5	8	9	4	9	6	7	Medium-early maturing semidwarf, short coleoptile, above average tolera root rot and crown rot. Good dryland performance record in Colorado.
Ankor Akron/Halt//4*Akron	CSU 2002 Hard red winter	R*	5	5	4	3	6	3	8	8	9	6	7	6	5	Russian wheat aphid resistant version of Akron. Semidwarf, medium-earl maturity, vigorous growth pattern, closes canopy early in spring and con well with weeds. Slightly better straw strength and baking quality than A
Antelope Pronghorn/Arlin	NEB 2002 Hard white winter	S	5	6	2	--	--	--	2	--	--	5	5	7	7	Hard white winter wheat (HWW) released by USDA-ARS breeding progr Nebraska. Medium height, medium-late maturity. Excellent straw strengt good stripe rust resistance, good irrigated performance record in Colorad
AP502 CL TXGH12588-26*4/FS2	Agripro 2001 Hard red winter	S	2	1	4	3	9	3	8	9	5	7	5	7	7	Clearfield* winter wheat marketed by Agripro. Red chaff, early maturing, semidwarf. Very low test weight relative to TAM 110 and Above. Margi milling and baking quality.
Arrowsmith KS87809-10/Arapahoe	NEB 2002 Hard white winter	S	7	8	5	--	--	--	2	--	--	2	2	4	5	Hard white winter wheat (HWW) released by USDA-ARS breeding progr Nebraska. Tall, medium-late maturity. First entered in Colorado Dryland Trials (UVPT) in 2004.
Avalanche KS87H325/Rio Blanco	CSU 2001 Hard white winter	S	5	5	4	4	2	4	8	6	5	1	6	2	5	Hard white winter wheat (HWW), sister selection to Trego HWW. Two earlier than Trego in Colorado. High test weight, good stand establishm fall growth. Good dryland performance record in Colorado.
Cisco CG9119021/CG60725// KARL 92	Westbred 2002 Hard red winter	S	3	2	--	4	2	--	8	--	--	5	1	3	3	Developed and marketed by Westbred. Early-maturing semidwarf. First entered in Colorado Trials in 2002.
Dumas WI90-425//N84-0758// WI81-297-3	Agripro 2000 Hard red winter	S	5	4	1	--	5	4	6	4	7	3	7	1	6	Developed and marketed by Agripro. Medium-height, medium-maturity. Targeted for irrigated production in the western Great Plains. Excellent st strength and test weight.
Enhancer 1992 Nebraska Bulk Selection	Westbred 1998 Hard red winter	S	5	5	8	4	7	5	3	7	6	5	4	7	6	Developed and marketed by Westbred. Medium height and medium matu Good fall growth, good stripe rust resistance. Poor straw strength and te weight. Good dryland performance record in Colorado.
Goodstreak SD3055/KS88H164// NE89646(=COLT*2/ PATRIZANKA)	NEB 2002 Hard red winter	S	6	8	--	--	--	--	--	--	--	--	--	2	8	University of Nebraska release (2002). Tall, medium-maturing wheat. Go performance in Nebraska-Panhandle trials. First entered in Colorado Dry Trials (UVPT) in 2004.

*Russian Wheat Aphid resistance (RWA), heading date (HD), plant height (HT), straw strength (SS), shatter (ST), Coleoptile length (COL), winterhardiness (WH), striperust (YR), leaf rust re wheat streak mosaic virus tolerance (WSMV), test weight (TW), Protein Content (PC), milling quality (MILL), and baking quality (BAKE).

**Rating scale: 0 - very good, very early, or very short to 9 - very poor, very late, or very tall; WH-winterhardiness; WSMV - wheat streak mosaic virus tolerance.

***RWA rating denotes resistance to the original biotype (biotype A) of RWA. All available cultivars are susceptible to the new biotype of RWA (biotype B).

NAME AND PEDIGREE	ORIGIN/CLASS	RWA	HD	HT	SS	ST	COL	WH	YR	LR	WSMV	TW	PC	MILL	BAKE	COMMENT
Halt Sumner/CO820026,F1// PI372129,F1/3/TAM 107	CSU 1994 Hard red winter	R*	3	1	3	5	4	4	8	9	7	8	2	3	2	RWA resistant, semidwarf, early maturity, below average test weight, ver good milling and baking quality characteristics. Dryland yield record in Colorado identical to TAM 107 with advantages over TAM 107 seen at h yield levels.
Harry NE90614/NE87612	NEB 2002 Hard red winter	S	6	4	--	--	--	--	--	--	--	--	--	7	7	University of Nebraska release (2002). Very good performance in Nebras Panhandle trials. First entered in Colorado Dryland Trials (UVPT) in 2004
Jagalene Abilene/Jagger	Agripro 2001 Hard red winter	S	5	5	4	7	6	--	2	3	4	1	3	2	5	Developed and marketed by Agripro. Medium height, medium maturity. Excellent winterhardiness, leaf and stripe rust resistance, and test weight. been observed to shatter severely in Colorado trials.
Jagger KS82W418/Stephens	KSU 1994 Hard red winter	S	2	4	6	5	7	8	2	8	4	5	2	5	5	Bronze-chaffed, early maturing semidwarf. High grain protein content an baking quality, good WSMV tolerance, good stripe rust reistance. Below average straw strength. Prone to spring freeze injury, breaks dormancy v early in the spring.
Kalvesta Oelson/Hamra//Australia 215/3/Karl92	Westbred 1999 Hard red winter	S	4	2	3	5	4	2	9	9	8	5	3	2	5	Developed and marketed by Westbred. Medium-early, semidwarf.
Lakin Arlin/KS89H130	KSU 2000 Hard white winter	S	5	5	4	4	5	4	9	9	5	5	2	3	6	Hard white winter wheat (HWW) released by Kansas State. Medium hei medium maturity. Suitable for both domestic (bread) and export (Asian noodles) uses.
Millennium Arapahoe/Abilene//NE8648	NEB 1999 Hard red winter	S	6	5	--	--	--	--	3	2	8	--	--	2	6	University of Nebraska release (1999). Very good performance in Nebras Panhandle trials. First entered in Colorado Dryland Trials (UVPT) in 2004
NuFrontier Undisclosed	General Mills 2000 Hard white winter	S	7	6	5	3	5	4	2	9	8	4	5	4	5	Hard white winter wheat (HWW), privately developed in the Great Plains marketed exclusively by General Mills. Medium-late maturing, tall semidw Good stripe rust resistance. First entered in Colorado Dryland Trials (UV in 2001.
NuHills Undisclosed	General Mills 2003 Hard white winter	S	5	5	--	--	--	--	2	4	--	--	--	--	--	Hard white winter wheat (HWW), privately developed in the Great Plains marketed exclusively by General Mills. Sister selection to Jagalene. First entered in Colorado Dryland Trials (UVPT) in 2004.
NuHorizon Undisclosed	General Mills 2000 Hard white winter	S	6	1	3	3	8	4	2	9	4	1	4	5	7	Hard white winter wheat (HWW), privately developed in the Great Plains marketed exclusively by General Mills. Medium maturing semidwarf, exce test weight. Good stripe rust resistance. First entered in Colorado Dryla Trials (UVPT) in 2001.
Nuplains Abilene/KS831862	NEB 1999 Hard white winter	S	8	3	4	--	3	2	8	6	8	4	1	2	5	Hard white winter wheat (HWW) released by USDA-ARS program in Nebraska. Medium-late maturity, semidwarf, excellent straw strength, go test weight. High protein, very good milling and baking quality character
Ok101 OK87W663/Mesa//2180	OK 2001 Hard red winter	S	3	5	4	5	1	6	7	5	7	4	9	2	5	Medium-early, medium height. Good fall forage production and excellent recovery after grazing. Large kernel size, good milling and baking quality Targeted for production in north central Oklahoma and irrigated producti the High Plains.
Ok102 2174/Cimarron	OK 2002 Hard red winter	S	5	1	2	4	3	--	7	--	--	3	3	2	3	Medium-maturity, semidwarf. Excellent milling and baking quality characteristics. Targeted toward irrigated production in the High Plains.
Overley U1275-1-4-2-2/ KS85W663-7-4-2//JGR	KSU 2003 Hard red winter	S	2	4	--	--	--	--	1	4	4	--	--	2	2	New release from Kansas State University (Manhattan). Excellent milling baking quality characteristics. First entered in Colorado Dryland Trials (UVPT) in 2004.

*Russian Wheat Aphid resistance (RWA), heading date (HD), plant height (HT), straw strength (SS), shatter (ST), Coleoptile length (COL), winterhardiness (WH), striperust (YR), leaf rust re wheat streak mosaic virus tolerance (WSMV), test weight (TW), Protein Content (PC), milling quality (MILL), and baking quality (BAKE).

**Rating scale: 0 - very good, very early, or very short to 9 - very poor, very late, or very tall; WH-winterhardiness; WSMV - wheat streak mosaic virus tolerance.

***RWA rating denotes resistance to the original biotype (biotype A) of RWA. All available cultivars are susceptible to the new biotype of RWA (biotype B).

NAME AND PEDIGREE	ORIGIN/CLASS	RWA	HD	HT	SS	ST	COL	WH	YR	LR	WSMV	TW	PC	MILL	BAKE	COMMENT
Platte N84-1104/Abilene	Agripro 1995 Hard white winter	S	6	1	1	--	3	5	9	--	7	3	5	3	1	Developed by Agripro and marketed under identity-preserved contracts ConAgra. Excellent test weight and milling and baking quality. Targeted specifically for irrigated production. Very susceptible to stripe rust
Prairie Red CO850034/PI372129// 5*TAM 107	CSU 1998 Hard red winter	R*	1	2	4	2	8	4	9	9	5	7	6	4	6	Russian wheat aphid resistant version of TAM 107. Bronze-chaffed, earl maturing semidwarf, medium long coleoptile, good heat and drought tole poor end-use quality reputation. Very suseptible to leaf rust.
Prowers 99 CO850060/PI372129// 5*Lamar	CSU 1999 Hard red winter	R*	8	8	7	4	9	2	7	6	7	1	3	5	1	Developed from reselection within Prowers for improved RWA resistance Tall, long coleoptile, medium-late maturity, high test weight, good milling baking quality characteristics. Very similar to Lamar and Prowers.
Stanton PI220350/KS87H57// TAM-200/KS87H66/3/ KS87H325	KSU 2000 Hard red winter	R*	5	6	5	4	4	4	5	2	5	2	3	2	6	RWA-resistant (different resistance gene from CSU varieties), medium-tal medium maturity. Good leaf rust resistance. Very good dryland performa record in Colorado.
T81 TAM 107/T213 sib	TRIO 1995 Hard red winter	S	3	2	4	--	--	--	2	7	6	--	--	3	3	Developed by Trio Research. First entered in Colorado Dryland Trials (U in 2004.
TAM 110 (TAM 105*4/Amigo)*5//Largo	TX 1995 Hard red winter	S	3	2	4	3	9	4	8	9	5	7	4	5	5	Developed transfer of an additional Greenbug resistance gene directly in TAM 107. Bronze-chaffed, early maturing semidwarf, low test weight, sli improved end-use quality reputation relative to TAM 107.
TAM 111 TAM- 107//TX78V3630/CTK78/3/ TX87V1233	TX 2002 Hard red winter	S	5	6	4	4	9	5	2	6	5	1	3	3	4	Release from Texas A&M-Amarillo, marketed by Agripro. Medium heigh medium maturity. Good milling and baking quality characteristics, good s rust resistance. Good dryland performance record in Colorado.
Thunderbolt Abilene/KS90WGRC10	Agripro 1999 Hard red winter	S	7	5	3	7	8	4	8	4	5	1	1	1	4	Developed and marketed by Agripro. Bronze chaffed, medium height, me maturity, high test weight, good milling and baking quality and leaf rust resistance. Has been observed to shatter severely in Colorado trials.
Trego KS87H325/Rio Blanco	KSU 1999 Hard white winter	S	6	4	6	3	3	4	8	8	5	1	7	2	6	Hard white winter wheat (HWW) released by Kansas State. Medium-late maturity, semidwarf, high test weight. Excellent dryland performance rec Colorado.
Venango Random Mating Population	Westbred 2000 Hard red winter	S	7	3	2	8	6	4	9	5	5	7	4	6	4	Developed and marketed by Westbred. Medium-late maturing, semidwar good straw strength, good test weights. Good irrigated performance rec Colorado. Has been observed to shatter severely in Colorado trials.
Wahoo Arapahoe/Abilene// Arapahoe	NEB 2000 Hard red winter	S	6	4	--	--	--	--	--	--	--	--	--	6	7	University of Nebraska release (2000). Very good performance in Nebras Panhandle trials. First entered in Colorado Dryland Trials (UVPT) in 2004
Wesley KS831936-3//Colt/Cody	NEB 1998 Hard red winter	S	4	1	2	--	4	3	2	7	7	8	2	3	4	Medium-early, short, excellent straw strength. Good winterhardiness an milling and baking quality characteristics. Good stripe rust resistance, g irrigated performance record in Colorado.
Yuma NS14/NS25/2/2*Vona	CSU 1991 Hard red winter	S	5	3	2	5	1	4	7	8	6	4	9	7	3	Medium maturity, semidwarf, very good straw strength, short coleoptile, baking quality characteristics. Good dryland and irrigated performance r in Colorado.
Yumar Yuma/PI372129//CO850034/ 3/4*Yuma	CSU 1997 Hard red winter	R*	5	4	3	5	1	4	6	8	6	3	8	5	3	Russian wheat aphid resistant version of Yuma. Medium-maturing semid Good straw strength, good baking quality characteristics. Good irrigated performance record in Colorado.

*Russian Wheat Aphid resistance (RWA), heading date (HD), plant height (HT), straw strength (SS), shatter (ST), Coleoptile length (COL), winterhardiness (WH), striperust (YR), leaf rust re
wheat streak mosaic virus tolerance (WSMV), test weight (TW), Protein Content (PC), milling quality (MILL), and baking quality (BAKE).
**Rating scale: 0 - very good, very early, or very short to 9 - very poor, very late, or very tall; WH-winterhardiness; WSMV - wheat streak mosaic virus tolerance.
***RWA rating denotes resistance to the original biotype (biotype A) of RWA. All available cultivars are susceptible to the new biotype of RWA (biotype B).

Table 2. Colorado winter wheat Uniform Variety Performance Trial summary for 2003.

	Location												2003			
	Akron		Burlington		Cheyenne Wells		Julesburg		Orchard		Walsh		Averages			
Variety[1]	Yield	Test Wt	Yield	Test Wt	Yield	Test Wt	Yield	Test Wt	Yield	Test Wt	Yield	Test Wt	Yield	% of Trial Average	Test Wt	Plant Ht
	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	%	lb/bu	in
Yuma	93.4	59.5	56.0	56.9	42.5	59.4	75.9	59.0	33.0	61.4	17.2	59.7	53.0	109	59.3	28
Trego	92.8	61.0	48.3	59.7	41.9	60.3	74.0	60.7	35.3	63.3	24.9	60.5	52.9	109	60.9	26
Above	93.1	59.6	46.0	57.0	41.0	58.8	72.4	59.1	39.2	59.1	25.0	59.9	52.8	109	58.9	27
TAM 111	101.3	60.8	46.5	57.8	41.4	61.1	72.6	59.1	35.4	62.8	18.7	60.2	52.6	109	60.3	28
Ankor	90.4	58.1	45.2	57.5	41.8	58.6	73.5	58.4	37.3	61.4	22.8	60.2	51.8	107	59.0	29
Enhancer	94.9	60.2	48.0	55.8	42.8	60.5	76.8	58.2	32.4	61.5	14.0	59.2	51.5	106	59.2	31
Alliance	92.2	59.5	42.7	56.6	39.3	60.9	74.2	58.8	34.4	61.9	20.4	58.9	50.5	104	59.4	27
Avalanche	89.9	61.0	47.7	58.7	42.3	60.5	65.4	60.7	34.4	61.8	22.9	61.1	50.4	104	60.6	28
Yumar	91.0	60.2	50.2	58.1	38.7	58.7	77.0	59.6	29.1	61.2	16.0	60.5	50.3	104	59.7	28
Prairie Red	88.5	59.2	48.8	56.9	40.7	57.2	68.2	59.0	32.3	61.4	22.6	59.2	50.2	104	58.8	28
TAM 110	87.2	58.1	44.3	56.6	41.0	58.0	71.9	59.5	33.8	60.7	21.6	59.5	49.9	103	58.7	27
Akron	88.4	59.4	46.3	57.7	42.6	58.8	67.5	58.6	33.4	60.5	19.5	59.3	49.6	103	59.0	28
Stanton	92.2	60.3	41.7	58.4	39.7	59.3	69.9	59.0	31.7	62.1	21.0	60.5	49.4	102	59.9	29
AP502 CL	87.6	59.4	43.5	56.9	39.2	58.7	71.4	59.4	31.1	60.4	20.6	58.6	48.9	101	58.9	28
Ok101	88.4	60.0	46.6	56.9	37.8	59.1	69.5	58.9	33.1	61.6	17.1	60.2	48.8	101	59.4	29
Cisco	88.9	60.5	48.3	56.6	37.5	57.9	57.2	59.6	32.5	60.5	22.4	60.4	47.8	99	59.2	28
Lakin	81.5	57.9	48.2	57.2	38.8	60.3	71.0	58.0	34.1	62.0	13.2	59.9	47.8	99	59.2	28
2137	85.7	59.3	45.8	58.0	38.0	59.0	71.5	59.4	30.2	61.3	13.1	59.1	47.4	98	59.4	27
Ok102	84.7	60.5	44.8	57.6	39.8	58.5	64.1	59.5	30.7	61.9	19.2	60.3	47.2	98	59.7	27
Halt	85.4	58.3	41.7	56.0	33.1	59.6	71.5	58.0	30.5	61.0	17.8	59.1	46.7	96	58.7	27
Jagalene	90.6	61.4	41.7	57.6	37.9	58.1	67.3	59.6	26.7	63.0	15.4	61.0	46.6	96	60.1	27
Jagger	93.2	60.6	44.2	56.0	33.4	58.8	62.2	58.9	30.8	60.9	12.4	60.0	46.0	95	59.2	29
Kalvesta	87.8	59.8	40.8	56.2	35.2	59.7	66.0	58.6	31.4	61.6	14.1	59.5	45.9	95	59.2	27
Prowers 99	83.3	61.4	40.0	58.0	40.2	61.5	62.2	60.5	31.4	62.2	15.2	60.4	45.4	94	60.7	32
G980091-1	85.1	59.7	39.7	56.4	28.7	58.8	66.5	58.3	33.0	60.6	10.8	59.4	44.0	91	58.9	26
Venango	81.2	59.7	33.4	55.8	27.9	59.0	68.6	59.1	29.3	*	6.0	60.2	41.1	85	58.8	28
Thunderbolt	78.0	61.2	35.3	58.2	26.5	59.8	61.0	59.9	28.1	62.5	8.8	61.0	39.6	82	60.4	27
Average	88.8	59.9	44.7	57.2	38.1	59.3	69.2	59.2	32.4	61.5	17.5	59.9	48.4	100	59.5	28
$LSD_{(0.30)}$	4.6		2.7		3.9		3.1		2.8		2.4					

[1]Varieties in table ranked by the average yield over six locations in 2003.

*Inadequate grain for test weight determination.

Table 3. Colorado winter wheat 3-Yr and 2-Yr Uniform Variety Performance Trial summary.

	Averages						
Variety[1]	3-Yr	2-Yr	2003	2002	2001	3-Yr	2-Yr
	----------Yield (bu/ac)----------					--Twt (lb/bu)--	
Trego (HWW)	47.2	46.7 (3)	52.9	34.3	42.5	59.8	60.8
Enhancer	45.0	44.4	51.5	30.3	40.5	57.8	58.9
Stanton	45.0	43.8	49.4	32.6	41.1	58.4	59.9
Above (CL)*	44.5	46.7 (2)	52.8	34.5	37.3	57.4	59.0
Yuma	44.3	45.3 (5)	53.0	30.0	38.3	57.7	59.2
Alliance	44.3	44.5	50.5	32.5	39.1	57.8	59.2
Ankor	43.8	45.8 (4)	51.8	33.7	37.0	57.6	58.7
Jagger	43.8	41.3	46.0	31.7	41.5	58.1	59.2
Akron	43.7	44.1	49.6	33.2	38.4	57.7	58.8
Prairie Red	43.0	45.0	50.2	34.6	36.2	57.5	58.8
Avalanche (HWW)	42.8	44.1	50.4	31.6	36.7	59.2	60.6
Halt	42.8	42.7	46.7	34.7	38.1	57.4	58.6
Yumar	42.4	43.8	50.3	30.8	36.2	58.3	59.3
AP502 CL*	41.6	43.5	48.9	32.7	35.1	56.9	58.6
TAM 110	41.2	44.1	49.9	32.3	33.7	57.0	58.8
Prowers 99	41.1	40.9	45.4	31.8	36.8	59.5	60.3
Lakin (HWW)	40.8	43.2	47.8	33.9	33.9	58.3	59.3
2137	40.2	42.3	47.4	32.2	33.6	57.5	59.0
Venango	37.3	37.3	41.1	29.9	33.1	58.5	58.9
TAM 111	---	46.8 (1)	52.6	35.0	---	---	59.9
Jagalene	---	43.0	46.6	35.7	---	---	60.2
Ok101	---	42.8	48.8	30.9	---	---	59.2
Cisco	---	42.5	47.8	31.7	---	---	59.1
Thunderbolt	---	36.7	39.6	30.8	---	---	60.2

[1]Varieties in table ranked based on 3-Yr average yields.

[1.....5]Variety rank based on 2-Yr average yields.

CL - CLEARFIELD wheat variety.

HWW - Hard white winter wheat variety.

Table 4. Winter wheat Uniform Variety Performance Trial at Akron in 2003[1].

Variety	Yield	Test Weight	Plant Height	Lodging[2]	Days to Head.[3]	Stripe Rust[4]
	bu/ac	lb/bu	in	1-9	days	1-9
TAM 111	101.3	60.8	34	2	145	2
Enhancer	94.9	60.2	38	7	144	3
Yuma	93.4	59.5	36	2	145	7
Jagger	93.2	60.6	36	3	140	2
Above	93.1	59.6	35	2	140	9
Trego	92.8	61.0	34	2	146	5
Stanton	92.2	60.3	37	2	144	5
Alliance	92.2	59.5	31	2	143	5
Yumar	91.0	60.2	36	2	144	6
Jagalene	90.6	61.4	35	2	144	2
Ankor	90.4	58.1	36	3	145	8
Avalanche	89.9	61.0	34	2	145	8
Cisco	88.9	60.5	35	3	143	8
Prairie Red	88.5	59.2	34	2	141	9
Ok101	88.4	60.0	38	2	143	8
Akron	88.4	59.4	32	4	146	8
Kalvesta	87.8	59.8	32	2	144	9
AP502 CL	87.6	59.4	36	2	140	9
TAM 110	87.2	58.1	36	3	140	8
2137	85.7	59.3	31	2	146	9
Halt	85.4	58.3	33	2	142	8
G980091-1	85.1	59.7	34	2	143	6
Ok102	84.7	60.5	34	2	144	7
Prowers 99	83.3	61.4	41	5	147	7
Lakin	81.5	57.9	35	2	145	9
Venango	81.2	59.7	35	2	145	9
Thunderbolt	78.0	61.2	33	2	147	8
Average	88.8	59.9	35	3	144	7
$LSD_{(0.30)}$	4.6					

[1]Trial conducted on the Central Great Plains Research Center; seeded 9/23/02 and harvested 7/10/03.
[2]Rating scale 1-9, with 1 = no lodging and 9 = completely lodged**.**
[3]Days from January 1.
[4]Rating scale 1-9, with 1 = no stripe rust and 9 = severe stripe rust.

Notes: Excellent emergence and stand establishment. No subsoil moisture but caught every good rain on a timely basis for whole season. Severe stripe rust, growing on awn and behind glumes on kernels by mid-June. Septoria leaf blotch observed at moderate levels. Sporadic RWA. High temperatures last 10 days of grain filling. Leaf rust was also at relatively high levels in materials that kept their leaf due to them being stripe rust resistant

Table 5. Winter wheat Uniform Variety Performance Trial at Bennett in 2003[1].

Variety	Yield	Grain Moisture	Test Weight	Plant Height
	bu/ac	%	lb/bu	in
TAM 111	56.0	11.0	58.7	27
Ankor	53.4	10.6	56.8	30
Lakin	50.6	10.6	57.1	27
Thunderbolt	49.0	9.8	56.1	28
Yumar	48.9	10.4	56.1	29
G980091-1	48.2	9.5	54.4	24
Stanton	48.2	10.2	56.2	30
Alliance	47.2	10.0	54.9	31
Jagalene	46.7	10.0	54.3	24
Prowers 99	46.3	10.3	56.1	33
Enhancer	45.8	10.2	53.4	28
Above	45.7	9.7	53.5	27
TAM 110	44.9	9.3	54.6	26
Ok102	44.4	11.6	56.2	22
Cisco	42.8	9.9	57.5	27
Prairie Red	42.5	9.4	55.8	29
Jagger	41.8	9.8	53.6	27
Yuma	40.4	10.8	53.1	26
Akron	39.4	9.8	54.6	29
Venango	39.0	11.1	56.8	27
Trego	38.5	9.4	51.7	27
Halt	38.5	10.2	53.6	24
Ok101	38.0	11.0	54.3	24
Avalanche	35.4	9.7	51.8	27
Kalvesta	35.3	10.8	56.6	26
AP502 CL	35.3	9.0	54.2	25
2137	30.9	9.4	53.3	25
Average	43.4	10.1	55.0	27
$LSD_{(0.30)}$	5.6			

[1]Trial conducted on the John Sauter farm; seeded 9/26/02 and harvested 7/20/03.

Notes: No emergence in fall and only 5-10% emerged in early March. Very uneven stands observed May 1. Heavy RWA pressure observed, likely biotype A. Also high numbers of Bird Cherry-Oat aphid noted.

Table 6. Winter wheat Uniform Variety Performance Trial at Burlington in 2003[1].

Variety	Yield	Test Weight	Plant Height
	bu/ac	lb/bu	in
Yuma	56.0	56.9	25
Yumar	50.2	58.1	24
Prairie Red	48.8	56.9	25
Cisco	48.3	56.6	25
Trego	48.3	59.7	23
Lakin	48.2	57.2	24
Enhancer	48.0	55.8	29
Avalanche	47.7	58.7	25
Ok101	46.6	56.9	26
TAM 111	46.5	57.8	25
Akron	46.3	57.7	25
Above	46.0	57.0	24
2137	45.8	58.0	25
Ankor	45.2	57.5	25
Ok102	44.8	57.6	25
TAM 110	44.3	56.6	25
Jagger	44.2	56.0	27
AP502 CL	43.5	56.9	25
Alliance	42.7	56.6	23
Jagalene	41.7	57.6	24
Stanton	41.7	58.4	25
Halt	41.7	56.0	24
Kalvesta	40.8	56.2	26
Prowers 99	40.0	58.0	28
G980091-1	39.7	56.4	24
Thunderbolt	35.3	58.2	27
Venango	33.4	55.8	25
Average	44.7	57.2	25
$LSD_{(0.30)}$	2.7		

[1]Trial conducted on the Barry Hinkhouse farm; seeded 9/17/02 and harvested 7/07/03.

Notes: Uneven emergence with gaps filling in with delayed winter and early spring emergence. Spring drought and no subsoil reserve moisture. Early June moisture saves trial and leads to average yields and good results. Stripe rust present at very low levels.

Table 7. Winter wheat Uniform Variety Performance Trial at Cheyenne Wells in 2003[1].

Variety	Yield	Grain Moisture	Test Weight	Plant Height	Shatter[2]
	bu/ac	%	lb/bu	in	1-9
Enhancer	42.8	9.7	60.5	26	5
Akron	42.6	9.8	58.8	25	2
Yuma	42.5	9.8	59.4	24	4
Avalanche	42.3	9.9	60.5	23	1
Trego	41.9	10.1	60.3	21	1
Ankor	41.8	9.6	58.6	25	3
TAM 111	41.4	10.3	61.1	25	2
Above	41.0	9.5	58.8	21	2
TAM 110	41.0	9.0	58.0	23	2
Prairie Red	40.7	8.8	57.2	27	1
Prowers 99	40.2	10.6	61.5	27	4
Ok102	39.8	9.1	58.5	22	2
Stanton	39.7	9.7	59.3	27	1
Alliance	39.3	9.8	60.9	23	2
AP502 CL	39.2	9.0	58.7	21	2
Lakin	38.8	9.6	60.3	24	3
Yumar	38.7	9.9	58.7	26	4
2137	38.0	9.6	59.0	25	2
Jagalene	37.9	8.7	58.1	21	3
Ok101	37.8	9.4	59.1	24	3
Cisco	37.5	9.2	57.9	24	4
Kalvesta	35.2	9.2	59.7	22	4
Jagger	33.4	9.4	58.8	24	3
Halt	33.1	9.1	59.6	23	5
G980091-1	28.7	9.5	58.8	23	5
Venango	27.9	9.4	59.0	23	8
Thunderbolt	26.5	10.1	59.8	23	5
Average	38.1	9.5	59.3	24	3
$LSD_{(0.30)}$	3.9				

[1]Trial conducted on the Tom Heinz farm; seeded 9/17/02 and harvested 7/05/03.
[2]Rating scale 1-9, with 1 = no shatter and 9 = severely shattered.

Notes: Good stands. Good top soil moisture. Limited subsoil moisture. Some spring drought but caught some timely local precipitation leading to average yields and a good trial. Slight hail damage early June. Stripe rust present at very low levels.

Table 8. Winter wheat Uniform Variety Performance Trial at Genoa in 2003[1].

Variety	Yield	Grain Moisture	Test Weight	Plant Height	Shatter[2]
	bu/ac	%	lb/bu	in	1-9
Above	32.1	9.0	53.3	31	4
Ok101	28.4	9.3	53.1	31	5
Ok102	27.3	11.1	53.3	28	4
Trego	25.7	10.7	57.1	27	5
Avalanche	25.2	10.2	55.9	29	6
TAM 110	24.2	9.4	55.5	31	3
Alliance	24.0	9.8	57.3	27	6
Stanton	22.9	9.1	52.1	34	5
Jagalene	22.7	9.3	53.7	28	6
Prairie Red	21.3	9.3	55.4	28	4
TAM 111	20.2	12.1	55.4	29	6
2137	20.1	11.5	54.3	28	5
Akron	20.0	10.7	56.9	28	6
Yuma	19.9	10.4	53.1	29	4
Prowers 99	19.5	11.2	58.1	34	--
Halt	19.0	9.6	55.8	28	5
Cisco	19.0	9.8	54.8	31	5
AP502 CL	18.3	10.6	51.7	29	6
Lakin	18.3	10.7	55.2	29	5
Yumar	18.2	11.6	52.1	28	6
Kalvesta	17.7	9.0	56.1	30	5
Enhancer	17.1	11.3	57.0	32	6
Ankor	16.3	11.1	54.2	30	6
G980091-1	15.8	11.1	54.1	27	4
Thunderbolt	15.5	10.8	52.8	28	8
Jagger	14.6	8.8	53.1	27	8
Venango	11.9	11.4	54.8	30	7
Average	20.6	10.3	54.7	29	5
$LSD_{(0.30)}$	3.7				

[1]Trial conducted on the Ross Hansen farm; seeded 9/19/02 and harvested 7/18/03.

[2]Rating scale 1-9, with 1 = no shatter and 9 = severely shattered.

Notes: Uniform but low emergence. Damaging, head-snapping, hail early June. Stripe rust present at moderate levels.

Table 9. Winter wheat Uniform Variety Performance Trial at Julesburg in 2003[1].

Variety	Yield	Test Weight	Plant Height
	bu/ac	lb/bu	in
Yumar	77.0	59.6	34
Enhancer	76.8	58.2	38
Yuma	75.9	59.0	36
Alliance	74.2	58.8	36
Trego	74.0	60.7	34
Ankor	73.5	58.4	35
TAM 111	72.6	59.1	36
Above	72.4	59.1	35
TAM 110	71.9	59.5	35
Halt	71.5	58.0	34
2137	71.5	59.4	34
AP502 CL	71.4	59.4	34
Lakin	71.0	58.0	34
Stanton	69.9	59.0	37
Ok101	69.5	58.9	35
Venango	68.6	59.1	34
Prairie Red	68.2	59.0	34
Akron	67.5	58.6	35
Jagalene	67.3	59.6	33
G980091-1	66.5	58.3	32
Kalvesta	66.0	58.6	34
Avalanche	65.4	60.7	37
Ok102	64.1	59.5	31
Prowers 99	62.2	60.5	41
Jagger	62.2	58.9	36
Thunderbolt	61.0	59.9	34
Cisco	57.2	59.6	35
Average	69.2	59.2	35
$LSD_{(0.30)}$	3.1		

[1]Trial conducted on the Walt Strasser farm; seeded 9/18/02 and harvested 7/09/03.

Notes: Excellent emergence. Some stripe rust but arrested by early June drought stress. Minor weed pressure. High temperatures last 10 days of grain filling.

Table 10. Winter wheat Uniform Variety Performance Trial at Lamar in 2003[1].

Variety	Yield	Plant Height
	bu/ac	in
Akron	23.8	24
Enhancer	22.8	24
Prairie Red	21.2	19
Ankor	20.7	17
Ok102	20.7	22
TAM 111	20.7	17
Cisco	20.1	20
Alliance	19.8	21
Yuma	19.8	22
Avalanche	19.3	18
Yumar	17.9	18
Trego	16.5	20
Stanton	16.0	24
AP502 CL	13.5	23
TAM 110	12.2	19
Above	12.1	17
Halt	12.0	20
2137	11.0	18
Ok101	11.0	20
Kalvesta	10.3	21
Prowers 99	9.1	17
Jagalene	9.1	19
Jagger	9.0	22
G980091-1	7.0	21
Lakin	6.8	16
Venango	6.2	17
Thunderbolt	4.8	23
Average	14.6	20
$LSD_{(0.30)}$	6.0	

[1]Trial conducted on the John Stulp farm; seeded 9/18/02 and harvested 7/02/03.
*Insufficient grain available to determine individual plot test weights. Trial average was 57.4 lb/bu.

Notes: Good emergence. No subsoil moisture. Severe spring drought. Hail end of June. Lots of shattering.

Table 11. Winter wheat Uniform Variety Performance Trial at Orchard in 2003[1].

Variety	Yield	Grain Moisture	Test Weight	Plant Height
	bu/ac	%	lb/bu	in
Above	39.2	8.8	59.1	25
Ankor	37.3	10.1	61.4	27
TAM 111	35.4	10.2	62.8	24
Trego	35.3	10.6	63.3	24
Alliance	34.4	10.1	61.9	24
Avalanche	34.4	10.1	61.8	25
Lakin	34.1	10.1	62.0	25
TAM 110	33.8	9.4	60.7	23
Akron	33.4	10.1	60.5	27
Ok101	33.1	10.1	61.6	27
Yuma	33.0	9.8	61.4	23
G980091-1	33.0	9.6	60.6	25
Cisco	32.5	9.2	60.5	27
Enhancer	32.4	9.8	61.5	28
Prairie Red	32.3	9.9	61.4	23
Stanton	31.7	10.2	62.1	27
Kalvesta	31.4	10.2	61.6	25
Prowers 99	31.4	10.7	62.2	29
AP502 CL	31.1	9.3	60.4	27
Jagger	30.8	10.1	60.9	23
Ok102	30.7	10.1	61.9	25
Halt	30.5	9.7	61.0	23
2137	30.2	9.9	61.3	24
Venango	29.3	*	*	26
Yumar	29.1	10.3	61.2	24
Thunderbolt	28.1	10.3	62.5	25
Jagalene	26.7	10.8	63.0	25
Average	32.4	10.0	61.5	25
$LSD_{(0.30)}$	2.8			

[1]Trial conducted on the Cary Wickstrom farm; seeded 9/25/02 and harvested 7/09/03.
*Inadequate grain for grain moisture or test weight determination.

Notes: Adequate stands with good top soil moisture but no sub soil moisture. Low levels of RWA. Low levels of stripe rust, leaf rust, Septoria leaf blotch, and root rot. Spring drought reduced yields. Some hail.

Table 12. Winter wheat Uniform Variety Performance Trial at Sheridan Lake in 2003[1].

Variety	Yield
	bu/ac
Alliance	15.2
Halt	15.0
Ok102	14.7
TAM 110	14.6
Avalanche	14.0
Stanton	13.4
Above	13.2
Trego	12.7
Ok101	12.6
2137	12.2
Yumar	11.9
Yuma	11.8
Akron	10.8
Prowers 99	10.2
Cisco	9.1
TAM 111	8.9
G980091-1	8.7
Kalvesta	8.3
Jagalene	7.0
Enhancer	6.8
Venango	5.1
Jagger	5.0
Thunderbolt	4.9
Average	10.7
$LSD_{(0.30)}$	1.8

[1]Trial conducted on the Eugene Splitter farm; seeded 9/17/02 and harvested 7/07/03.
*Insufficient grain available to determine individual plot test weights. Trial average was 57.4 lb/bu.

Notes: Uneven emergence. No subsoil moisture. Large Tordon residual circle in plots. Severe spring drought. Hail and shattering.

Table 13. Winter wheat Uniform Variety Performance Trial at Walsh in 2003[1].

Variety	Yield	Test Weight	Plant Height	Shatter[2]
	bu/ac	lb/bu	in	1-9
Above	25.0	59.9	24	4
Trego	24.9	60.5	23	4
Avalanche	22.9	61.1	24	5
Ankor	22.8	60.2	24	3
Prairie Red	22.6	59.2	23	3
Cisco	22.4	60.4	23	4
TAM 110	21.6	59.5	23	3
Stanton	21.0	60.5	23	5
AP502 CL	20.6	58.6	23	3
Alliance	20.4	58.9	24	5
Akron	19.5	59.3	22	4
Ok102	19.2	60.3	22	4
TAM 111	18.7	60.2	26	5
Halt	17.8	59.1	24	5
Yuma	17.2	59.7	22	5
Ok101	17.1	60.2	23	6
Yumar	16.0	60.5	23	5
Jagalene	15.4	61.0	24	8
Prowers 99	15.2	60.4	26	4
Kalvesta	14.1	59.5	23	5
Enhancer	14.0	59.2	27	4
Lakin	13.2	59.9	23	5
2137	13.1	59.1	23	6
Jagger	12.4	60.0	26	6
G980091-1	10.8	59.4	21	6
Thunderbolt	8.8	61.0	22	8
Venango	6.0	60.2	23	8
Average	17.5	59.9	23	5
$LSD_{(0.30)}$	2.4			

[1]Trial conducted on the Plainsman Research Center; seeded 9/23/02 and harvested 7/01/03.
[2]Rating scale 1-9, with 1 = no shatter and 9 = severely shattered. Average of three replications.

Notes: Excellent moisture at planting, good stands. Brown wheat mites washed off by March 20 rain. Early spring drought stress. RWA found with Prowers 99 and Stanton showing effects as well as Biotype A susceptible varieties. Strong hail June 3. Hail again June 28. Lots of shattering.

Table 14. Protein Content of UVPT Entries at Four Trial Locations for 2003.

	Trial Locations				
Variety	Walsh	Burlington	Julesburg	Akron	Average
Ok102	15.0	17.9	10.5	13.7	14.3
Kalvesta	13.8	19.5	10.6	12.8	14.2
Thunderbolt	14.4	17.8	10.7	13.6	14.1
Cisco	14.6	17.8	11.2	12.6	14.1
Lakin	14.4	16.2	8.5	14.5	13.4
G980091-1	13.4	17.4	9.5	12.8	13.3
Jagger	12.6	17.6	9.5	13.5	13.3
Halt	12.2	17.3	9.2	13.9	13.1
TAM 111	13.0	17.5	9.2	12.4	13.0
Venango	12.9	17.2	10.1	12.0	13.0
Stanton	13.5	17.7	8.6	11.9	12.9
Jagalene	12.2	17.6	9.0	12.7	12.9
Enhancer	13.3	17.4	9.4	11.1	12.8
AP502 CL	12.4	16.6	9.3	12.4	12.7
TAM 110	13.5	16.3	8.2	12.7	12.7
Prairie Red	11.8	16.2	9.6	12.8	12.6
Prowers 99	12.6	16.8	7.9	13.1	12.6
Above	12.0	16.1	9.1	13.3	12.6
Avalanche	12.7	16.3	9.5	11.4	12.5
Akron	11.9	16.2	8.0	13.0	12.3
Trego	11.4	16.8	8.5	12.5	12.3
2137	13.5	16.6	8.4	10.4	12.2
Ankor	10.8	16.4	8.4	13.2	12.2
Yumar	12.7	14.7	8.9	12.4	12.2
Ok101	12.2	15.7	8.1	12.0	12.0
Yuma	11.9	15.2	8.8	11.5	11.9
Alliance	11.0	15.5	7.8	11.8	11.5
Average	12.8	16.8	9.1	12.6	12.8
Minimum	10.8	14.7	7.8	10.4	11.5
Maximum	15.0	19.5	11.2	14.5	14.3

*Protein contents adjusted to 12% moisture basis.

Table 15. Colorado winter wheat Irrigated Variety Performance Trial summary for 2003.

	Location							2003				
	Fort Collins			Ovid		Rocky Ford		Averages				
Variety[1]	Yield	Test Wt	Protein Content[2]	Yield	Test Wt	Yield	Test Wt	Yield	% of Trial Average	Test Wt	Plant Ht	Lodging[3]
	bu/ac	lb/bu	%	bu/ac	lb/bu	bu/ac	lb/bu	bu/ac	%	lb/bu	in	1-9
Jagalene	128.0	60.4	14.2	100.6	57.6	116.8	59.3	115.1	116	59.1	37	4
Prairie Red	124.7	59.1	13.5	81.7	53.2	119.1	58.4	108.5	109	56.9	38	2
Wesley	113.1	57.6	15.3	91.7	58.2	116.6	60.0	107.1	108	58.6	35	1
Yuma	120.2	58.2	13.9	97.5	58.3	103.5	59.4	107.1	108	58.6	38	2
G980091-1	116.8	58.4	14.1	92.4	56.0	106.7	61.6	105.3	106	58.7	35	3
Cisco	119.9	60.6	14.2	88.3	57.9	101.0	58.4	103.1	104	59.0	38	3
Antelope	107.1	58.0	14.6	90.8	56.8	106.5	61.5	101.5	102	58.7	39	4
Ok101	115.2	58.9	13.3	79.8	53.1	107.7	59.4	100.9	101	57.1	39	3
G980122	117.4	58.9	15.6	78.3	54.4	105.6	60.5	100.4	101	57.9	38	2
Dumas	126.4	60.7	12.9	78.5	53.2	96.1	61.3	100.3	101	58.4	37	2
Platte	121.5	61.5	13.8	53.2	47.5	121.8	60.6	98.8	99	56.5	37	2
Kalvesta	116.8	59.3	14.7	74.7	52.9	101.3	60.7	97.6	98	57.6	39	2
2137	121.4	59.1	14.5	76.0	54.3	94.9	60.1	97.4	98	57.8	39	1
Ok102	113.8	58.9	15.1	73.9	54.0	101.0	60.4	96.2	97	57.8	38	1
Ankor	109.0	57.5	13.1	65.5	53.4	108.5	61.1	94.3	95	57.3	40	2
Venango	116.1	59.3	14.3	82.1	58.2	69.9	62.2	89.4	90	59.9	38	2
Arrowsmith	86.4	54.1	15.2	81.9	55.6	98.6	61.5	89.0	89	57.1	43	4
Nuplains	92.7	60.0	14.1	51.6	52.8	98.6	60.8	81.0	81	57.9	37	2
Average	114.8	58.9	14.2	79.9	54.9	104.1	60.4	99.6	100	58.1	38	2
$LSD_{(0.30)}$	7.6			9.4		6.8						

[1]Varieties in table ranked by the average yield over three locations in 2003.
[2]Protein contents adjusted to 12% moisture basis.
[3]Rating scale 1-9, with 1 = no lodging and 9 = completely lodged.

Table 16. Colorado winter wheat 3-Yr and 2-Yr Irrigated Variety Performance Trial summary.

	Averages						
Variety[1]	3-Yr	2-Yr	2003	2002	2001	3-Yr	2-Yr
	----------Yield (bu/ac)----------					---Twt (lb/bu)---	
Wesley	102.8	100.6 (4)	107.1	91.0	108.2	59.8	58.9
Antelope (HWW)	99.7	95.6	101.5	86.9	109.7	60.1	58.8
Yuma	98.9	101.3 (3)	107.1	92.6	92.9	59.4	58.3
Prairie Red	98.5	103.1 (2)	108.5	94.9	87.0	58.5	57.5
2137	88.2	90.4	97.4	79.8	82.9	58.9	58.0
Venango	85.8	83.9	89.4	75.8	90.4	60.8	60.0
Nuplains (HWW)	83.2	84.4	81.0	89.5	80.3	59.7	58.8
Jagalene	---	106.1 (1)	115.1	92.5	---	---	59.4
Platte (HWW)	---	97.6 (5)	98.8	95.8	---	---	58.0
Ok101	---	97.4	100.9	92.2	---	---	57.2
Dumas	---	93.9	100.3	84.3	---	---	59.6
Ankor	---	92.1	94.3	88.8	---	---	56.7

[1]Varieties in table ranked based on 3-Yr average yields.
[1.....5]Variety rank based on 2-Yr average yields.
HWW - Hard white winter wheat variety.

Table 17. Winter wheat Irrigated Variety Performance Trial at Fort Collins in 2003[1].

Variety	Yield	Test Weight	Plant Height	Lodging[2]	Days to Heading[3]
	bu/ac	lb/bu	in	1-9	days
Jagalene	128.0	60.4	35	2	147
Dumas	126.4	60.7	36	1	147
Prairie Red	124.7	59.1	36	1	145
Platte	121.5	61.5	35	1	150
2137	121.4	59.1	40	1	149
Yuma	120.2	58.2	41	2	148
Cisco	119.9	60.6	38	2	147
G980122	117.4	58.9	37	1	149
Kalvesta	116.8	59.3	36	2	147
G980091-1	116.8	58.4	35	2	148
Venango	116.1	59.3	37	1	151
Ok101	115.2	58.9	41	4	146
Ok102	113.8	58.9	39	1	149
Wesley	113.1	57.6	34	1	147
Ankor	109.0	57.5	41	3	150
Antelope	107.1	58.0	39	2	151
Nuplains	92.7	60.0	36	2	151
Arrowsmith	86.4	54.1	41	4	154
Average	114.8	58.9	38	2	149
$LSD_{(0.30)}$	7.6				

[1]Trial conducted at the Agricultural Research, Development and Educational Center; seeded 9/25/02 and harvested 7/17/03.
[2]Rating scale 1-9, with 1 = no lodging and 9 = completely lodged.
[3]Days from January 1.

Notes: Excellent stand establishment, ample spring precipitation with timely irrigation. High temperatures last two weeks of grain fill reduced test weights. Stripe rust, leaf rust, and powdery mildew at relatively low levels. Russian wheat aphid (biotype A) infestation in susceptible varieties. Significant lodging.

Table 18. Winter wheat Irrigated Variety Performance Trial at Ovid in 2003[1].

Variety	Yield	Grain Moisture	Test Weight	Plant Height	Lodging[2]
	bu/ac	%	lb/bu	in	1-9
Jagalene	100.6	10.0	57.6	40	7
Yuma	97.5	9.8	58.3	37	1
G980091-1	92.4	9.5	56.0	33	5
Wesley	91.7	10.4	58.2	36	1
Antelope	90.8	9.8	56.8	40	6
Cisco	88.3	10.1	57.9	38	6
Venango	82.1	9.8	58.2	42	2
Arrowsmith	81.9	10.1	55.6	46	4
Prairie Red	81.7	9.1	53.2	40	3
Ok101	79.8	8.8	53.1	40	2
Dumas	78.5	8.6	53.2	38	3
G980122	78.3	9.2	54.4	39	2
2137	76.0	9.6	54.3	38	2
Kalvesta	74.7	8.6	52.9	42	2
Ok102	73.9	8.6	54.0	42	2
Ankor	65.5	9.2	53.4	40	1
Platte	53.2	8.1	47.5	37	4
Nuplains	51.6	8.6	52.8	38	3
Average	79.9	9.3	54.9	39	3
$LSD_{(0.30)}$	9.4				

[1]Trial conducted on the Jim Carlson farm; seeded 10/05/02 and harvested 7/16/03.
[2]Rating scale 1-9, with 1 = no lodging and 9 = completely lodged.

Notes: Trial seeded late after corn harvest and stands were only 70%-80% of desired million plants per acre. Trial average yield (80 bu/ac) would probably have exceeded 100 bu/ac except for early June serious infestation of stripe rust. Field treated with fungicide but damage was already done on susceptible lines. Well-managed trial.

Table 19. Winter wheat Irrigated Variety Performance Trial at Rocky Ford in 2003[1].

Variety	Yield	Grain Moist.	Test Weight	Plant Height	Lodging[2]
	bu/ac	%	lb/bu	in	1-9
Platte	121.8	10.2	60.6	37	3
Prairie Red	119.1	8.8	58.4	38	2
Jagalene	116.8	9.5	59.3	37	2
Wesley	116.6	10.0	60.0	36	1
Ankor	108.5	10.6	61.1	40	2
Ok101	107.7	9.3	59.4	37	4
G980091-1	106.7	10.4	61.6	36	3
Antelope	106.5	10.5	61.5	38	5
G980122	105.6	10.2	60.5	38	2
Yuma	103.5	9.4	59.4	36	3
Kalvesta	101.3	10.2	60.7	37	3
Cisco	101.0	9.3	58.4	38	2
Ok102	101.0	9.8	60.4	33	1
Nuplains	98.6	10.5	60.8	38	2
Arrowsmith	98.6	11.3	61.5	41	5
Dumas	96.1	10.4	61.3	37	2
2137	94.9	9.9	60.1	38	1
Venango	69.9	11.4	62.2	36	3
Average	104.1	10.1	60.4	37	2
$LSD_{(0.30)}$	6.8				

[1]Trial conducted at the Arkansas Valley Research Center; seeded 9/16/02 and harvested 7/02/03.
[2]Rating scale 1-9, with 1 = no lodging and 9 = completely lodged.

Notes: Plots looked very nice and uniform. No significant disease or insect problems. Significant lodging noted early June. Great trial.

2002/2003 Collaborative On-Farm Tests (COFT)

Jerry Johnson

Introduction

This year, over half (57%) of Colorado's wheat acreage was planted to winter wheat varieties that have been tested in the COFT program which is in its' sixth year of testing. With on-farm testing, wheat producers get to evaluate new varieties on their own farms before seed of the new varieties is available on the market to all farmers. On-farm testing directly involves agents and producers in the variety development process, thereby speeding adoption of superior, new varieties. COFT growers sometimes see some variety characteristic that was not recognized before COFT testing. Agents get experience with new varieties before the varieties are commonly available and share this experience with all their client growers. The whole wheat community benefits from reliable and unbiased COFT results.

Colorado State University Cooperative Extension agents have a large responsibility for the success of this program -recruiting volunteer growers, delivering seed, planning test layout and operations, helping with planting, keeping records, coordinating visits, communicating with growers and campus coordinators, coordination of weighing plot and measuring yields and collecting grain samples for quality analyses. COFT would not be possible without the collaboration of so many dedicated and conscientious wheat producers throughout eastern Colorado. The success of the COFT program in 2003 was also due to the long hours of hard work by our Cooperative Extension agents listed in the table below.

In the fall of 2002, thirty-one eastern Colorado wheat producers planted collaborative on-farm tests (COFT) in Baca, Prowers, Lincoln, Kit Carson, Washington, Phillips, Sedgwick, Logan, Morgan, Adams, Arapahoe, and Weld counties. Working alongside local Extension agents, each producer/collaborator received 100 pounds of seed of each variety and planted the six varieties in side-by-side strips. The objective was to compare performance and adaptability of newly-released

varieties. Comparisons of interest were:

- Compare Russian wheat aphid resistant, **Ankor**, with non-resistant parent, **Akron**.
- Compare high yielding KSU hard white wheat, **Trego**, with CSU sister line selection, **Avalanche**.
- Ascertain relative performance and wide spread adaptability of high yielding *CLEARFIELD** wheat variety, **Above**.
- Ascertain relative performance and wide spread adaptability of high yielding Cargill-Goertzen hard red winter wheat variety, **Enhancer**.

An important additional objective of the 2003 COFT tests is being carried out by Federico Pardina, a CSU graduate student supported by the Colorado Wheat Research Foundation, who is mapping eastern Colorado for COFT wheat variety yield and quality characteristics. Two pound grain samples of each variety were collected at all COFT tests and will be used for mapping Colorado for multiple wheat quality characteristics.

Results

Each test suffered from one or more of the causes for reduced wheat yields in 2003: poor/uneven stand establishment, Russian wheat aphid infestations, fall or spring drought, stripe rust infestation, and hail. Spring drought and hail were the most important factors affecting yields in 2003. Conclusions should not be drawn from a single on- farm test. The 2003 COFT results are divided into three geographic regions- primarily for ease of understanding the results. There were statistically significant differences in yield among varieties in all three regions and in the overall average yields, although the yield differences were not great.

- Ankor, the RWA-resistant derivative from HRW Akron, performed better than Akron in all regions and in the overall yield comparisons.
- Avalanche performed better, by comparison to Trego, in COFT tests than in the small-plot trials. The 2003 results indicate that Avalanche performed as well or better than Trego in southeastern Colorado and along the Front Range while Trego performed better than Avalanche in Northeastern Colorado.
- Above (HRW), the CLEARFIELD* wheat variety, performed well in all the regions and was one of the best overall performers. Above can be planted for yield performance alone but certified seed must be purchased annually and can not be kept for seed in another year.
- Enhancer (HRW), a 1998 release from Cargill-Goertzen, was a top performer in northeastern Colorado and along the Front Range and was one of the top two performing varieties in the overall averages.

Table 20. Eastern Colorado Cooperative Extension Wheat Educators and On-Farm Test Coordinators.

Name	Title	Office Location
Bruce Bosley	Platte River agronomist	Sterling
Tim Macklin	SE Area agronomist	Lamar
Ron Meyer	Golden Plains agronomist	Burlington
Tim Burton	Cheyenne County agent	Cheyenne Wells
Thaddeus Gourd	Adams County agent	Brighton
Jerry Alldredge	Weld County agent	Greeley
Gary Lancaster	Sedgwick County agent	Julesburg
Leonard Pruett	SE Area leader	Lamar
Dwight Rus	Lincoln County agent	Hugo

Table 21. Colorado Collaborative On-Farm Test (COFT) results in 2003.

Test Location	Variety (Yields in bu/ac @ 13% moisture)						
County	Akron	Ankor	Avalanche	Trego	Above	Enhancer	Avg
Adams-K1	17.2	18.2	19.8	19.6	20.2	20.7	19.3
Adams-K2	12.6	11.9	14.9	12.1	14.9	15.2	13.6
Adams-S	52.7	51.6	46.1	47.8	52.0	52.3	50.4
Weld-C	35.2	43.6	33.1	31.7	38.4	35.9	36.3
Weld-W	24.5	30.1	26.3	25.4	27.0	29.9	27.2
Weld-Wh	33.1	34.7	35.0	30.5	34.8	30.1	33.0
Front Range Avg	29.2	31.7	29.2	27.9	31.2	30.7	30.0
* $LSD_{(0.30)}$	b	a	b	b	a	a	
County	Akron	Ankor	Avalanche	Trego	Above	Enhancer	Avg
Kit Carson-D	34.5	37.6	37.0	39.1	39.4	45.8	38.9
Lincoln-H	18.9	20.2	20.5	18.2	14.0	22.4	19.0
Lincoln-M	38.9	38.5	38.4	37.9	42.1	43.4	39.9
Lincoln-O	60.0	62.6	60.8	66.5	59.9	54.1	60.7
Lincoln-S	47.6	48.0	46.4	51.6	53.9	49.3	49.5
Logan-A	44.5	43.7	46.2	48.6	53.9	49.2	47.7
Logan-B	28.6	29.8	29.5	28.3	28.7	29.9	29.1
Logan-G	33.2	34.8	33.9	34.9	36.9	36.4	35.0
Logan-N	59.1	53.7	54.9	58.8	59.4	60.2	57.7
Morgan-M	34.3	37.7	30.6	35.3	35.2	38.0	35.2
Sedgwick-D	60.1	61.0	63.1	59.4	62.5	60.7	61.1
Sedgwick-P	37.7	38.8	38.0	35.5	40.9	40.3	38.5
Washington-W	37.5	46.7	41.8	44.6	35.4	51.3	42.9
Northeast Avg	41.1	42.5	41.6	43.0	43.2	44.7	42.7
$LSD_{(0.30)}$	d	bc	cd	b	b	a	
County	Akron	Ankor	Avalanche	Trego	Above	Enhancer	Avg
Baca-B	40.8	41.7	43.0	42.6	42.1	42.1	42.1
Baca-H1	23.8	28.8	26.3	30.0	30.4	36.9	29.4
Baca-H2	26.3	27.6	26.3	26.7	28.5	29.4	27.5
Baca-L	25.3	27.3	28.3	30.3	31.4	19.2	27.0
Baca-S	17.2	19.8	20.2	14.1	17.5	15.4	17.4
Baca-W1	46.6	44.5	51.0	40.3	43.0	51.1	46.1
Baca-W2	23.9	29.4	31.2	30.1	29.1	27.1	28.5
Cheyenne-S	20.9	20.9	16.3	19.7	17.2	18.0	18.8
Prowers-H1	46.4	44.5	51.3	42.1	37.7	37.8	43.3
Prowers-H2	18.5	17.6	23.1	17.8	28.9	22.1	21.3
Prowers-S	38.0	33.9	36.1	32.8	38.7	27.5	34.5
Southeast Avg	29.8	30.5	32.1	29.7	31.3	29.7	30.5
$LSD_{(0.30)}$	bc	abc	a	c	ab	c	
	Akron	Ankor	Avalanche	Trego	Above	Enhancer	Avg
Overall Average	34.6	36.0	35.7	35.1	36.5	36.4	35.7
$LSD_{(0.30)}$	c	a	ab	bc	a	a	

*Varieties with different letters indicate statistically different mean yields using a Least Significant Difference test with alpha = 0.30.

Decision Tree for Winter Wheat Variety Selection in Colorado

Jerry Johnson and Scott Haley *(2003)*

High Performance Varieties for Dryland Eastern Colorado

*CLEARFIELD**	Hard White Winter	Hard Red Winter	RWA-Resistant
Above •High, stable yielding HRW •*Clearfield** wheat for winter annual grass weed control •2001 CSU release •Can't save seed!	Trego •High, stable yielding •High test weight •Leaf rust resistance •1999 KSU release Avalanche •High yield, test weight •Trego sister selection, slightly earlier and taller •2001 CSU release	Enhancer •High yielding 1998 Cargill-Goertzen release •Good growth/row cover •Stripe rust resistance TAM 111 •High yielding •Agripro wheat variety •Taller semidwarf •Stripe rust resistance •HQ release 2002	Stanton •High yielding HRW •Taller semidwarf •Leaf rust resistance •2000 KSU release Ankor •High yielding HRW •Like Akron, higher yield •Better baking quality •Good growth/row cover •2002 CSU release

High Performance Varieties for Colorado Irrigated Conditions

Platte	Jagalene	Yuma	Wesley
•HWW IP Agripro variety released in 1995 and marketed with ConAgra •High yielding •High quality •High test weight •Very susceptible to stripe rust	•HRW Agripro variety released in 2001 •High yielding •Leaf and stripe rust resistant •High test weight	•HRW CSU variety released in 1991 •Excellent yield record in Colorado •Good straw strength •Stripe rust susceptible •Short coleoptile	•HRW Nebraska variety released in 1998 •Excellent yield record in Colorado •Good straw strength •Good stripe rust resistance •High quality

(HQ) high end-use (milling and baking) quality.

(HWW) Hard White Winter wheat variety.

(HRW) Hard Red Winter wheat variety.

(CL) herbicide-tolerant CLEARFIELD* wheat variety.

(RWA-R) resistant to Russian wheat aphid (biotype A).

(**IP)** a variety that is identity-preserved, produced on contract, and eligible for bonus payment based on contract criteria.

The best combination of winter wheat varieties in Colorado depends upon variable production conditions. Production risks may be reduced by planting two or more varieties. The decision tree is based on variety performance, quality assessments, and agronomic observations in CSU variety trials and collaborative on-farm tests over a period of two or more years.

CONTRIBUTING WHEAT ARTICLES

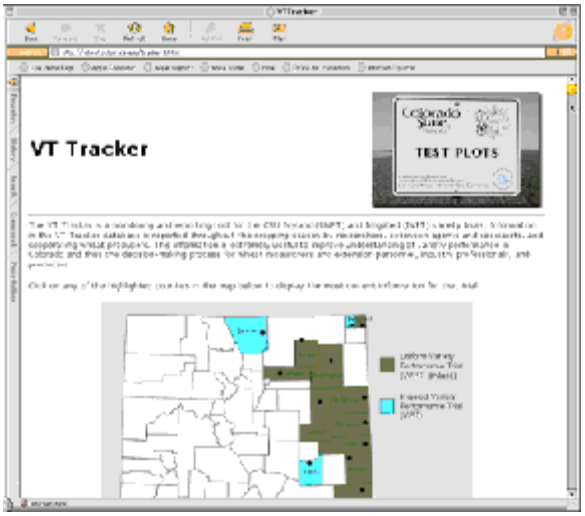
VT and COFT Tracker Database

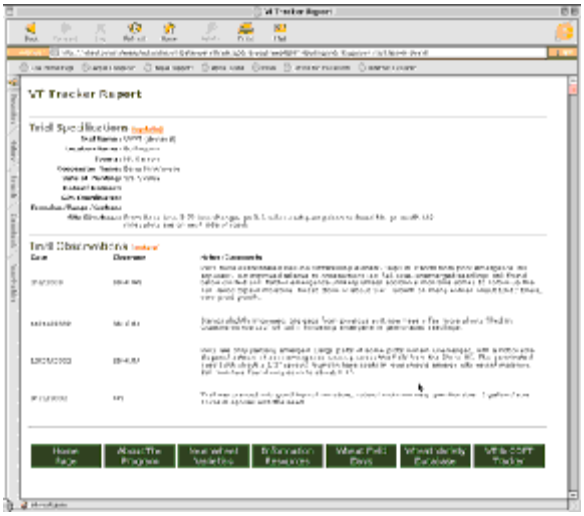
Scott Haley and Jerry Johnson

Colorado State University personnel conduct dryland and irrigated wheat variety trials at multiple locations throughout Colorado every year. The Collaborative On-Farm Testing (COFT) system has been used since the release of 'Halt' (in 1994) to test a few varieties in side-by-side strips in many farmer fields throughout eastern Colorado. These trials provide reliable and unbiased information to wheat producers to make winter wheat variety selection decisions. Data from these trials are published in the popular press, extension publications, DTN, and on the Internet.

We have recently developed a "tracking system" to monitor information on both the Variety Trials and COFT. Individual trial data and observations can be entered on the web by CSU personnel, extension agents, or producers. Anyone with access to the web can monitor the evolution of wheat trials. This tracking system organizes and stores data and observations made by different observers and make them available to the entire Colorado wheat community. At harvest, yields can be interpreted with respect to the environmental conditions experienced at any given location. This tracking system is unique to Colorado and still in an experimental phase. We are continually looking for suggestions on how to improve the system to make it more useful.

The VT and COFT Tracker databases may be found from the CSU Wheat Breeding Program home page (http://wheat.colostate.edu) or directly at http://wheat.colostate.edu/tracker.html.





- For the VT Tracker, counties with dryland or irrigated trials are color coded (*above left*).
- For the COFT Tracker, individual locations within each color-coded county are selected with a simple pull-down menu system.
- Selection of a trial location within either database produces a report (*above right*) for that particular location.
- The top part of the tracker report displays information on the location of the trial, date of planting, and GPS coordinates.
- The bottom part of the report displays a list of trial observations entered for that site.
- For security reasons, users interested in entering or updating information in either database are required to obtain a password (by emailing scott.haley@colostate.edu).

Stripe Rust (Yellow Rust) of Winter Wheat & Barley

Howard F. Schwartz & Joseph P. Hill with Scott Fichtner, Tamla Blunt, and Vidal Velasco

Stripe rust is caused by the fungus *Puccinia striiformis* whose urediniospores are disseminated by wind, and although sensitive to UV radiation, they may travel more than 1000 miles and remain viable. The pathogen and disease may affect wheat and human health. In 2000, incidence of stripe rust was the most widespread in the United States in recorded history. In addition to the known races (strains) in the U.S., 21 new races were identified in 2000, some of which had virulences previously unknown in the United States. The major weapon in combating this disease is the deployment of wheat varieties with genetic resistance to varied races of the fungus.

The pathogen may over-winter (mostly in southern Plains locations) in recently planted wheat, volunteer wheat, and non-cereal grasses. Depending on daily temperatures, fungal growth starts between May 1 and June 1 and disease development is favored by more than 30 rainy days, and total rainfall in excess of 12 inches during a growing season.

Serious outbreaks of this pathogen and disease have occurred in isolated areas of small grain production in Colorado since 2000. Apparently, the fungal spores have been blown into Colorado by spring winds from earlier-maturing small grain production areas including Mexico, Texas, Oklahoma and Kansas. The severity of the outbreaks is dependent upon the susceptibility of varieties and environmental conditions; in Colorado, the disease is favored by cool, moist periods in spring.

If your Total Score was over 10 then you have a high risk; 5 – 9 then you have a moderate risk and less than 5 you have a low risk. If the variety is susceptible and the total score was 10 or higher, consider treatment of the flag leaf (prior to the beginning of flowering) with a labeled fungicide such as Mancozeb (Dithane, 26 day preharvest interval), propiconazole (Stratego, 35 day phi), pyraclostrobin (Headline, 14 day phi) or azoxystrobin (Quadris, 45 day phi) at first signs of rust in the field or nearby region.

Resistant Varieties

Varieties adapted for dryland or irrigated production in Colorado vary in their reaction to prevalent races of stripe rust. Based on current races, the varieties may be grouped as follows:

Resistant: Antelope, Enhancer, Jagger, Jagalene, NuFrontier, NuHorizon, NuHills, Wesley, TAM 111

Moderately-resistant to moderately-susceptible: Alliance, Dumas, Millennium, Stanton, Yumar/Yuma

Susceptible to very susceptible: Above, Akron/Ankor, AP401 CL, AP502 CL, Avalanche, Halt, Lakin, Niobrara, Nuplains, Platte, Prairie Red/TAM 107, Thunderbolt, Trego

June, 2003 Wheat Survey

CSU pathologists surveyed several hundred wheat fields in 2003 and found stripe rust and leaf rust throughout the state. Dr. Ned Tisserat, has been hired to fill Bill Brown's position effective August of 2004. He will be primarily focused on turfgrass research and extension, but will coordinate the plant diagnostic lab, the pest survey, and IPM activities statewide.

STRIPE RUST - Fungicide Decision Strategy

Rainfall (Fall/Winter) - Above normal = 2 Normal = 1 Below normal = 0 Score _____
Rainfall (Spring/Summer) - Above normal = 2 Normal = 1 Below normal = 0 Score _____
Production system - Irrigated = 2 Dryland = 0 Score _____
Rotation from wheat – Less than 3 years - Yes = 2 No = 0 Score _____
Varietal resistance to known races – Susceptible = 4 Unknown = 2 resistant = 0 Score _____
Initial rust infestation – Prior to Stage 9 pre-boot = 4 Stage 10.5 flowering = 2 Score _____
Total Score _____

Managing the New Russian Wheat Aphid Biotype

Frank Peairs, Scott Haley, and Jerry Johnson

Background

Wheat varieties resistant to Russian wheat aphid have been available in Colorado for about 10 years, starting with Halt. Since then, resistant versions of several popular Colorado wheats have been released, including Ankor (Akron), Prairie Red (TAM 107), Prowers 99 (Lamar) and Yumar (Yuma). The resistance in all of these varieties is conferred by the gene Dn4. The sixth resistant variety, Stanton, is a wheat variety from Kansas with a different source of resistance. Together, Russian wheat aphid resistant varieties accounted for approximately 25% of Colorado's wheat acres in the 2002 and 2003 crop years, with higher percentages in counties with more consistent infestations.

In the spring of 2003 we received a number of reports of unusual Russian wheat aphid damage in resistant varieties. We were soon able to confirm that this damage was caused by a new Russian wheat aphid biotype that is unaffected by the sources of resistance currently in use. We use the term "Biotype A" to refer to the original aphid for which the resistant varieties were developed and "Biotype B" to refer the new aphid population that is able to overcome the resistance in available resistant varieties.

Biotype B has been collected from the Texas panhandle, southeast and east central Colorado, western Kansas, and western Nebraska. The distribution of Biotype A has not changed. Mixed infestations of Biotypes A and B have been observed, even within a single rolled leaf.

Developing New Resistant Varieties

A common question is how soon will varieties resistant to both Biotype A and Biotype B be available? This depends on where we find new sources of resistance. If resistance is found in advanced breeding material with good quality and agronomic traits, then the development period would be relatively short. However, if resistance is found in an unadapted, undesirable wheat, as was the case with Dn4, then the development period will be substantially longer, perhaps as long as 10 years. Effective resistance to the new biotype has been identified in a few breeding lines from CSU and the USDA-ARS in Stillwater, OK. Agronomic and quality evaluation of these materials is underway.

We also have begun to screen for new sources of resistance. Most of the sources known to be resistant to Biotype A have proven to be susceptible to Biotype B. The exception is Dn7, which confers high resistance to both biotypes, but was transferred to wheat from rye and is generally associated with poor baking quality. In addition, we have evaluated more than 700 Biotype A resistant lines and have identified several promising new sources. We also have started to screen an additional 12,000 lines from the National Small Grains Collection, which should be completed in the fall of 2005. Lines resistant to Biotype B will be rescreened with Biotype A to identify lines resistant to both biotypes for use in variety development.

Management of Biotype B

The resistant varieties mentioned above are still the most economical and effective management option for Biotype A. However, currently available resistance is not effective against Biotype B, so it must be managed with the methods developed before resistant varieties were available. These include biological control, cultural controls, and judicious insecticide treatments based on appropriate scouting and economic threshold information.

Biological controls consist of (1) native natural enemies, such as lady beetles, lacewings, and spiders, which feed on a variety of insects including aphids; (2) exotic natural enemies collected from the Russian wheat aphid's native range and imported specifically for its control; and (3) commercially available natural enemies, which can be purchased and released in large numbers to control Russian wheat aphid. Each of these approaches may provide some control benefit in certain situations, but overall, biological control has not been sufficiently effective against Russian wheat aphid.

Cultural controls are changes in crop production practices that result in a crop environment that is less favorable for the pest or more favorable for natural enemies. Several cultural controls are known to provide some control benefit for Russian

wheat aphid. Delayed planting of winter wheat and early planting of spring grains can help reduce initial aphid infestations. Crop diversification by producing winter wheat in rotation with summer crops is thought to enhance biological control activity, as well as providing a number of other economic and pest management benefits. Finally, any practice that results in a healthier and more vigorous crop should help minimize Russian wheat aphid problems, which often are worse in stressed portions of the field.

The important considerations in chemical control of Russian wheat aphid are what product to use and when to use it. We have tested a number of insecticide treatments since Russian wheat aphid first appeared in Colorado. It is convenient to compare treatments based on their consistency in achieving very good control (better than 90% control at three weeks after treatment). These results, summarized in Table 1, indicate that one pint of Lorsban 4E has been our most consistent treatment. Other available treatments, which we have not tested as extensively, include Cruiser and Gaucho seed treatments, Di-Syston and Furadan soil treatments, and Mustang Max foliar treatment.

The presence of other pests may have a bearing on the most appropriate treatment choice. For example, if cutworms are present in addition to Russian wheat aphid, a pyrethroid insecticide such as Mustang Max or Warrior would be a better choice than Lorsban 4E. The pyrethroids are highly effective against cutworms and moderately effective against Russian wheat aphid, while Lorsban is highly effective against the aphid but not effective against cutworms at the label rate.

See Table 2 for simple treatment guidelines for deciding whether a Russian wheat aphid treatment should be made. If one tiller shows damage, then the plant should be considered damaged. Aphids can be very difficult to find during cold weather, so base treatment decisions on damage alone under such conditions.

Table 1. Control of Russian wheat aphid with hand-applied insecticides in winter wheat,1986-2003[1].

PRODUCT	LB (AI)/ACRE	TESTS WITH > 90% CONTROL	TOTAL TESTS	% TESTS
LORSBAN 4E	0.50	23	39	59
DI-SYSTON 8E	0.75	16	41	39
LORSBAN 4E	0.25	7	21	33
DIMETHOATE 4E	0.375	7	33	21
DI-SYSTON 8E	0.50	2	10	20
PENNCAP M	0.75	3	19	17
WARRIOR 1E	0.03	2	12	17

[1]Includes data from several states.

Table 2. Treatment guidelines for Russian wheat aphid by crop stage.

Crop Stage	Level at which aphids should be treated[1]
FALL	
Any growth stage	10 – 20% damaged plants
SPRING	
Regrowth to early boot	5 – 10% damaged and infested tillers
Early boot to flowering	10 – 20% damaged and infested tillers
After flowering	More than 20% damaged and infested tillers

[1]Based on a 100 plant or tiller sample.

An alternative threshold for the period from spring regrowth to heading, which takes into consideration control costs and expected crop value, is as follows:

$$\% \text{ Infested Tillers} = \frac{\text{Control Costs (\$/acre)} \times 200}{\text{Expected yield (bu/acre)} \times \text{Expected price (\$/bu)}}$$

For example, the % infested tillers above which treatment should be considered for $15 control costs, 34 bu/acre expected yield and $3.50 would be calculated as follows:

$$25\% \text{ Infested Tillers} = \frac{\$15.00 \times 200}{34 \times \$3.50}$$

Increases in crop value or reduced control costs result in less infestation required to justify treatment, while the reverse is true for decreased crop value or increased control costs. For example, if the price of wheat were lower it would take more aphid damage to justify an insecticide expenditure.

$$32\% \text{ Infested Tillers} = \frac{\$15.00 \times 200}{34 \times \$2.75}$$

If the percentage of infested tillers calculated in this manner is less than the percentage of infestation observed in a 100-tiller sample from the field being evaluated, then a treatment should be considered. After heading, use a factor of 500 rather than 200 in the numerator.

Further Information

The ***High Plains Integrated Pest Management Guide for Colorado, western Nebraska, Wyoming, and Montana*** provides on-line management information for Russian wheat aphid and the other pests and diseases of small grains, as well as most other crops grown in the region. http://www.highplainsipm.org/

The Colorado State University fact sheet ***Aphids in Small Grains*** summarizes management information for Russian wheat aphid as well as other aphids that attack wheat and similar crops in Colorado.
http://www.ext.colostate.edu/pubs/insect/05568.pdf

Areawide Pest Management for Wheat: Management of Greenbug and Russian Wheat Aphid is a cooperative project between USDA-ARS and several states, including Colorado. This project is designed to improve the management of these key wheat pests through diversified cropping, resistant varieties, remote sensing, and other pest management tools. New pest management information is being developed through economic surveys, field research, and grower focus groups. Colorado research sites are located at Walsh, Lamar, and Briggsdale.
http://www.pswcrl.ars.usda.gov/AWPM2/index.htm

Weed Control For Colorado Farmers and Wheat Producers

Phil Westra

Unique Characteristics of Jointed Goatgrass. Jointed goatgrass is an invasive weed that was brought to America in wheat seed in the early 1900's. It spread rapidly from its introduction on the east coast and by 1917 was reported in the Pacific Northwest. Jointed goatgrass now infests over 5 million acres of wheat. A jointed goatgrass seed head is called a spike. Each spike consists of 10 – 15 spikelets which break apart at maturity and often fall to the soil prior to wheat harvest. Jointed goatgrass seed can remain dormant up to 5 years. The cylinder which surrounds the seed can act like a sponge, soaking up water in a rainstorm and providing enough moisture for jointed goatgrass to establish on the soil surface without being buried in the soil. In the seedling stage, fine hairs along the leaf margin distinguish jointed goatgrass from winter wheat. Many growers have resorted to diversified crop rotations utilizing spring crops such as corn, millet, sunflower, and sorghum to disrupt the life cycle of jointed goatgrass. Jointed goatgrass is almost always a problem in a wheat-fallow system. An excellent review of the biology and ecology of jointed goatgrass can be found at www.jointedgoatgrass.org/Acrobat%20Files/Ecology.pdf.

A research project at CSU is evaluating the viability of seed from jointed goatgrass X winter wheat hybrid plants. In 2002 and 2003, a total of 6,700 hybrid spikelets have produced 41 plants, is a viability rate of less than 1% (0.61%). Since 1994,

CSU and wheat growers from Colorado have been actively involved in a National Jointed Goatgrass Research and Education initiative. This competitive research program has funded a sustained scientific effort in 12 western states on this unique weed. A wealth of information from nearly 10 years of coordinated research on this unique weed can be found at http://www.jointedgoatgrass.org. Darrell Hanavan, executive director of the Colorado Wheat Administrative Committee is chairperson of this national research program.

Feral Rye is a weedy escape of rye that was grown during the Dust Bowl days. When feral rye seed shatters in the summer, usually prior to wheat harvest, more than 90% of the seed will germinate if moisture is present. However, approximately 1% of feral rye seeds are highly dormant and shriveled. These highly dormant seeds will not germinate even if conditions are favorable and remain in the soil for as long as 5 years. Feral rye normally grows from 6" to 1' taller than wheat and is visually the most noticeable of our winter annual grasses. At any given weed density, feral rye causes more wheat yield reduction than the other winter annual grasses.

Downy Brome and Cheatgrass are the most common grass weeds of wheat in Colorado. Maverick herbicide from Monsanto will control these weeds in conventional wheat. Olympus is another herbicide under development by Bayer for control of these weeds in conventional wheat.

Herbicide Resistance

Herbicide Resistant Weeds occur when weeds are no longer controlled by an herbicide that is usually used to control them. The weed that has developed the most resistance problems in Colorado is kochia with populations that are resistant or tolerant to triazine, sulfonylurea, 2,4-D, and dicamba herbicides. Researchers at the ARS and CSU are developing simple-to-use field kits to help growers test suspected herbicide resistant weed populations to ALS inhibitors, photosynthesis inhibitors, and glyphosate.

Drs. **Philip Westra**, **Scott Nissen**, **Sandra McDonald**, **George Beck**, and **Cynthia Brown** are weed scientists located at the CSU campus in Ft. Collins in the BSPM department; **Alan Helm** is a weed science area extension agent located at Holyoke, CO. Dr. **Laura Quackenbush** is at the CO Dept. of Agriculture in Denver. Dr. **Dale Shaner** is a weed scientist with the ARS Water Management Unit in Ft. Collins; Dr. **Dana Blumenthal** is a weed scientist with the ARS Rangeland Unit in Ft. Collins; Dr. **Brien Henry** is a weed scientist located at the ARS Central Great Plains station in Akron, CO.

What is Required for Organic Wheat Production?

Matt Pollart

Some Colorado wheat growers have been successfully producing and marketing their crop to the certified organic grain market. Although demand for organic commodities can vary greatly from year to year, it is a viable option for some operations. Any farm that wants to sell agricultural products as organically produced must adhere to the standards set forth by the USDA in the National Organic Program (NOP). These standards require that the grower operate under an organic system plan approved by the certifying agency. There are many certifying agencies accredited by the USDA, including the Colorado Department of Agriculture.

The National Organic Standards address the methods, practices, and substances used in producing and handling crop, livestock, and processed agricultural products. The crop production standards say that in order to be considered for certification, land must have no prohibited substances applied to it for at least three years before the harvest of an organic crop. Synthetic fertilizers and pesticides are generally prohibited. Genetically modified material, ionizing radiation, and sewage sludge are also prohibited. Soil fertility and crop nutrients will be managed through tillage, cultivation practices, crop rotations, and cover crops, supplemented with animal and crop waste materials and a limited list of synthetic materials. Growers must plant organic seed if it is available. Crop pests, weeds, and diseases will be controlled primarily through management practices including physical, mechanical, and biological controls.

When these practices are not sufficient, a biological, botanical, or a synthetic substance approved on the National List may be used.

For additional information on the National Organic Program and to see the standards visit http://www.ams.usda.gov/nop. For more information on the Colorado Organic Act and the certification process visit http://www.ag.state.co.us/DPI/Organic/organic.html or contact the Colorado Department of Agriculture at (303) 239- 4150.

Making Better Marketing Decisions in 2004

Darrell Hanavan

China will be the wild card in the 2004-05 marketing year, with the world wheat stocks-to-use ratio projected at its lowest level since the 1972-73 marketing year. China has drawn down its huge stocks of wheat and is potentially facing its smallest crop since 1983, which would result in the need to import large quantities of wheat. However, the U.S. wheat stocks-to-use ratio is projected to rise from 22.5 percent to 24.5 percent (but still below the 10-year average of 28.6%), due primarily to lower exports.

Projected planting of all U.S. wheat for harvest in 2004 is expected to be down approximately 2 percent, but down 8 percent from the 10-year average and the fourth lowest planted acreage since 1973. Wheat prices received by producers are projected to average $3.35 per bushel, unchanged from the 2003-04 marketing year. However, the actual acres harvested and yield will be the keys to the price of wheat in the 2004-05 marketing year, and could be favorably influenced by world wheat production (especially in China).

Understanding historical market trends can help Colorado wheat producers make better marketing decisions. Only 31 percent of the state's winter wheat production is marketed during the months of December to February when the highest price is typically received for the lowest carrying cost (storage plus interest). Forty-seven percent (47%) of Colorado's wheat production is sold prior to December when market prices have been the lowest. On average, there has been a 56-cent price advantage by selling after November instead of July. The estimated monthly carrying cost for storage and interest is five to six cents per bushel. Producers who are unable to take advantage of this historic rise in prices after November might consider options or futures contracts to manage financial risk.

Current wheat market fundamentals suggest that prices may increase by more than the 10-year average of 57 cents per bushel after November in the 2004-05 marketing year. The price of wheat during the 2003-04 marketing year was lower than it should have been based upon strong fundamentals of tight stocks-to-use ratios in the U.S. and world. Colorado wheat producers should strongly consider long-term price trends when making decisions to sell wheat early in the market season as they may miss out on upward price movement that historically occurs after November.

Irrigated Winter Wheat - The Platte Value Program

Rollin Sears and Rob Bruns

AgriPro's "Platte" variety is exclusively licensed to the Grain Processing Group of ConAgra Food Ingredients Company, and ConAgra contracts directly with High Plains producers to produce Platte and deliver it to assigned local country elevators or the ConAgra flour mill. This identity-preserved (IP) program, entering its eighth year in Colorado, links seed suppliers, producers, country elevators, a processor and bakers together to add value to each other's businesses. The producer benefit is based upon a grain pricing schedule, available at planting time and backed by a ConAgra Foods contract, that offers a basic premium over local hard red wheat markets, plus protein premiums which are commonly attainable under proper management. Producers know their premium potential prior to planting the wheat, and they also understands the crop's overall return potential if targets are achieved.

The Platte Value Program process starts when producers sign up with a local AgriPro Seed Associate to buy certified Platte seed in the fall. Producers agree to deliver all their Platte production

the following year to specified local delivery points spread out across NE Colorado and SW Nebraska. ConAgra markets the flour milled from Platte to a variety of customers to whom Platte delivers increased value over flour milled from "commodity" wheats such as Hard Red Winter or Hard Red Spring.

Platte has been a consistent top performer under irrigated trials and has an excellent test weight pattern. Platte's parentage includes Abilene and an experimental white wheat from Spain. It has shown the following characteristics in past years:

Height	- short semidwarf
Stem & leaf rust	- good
Straw strength	- excellent
Wheat Streak Virus	- above average
Test Weight	- excellent
Stripe rust	- susceptible
Protein potential	- excellent
Mildew	- susceptible
Maturity	- medium
RWA	- susceptible
Winter hardiness	- similar to Akron
Shatter	- average

In 2001 and 2003 stripe rust reduced yields of all susceptible varieties, including Platte. Because of this and powdery mildew, AgriPro is recommending a standard fungicide application on all high yield potential irrigated wheat and scouted high yield dryland acres. Participation in the Platte Value Program also allows a producer to be eligible to participate in the USDA's White Wheat Incentive Program, the details of which are available at local FSA offices. If you're interested in more information about participating in the Platte Value Program, contact Pete Anthan with ConAgra's Grain Processing Group at 303-289-6141, or Chuck Johnson, AgriPro Wheat at 785-667-2335, or any of the following AgriPro Associates that are growing the certified seed:

Andrew Bros	Yuma	970-848-0709
Perry Bros	Otis	970-246-3401
Kenny Pottorf Seed	Stratton	719-348-5213
Kneivel Seed	Wiggins	970-483-6166
Terry Ring Seed	Crook	970-253-5009
Dave Wagers Seed	Woodrow	970-842-2022
Dry Creek Seed	Genoa	719-763-2367
Tom Luhrs	Enders	308-882-5917
Prairie Farms	Albin	307-246-3458
Mattson Seed Farms	Pine Bluffs	307-245-3336

WESTERN WINTER WHEAT VARIETY PERFORMANCE TRIALS

Table 1. Description of winter wheat varieties in western trials.

Variety Name	Class	Origin
Above	Hard Red	Colorado/Texas
Ankor	Hard Red	Colorado
Avalanche	Hard White	Colorado
CO970547	Hard Red	Colorado
CO970547-2	Hard Red	Colorado
CO970547-7	Hard Red	Colorado
CO980376	Hard Red	Colorado
CO980607	Hard Red	Colorado
CO980630	Hard Red	Colorado
CO99177	Hard Red	Colorado
CO99141	Hard Red	Colorado
CO99314	Hard Red	Colorado
CO99W183	Hard White	Colorado
CO99W188	Hard White	Colorado
CO99W192	Hard White	Colorado
CO99W254	Hard White	Colorado
CO99W277	Hard White	Colorado
CO99W329	Hard White	Colorado
Deloris	Hard Red	Utah
Fairview	Hard Red	Colorado/Idaho
Gary	Hard White	Idaho
Golden Spike	Hard White	Utah
Hayden	Hard Red	Colorado/Idaho
ID 571	Hard Red	Idaho
Jeff	Hard Red	Idaho
Lakin	Hard White	Kansas
Manning	Hard Red	Utah
Moreland	Hard Red	Idaho

Winter Wheat Variety Performance Test at Hayden, Colorado 2003

Calvin Pearson, Scott Haley, Jerry Johnson, and Cynthia Johnson

Summary

Each year small grain variety performance tests are conducted in the Hayden, Colorado area to identify varieties that are adapted for commercial production in northwest Colorado. The 2003 growing season was very dry and yields in the trials were low. The 2003 results provide information about the performance of wheat varieties under severe stress conditions. Grain yield in the winter wheat variety performance test averaged 38.7 bu/ac. The highest yielding entry in the winter wheat test was CO980630 at 48.0 bu/ac with six entries outyielding other varieties.

Introduction

Growers in northwest Colorado are limited to only a few crops to grow because of constraints created by dryland production conditions, a short growing season, limited precipitation, and isolation to markets for their crops. The principal cash crop grown in northwest Colorado is wheat. Alternative crops are of interest to growers in northwest Colorado. Alternative small grains, such as malting barley, triticale, and specialty wheats (i.e., hard white wheats) are of interest to growers because these crops are often sold into specialty markets which demand a premium selling price. New crop production inputs and practices are also of interest to growers in northwest Colorado if these inputs and practices are determined to be profitable and environmentally sound. Growers in this region of Colorado are supportive of agronomic research that provides them with science-based information. They can use this information to assist them in making crop production decisions.

Results and Discussion

The summer of 2003 in the Craig/Hayden area was hotter than in many other years. The average maximum temperature in July 2003 was 91.4E F (Fig. 1). Precipitation during the 2003 growing season for the months of January through October totaled 14.76 inches with April receiving the most precipitation at 3.85 inches and July receiving the least amount of precipitation at only 0.18 inches (Fig. 2). Precipitation in the Craig/Hayden area varies considerably from month to month and year to year and is the most limiting factor for small grain production. The monthly precipitation in 2003 depicts the variability that often occurs in the area (Fig. 2). Variability in precipitation can occur both temporally and spatially, thus, the amount of precipitation received on a particular farm can vary considerably from the amounts recorded at a weather station.

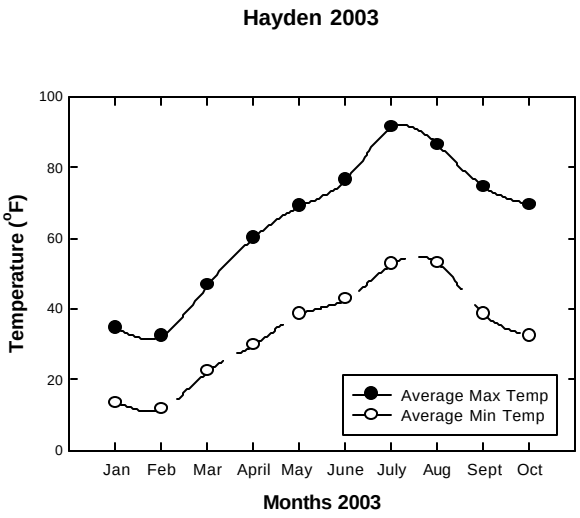


Fig. 1. Average maximum monthly and average minimum monthly temperatures for January through October 2003 at Hayden, Colorado.

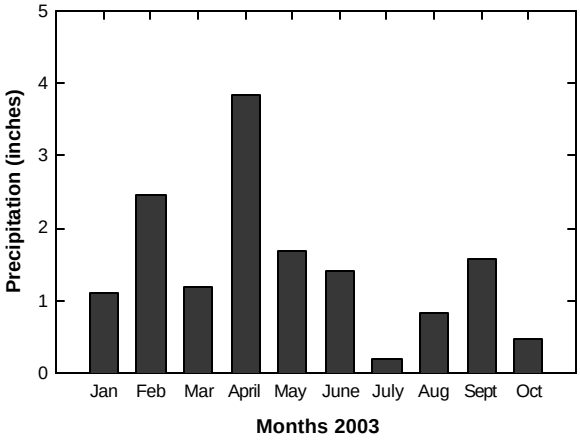


Fig. 2. Monthly precipitation for January through October 2003 at Hayden, Colorado.

Winter Wheat Variety Performance Test

Grain moisture in the winter wheat variety performance test at Hayden averaged 9.8% (Table 2). Grain moisture content ranged from a high of 10.5% for Gary to a low of 9.3% for CO99141. Grain yields of the winter wheat varieties averaged 38.7 bu/ac. Grain yields ranged from a high of 48.0 bu/ac for CO980630 to a low of 31.2 bu/ac for CO970547-2. Six varieties outyielded other entries. Test weights averaged 60.2 lbs/bu. Test weights ranged from a high of 61.1 lbs/bu for Hayden and Lakin to a low of 58.0 lbs/bu for Moreland. Planted height averaged 25.0 inches. Plant height ranged from a high of 30.9 inches for Hayden to a low of 21.5 inches for CO99W329. There was no lodging in the winter wheat variety performance test in 2003. Protein concentration averaged 12.5%. Protein concentration ranged from a high of 14.3% for CO970547-7 and CO99314 to a low of 11.3% for Deloris, Moreland, and ID 571.

Harvesting winter wheat plots at Hayden, Colorado on 13 Aug. 2003.

Table 2. Winter wheat variety performance trial at Hayden[1] in 2003.

Variety	Yield	Grain Moist.	Test Weight	Plant Height	Protein
	bu/ac	%	lb/bu	in	%
CO980630	48.0	10.0	60.8	24.9	11.5
Above	44.5	9.5	60.3	24.7	12.2
Golden Spike	44.2	10.0	59.5	28.1	11.4
CO99W183	43.2	9.6	59.4	24.5	11.7
Deloris	43.1	9.5	60.1	29.0	11.3
CO99177	42.8	9.5	59.9	25.4	13.1
CO980607	42.0	10.1	60.9	23.3	11.9
Lakin	40.6	10.4	61.1	23.8	12.9
Ankor	39.8	9.7	60.7	24.9	11.8
CO99W192	39.7	9.5	59.0	24.5	12.3
CO99314	39.3	9.8	60.0	23.5	14.3
CO99141	38.6	9.3	60.6	24.2	13.9
Moreland	38.6	9.9	58.0	23.3	11.3
Gary	37.9	10.5	59.7	27.1	10.7
CO99W277	37.6	10.0	60.4	25.8	13.1
Fairview	37.6	9.6	60.1	28.4	12.3
CO980376	37.5	9.7	60.9	24.3	12.2
ID571	36.4	9.9	60.0	25.3	11.3
CO99W188	36.4	9.4	60.2	22.8	12.6
CO970547	36.1	9.7	61.0	24.5	13.0
Avalanche	35.6	9.8	61.0	25.3	12.9
CO970547-7	35.5	9.9	60.0	24.4	14.3
CO99W254	35.0	9.5	61.0	22.7	13.2
CO99W329	33.2	10.0	60.9	21.5	12.2
Hayden	31.3	9.5	61.1	30.9	13.3
CO970547-2	31.2	10.2	59.4	23.8	13.8
Average	38.7	9.8	60.2	25.0	12.5
$LSD_{(0.05)}$	5.9	0.3	0.9	1.5	

[1]Trial conducted on the Mike and Dutch Williams farm, seeded 9/25/02 and harvested 8/13/03.

Site Information:

The experiment design was a randomized complete block with four replications. Plot size was 4-ft. wide by 40-ft. long with six seed rows per plot. The seeding rate was 56 lb/ac. Herbicide (2,4-D at 8 oz/acre) was applied aerially on 26 May 2003. No insecticides or fertilizers were applied.

Winter Wheat Variety Performance Test at Yellow Jacket, Colorado 2003

Mark Stack

Table 3. Dryland winter wheat performance trial at Yellow Jacket[1] in 2003.

Variety	Yield[2]	Test Weight	Plant Height	Heading Date[3]	Grain Protein
	bu/ac	lb/bu	in	date	%
CO970547	33.4	52.7	27	5/29	16.7
CO99177	32.7	52.5	25	5/29	15.3
Lakin	32.5	53.5	25	6/1	17.4
Avalanche	32.2	54.7	26	6/1	15.9
CO99W183	31.9	52.4	25	5/29	16.6
CO99W188	31.9	53.1	24	6/2	16.7
Fairview	31.2	52.3	26	6/4	16.6
CO99314	31.1	53.1	24	5/29	17.9
Above	30.8	51.6	24	5/29	18.7
CO99W277	29.9	53.5	25	6/2	16.6
CO970547-7	29.8	51.8	26	6/1	15.5
CO980607	29.7	52.8	22	6/2	15.8
CO980630	29.6	53.7	24	6/3	17.7
CO99141	29.2	54.9	25	5/29	16.0
CO99W192	29.2	53.5	24	6/2	16.4
Ankor	28.9	51.7	23	6/2	17.2
Deloris	28.6	53.9	28	6/6	15.8
CO970547-2	28.5	52.8	25	6/2	16.4
CO99W254	28.4	54.9	23	5/29	17.1
Golden Spike	28.3	52.3	26	6/6	16.5
Manning	28.2	53.1	25	6/4	16.4
Gary	28.0	53.5	26	6/7	17.3
CO99W329	27.7	52.5	25	5/29	17.6
ID 571	27.6	55.4	26	6/4	16.5
CO980376	26.2	52.6	26	6/2	18.1
Moreland	24.5	50.1	22	6/4	17.0
Jeff	24.5	55.5	29	6/6	17.5
Hayden	23.7	55.2	29	6/7	16.8
Average	29.2	53.2	25	6/1	16.8
$LSD_{(0.05)}$	3.5				

[1]Trial conducted at the Southwestern Colorado Research Center; seeded 9/27/02 and harvested 8/4/03.

[2]Yields not adjusted for grain moisture content.

[3]Date 50% of plants headed.

Site Information:

Soil type: Wetherill silty clay loam

Previous crop: Fallow

Seeding rate: 50 lb/ac; 12-in. row spacing

Fertilizer: 50 lb N/ac broadcast preplant

Insecticide: Mustang 1.5 EC 3.5 oz/ac aerial applied 3/23/03

Precipitation: October 2002 thru June 2003: 8.8 inches (11.1 inches long-term average)

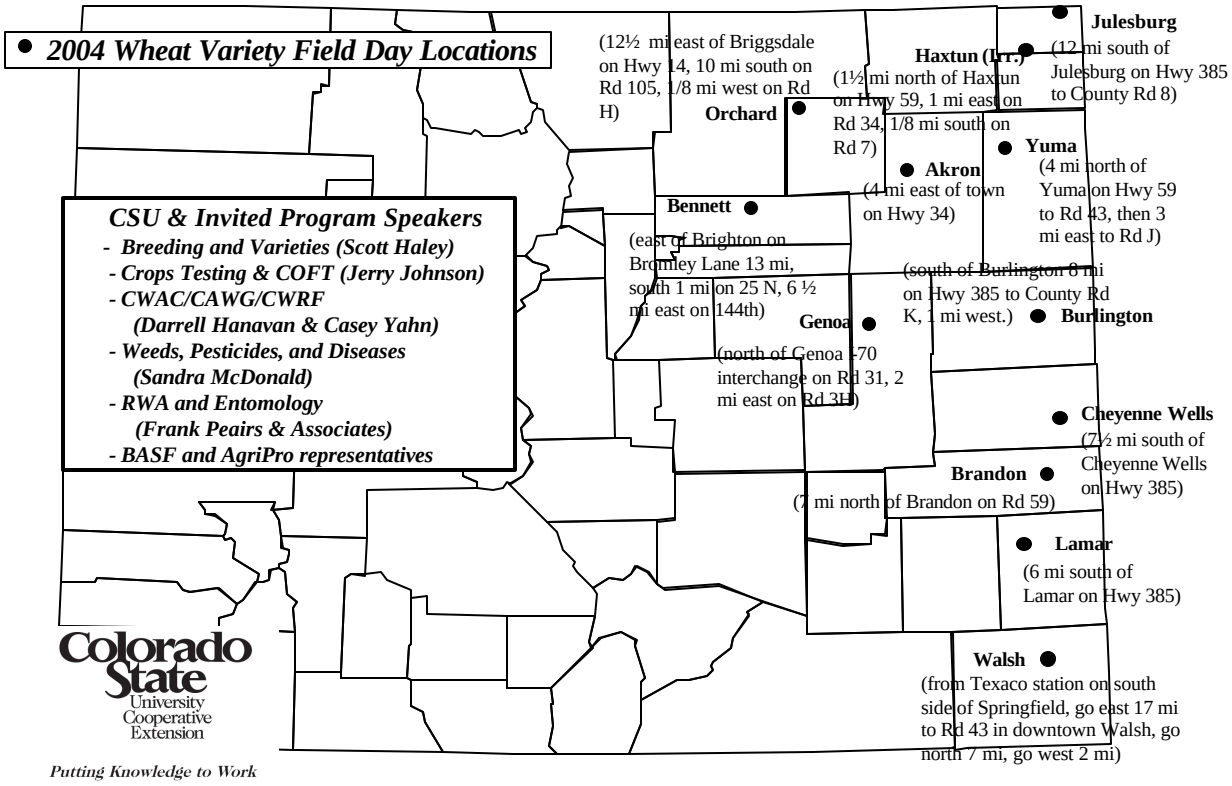
Comments: The dryland winter wheat variety trial yielded above average in spite of the continuing drought in southwestern Colorado. The 29.2 bu/ac average grain yield is attributable to planting on fallow ground, good fertility, above average fall precipitation, and emergence in early October. The below average test weights (average 53.2 lb/bu) and the very high grain protein (average 16.8 %) indicates that moisture was the limiting factor for grain yield.

There was a severe army cutworm infestation in southwestern Colorado during the winter and spring of 2003. The plots were treated in March with a pyrethroid insecticide. The wheat variety trial escaped serious damage from cutworm feeding due to the insecticide application. Area wheat fields that were not treated either incurred serious damage or suffered a complete loss due to army cutworm feeding. Russian wheat aphid damage was not observed in any of the entries nor was dwarf bunt noted at harvest.

Colorado Wheat Field Days 2004

Walsh	***June 14 (Mon)***	***9 a.m. at Plainsman Research Center, Baca County***
Lamar (*CM)	***June 14 (Mon)***	***6 p.m. at John Stulp's house, Prowers County***
Brandon (Sheridan Lake)	***June 15 (Tues)***	***8 a.m. at Burl Scherler Farm, Kiowa County***
Cheyenne Wells (*CM)	***June 15 (Tues)***	***12 p.m. at Tom Heinz Farm, Cheyenne County***
Burlington (*CM)	***June 15 (Tues)***	***4 p.m. at Randy Wilks Farm, Kit Carson County***
Akron (*CM)	***June 16 (Wed)***	***8 a.m. at Central Great Plains Res. Station, Washington County***
Yuma	***June 16 (Wed)***	***4 p.m. at Andrew Brothers Farm, Yuma County***
Julesburg	***June 17 (Thurs)***	***9 a.m. at Walt Strasser Farm, Sedgwick County***
Haxtun (Irrigated) (*CM)	***June 17 (Thurs)***	***12 p.m. at Steve Smith Farm, Phillips County***
Orchard	***June 17 (Thurs)***	***5 p.m. at Cary Wickstrom Farm, NW Morgan County***
Genoa (*CM)	***June 21 (Mon)***	***12 p.m. at Ross Hansen Farm, Lincoln County***
Bennett (*CM)	***June 21 (Mon)***	***5 p.m. at John Sauter Farm, Adams County***

(*CM = Complimentary Meal at the Field Day)

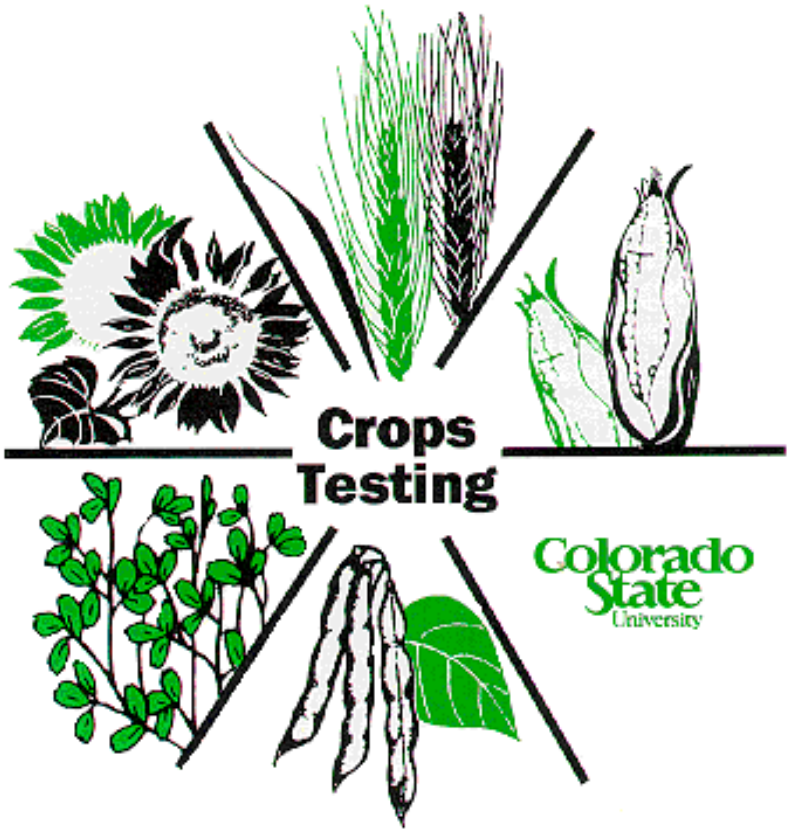


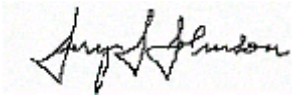
2003-2004 Colorado Winter Wheat UVPT

Variety Name	Plot #	Comments
Prowers 99	101	
Prairie Red	102	
Stanton	103	
CO980607	104	
Ankor	105	
Akron	106	
Above	107	
CO00D007	108	
Jagger	109	
Overley	110	
Jagalene	111	
TAM 111	112	
Alliance	113	
Wahoo	114	
Trego	115	
Avalanche	116	
Lakin	117	
Antelope	118	
Arrowsmith	119	
NuFrontier	120	
NuHorizon	121	
NuHills	122	
T81	123	
AP502 CL	124	
Thunderbolt	125	
W99-194	126	
Halt	127	
Yuma	128	
Yumar	129	
Millenium	130	
Harry	131	
Goodstreak	132	
CO00016	133	
CO00345	134	
CO00347	135	
CO00554	136	
CO00698	137	
CO00739	138	
CO00796	139	
CO970547-7	140	
CO991057	141	
CO991132	142	
CO99W183	143	
CO99W192	144	
CO99W254	145	
CO99W329	146	

2003-2004 Colorado Winter Wheat IVPT

Variety Name	Plot #	Comments
Yuma	101	
CO99W254	102	
CO99W329	103	
CO99W183	104	
Wesley	105	
Platte	106	
Jagalene	107	
Dumas	108	
Prairie Red	109	
NuFrontier	110	
NuHills	111	
NuHorizon	112	
Antelope	113	
CO980607	114	
CO00D007	115	
Nuplains	116	
Ok102	117	
Ankor	118	
Overley	119	
CO970547-7	120	
CO00016	121	
CO00345	122	
CO00347	123	
CO00554	124	
CO00698	125	
CO00739	126	
CO00796	127	
CO991057	128	
CO991132	129	
CO99W192	130	





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Putting Knowledge to Work

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