Cooperative Extension
Colorado State University

MAKING BETTER DECISIONS

2001 Colorado Wheat Variety Performance Trials

Agricultural Experiment Station

Colorado State University

Knowledge to Go Places

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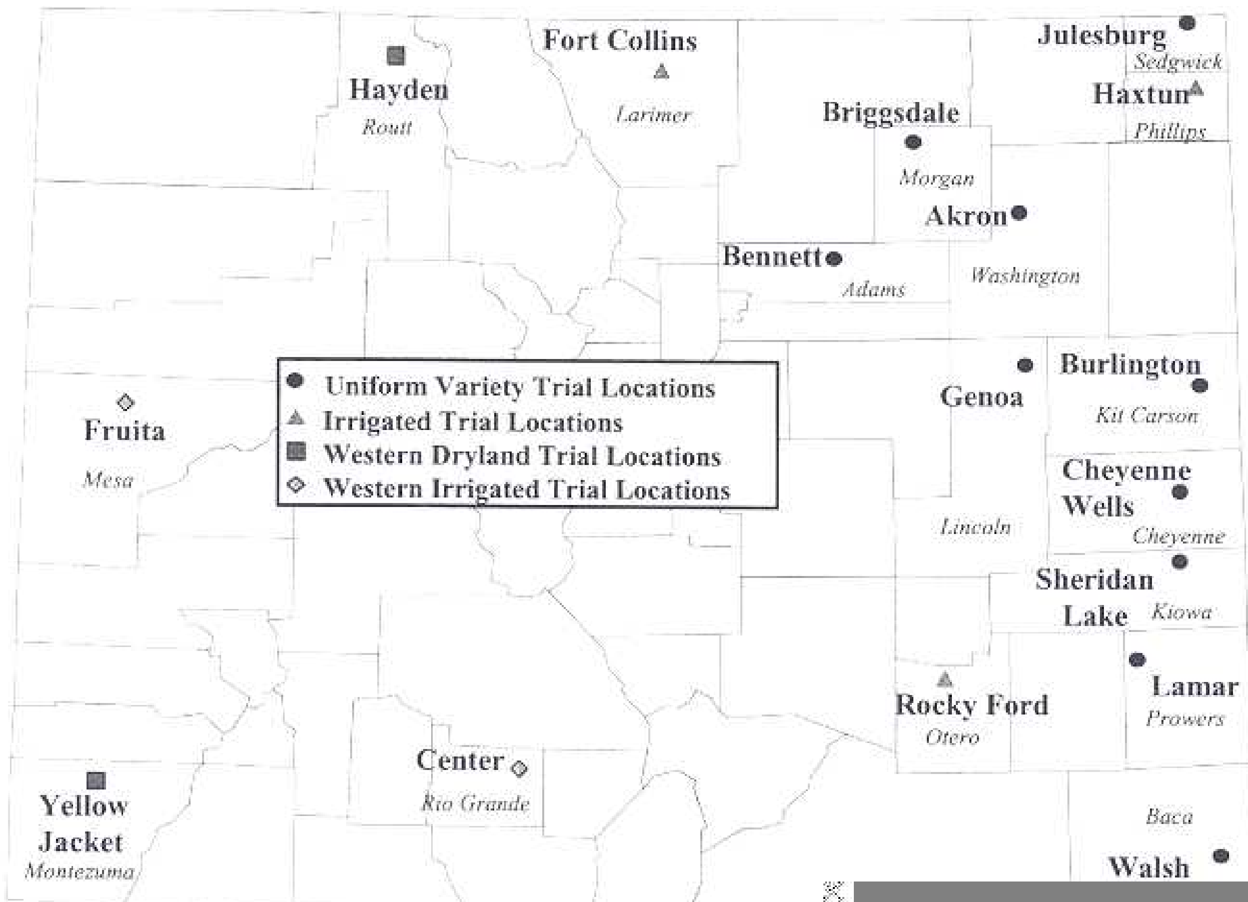
2001 CSU Wheat Variety Performance Trials



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2001 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 put up on DTN (Data Transmission Network)
3) Variety trial results are available on the Crops Testing Internet page: *www.colostate.edu/Depts/SoilCrop/extension/CropVar/wheat1.html*
4) Results are published in *From the Ground Up*, a Soil and Crop Science Extension publication
5) Results are published in *The Colorado Farmer Stockman*
6) E-mail copies of results are sent to Cooperative Extension agents and producers who request them
7) Results are incorporated into the Colorado wheat variety performance database *http://wheat.colostate.edu/vpt.html*

Trial Conditions and Methods - 2000/01

Inadequate soil moisture conditions throughout much of eastern Colorado in the fall of 2000, especially in southeast Colorado, led to late planting or planting into dry soil. Cooler than normal temperatures in October and November resulted in inconsistent stand establishment and slow fall growth. Significant portions of fall-planted acreage did not emerge until early spring following mild winter temperatures and good winter moisture.

Early spring growth was good at many locations but was followed by late spring drought. wheat was adversely affected by sub-optimal fall and spring growing degree-days. Cold night temperatures in mid-May led to widespread late spring freeze damage, although less severe this year than in 2000.

Prolonged high temperatures in June affected grain filling and reduced yields, especially in locations already stricken with drought. Heavy June infestations of stripe rust also led to widespread damage, especially in northeast Colorado. Historically, stripe rust occurrence in Colorado has been very rare, only once in approximately 20 years according to Bill Brown, CSU plant pathologist. Initial estimations of expected yield loss due to stripe rust were minimal due to the late stage of infection followed by long periods of high temperatures and low moisture. Later evidence suggests that yield losses were greater than expected, as much as 25% in the irrigated wheat trial at Haxtun. Dryland trial locations most severely affected by stripe rust were Julesburg, Akron, and Walsh. Moderate stripe rust infection was observed at Briggsdale and Genoa. Insect pressure was low to non-existent in 2001. Consequently there was only minimal yield loss to due wheat steak mosaic, high plains disease, or barley yellow dwarf virus.

Our dryland winter wheat variety trial, restructured in 1999, is a single uniform variety performance trial conducted at 10 locations. Yields were obtained from eight of the ten locations as hail destroyed the Bennett trial in May and the Sheridan Lake trial, which was in an area dominated by spring emergence, was not harvested due to severe wind erosion in early spring. Of the 60 entries in this trial, approximately half are named varieties and the other half are experimental lines. In addition to CSU varieties, named and experimental lines, the trial included public varieties from Nebraska, Oklahoma, and Kansas, and private varieties from Cargill-Goertzen and General Mills. Irrigated variety trials were conducted at Rocky Ford, Haxtun, and Fort

The irrigated trials are seeded at 1.2 million seeds per acre. The Haxtun irrigated trial was grown under circle sprinkler irrigation with plots seeded in 7 inch-spaced rows, 6' wide and 26 feet long. The Fort Collins, furrow-irrigated trial was planted in 7 inch-spaced rows on 30 inch beds and plots were 26 feet long.

Variety planting suggestions, based on these trial results, are found in the revised "Decision Tree for Winter Wheat Variety Selection in Colorado". We encourage producers to spread the variety decision risk by planting more than one variety. The average performance over two or three years is a proven tool for yield performance evaluation but producers should be mindful of other varietal characteristics, like maturity, height, disease and insect resistance, quality characteristics, and winter hardiness, that influence variety adaptation, performance, and marketing options. Complete variety descriptions and the full complement of trial results can be viewed on the web at: *http://www.colostate.edu/Depts/SoilCrop/extension/CropVar/wheat1.html*. The Colorado wheat variety performance database at *http://wheat.colostate.edu/vpt.html* provides characteristics for all varieties and allows producers to make variety comparisons over multiple years and multiple locations.

Table 1. 2001 Trial Information.

Locations	Date of Planting 2000	Date of Harvest 2001	Soil Texture	Fertilization (lb/ac) Nitrogen N	Phosphorus P_2O_5	Type of Irrigation
Uniform						
Akron	9/18/00	7/16/01	Silty clay	70	0	None
Briggsdale	9/27/00	7/17/01	Sandy loam	50	18	None
Burlington	9/14/00	7/02/01	Silty clay	85	25	None
Cheyenne Wells	9/26/00	7/02/01	Silt loam	35	18	None
Genoa	9/27/00	7/16/01	Sandy clay	55	18	None
Julesburg	10/02/00	7/17/01	Clay	45	0	None
Lamar	9/25/00	7/02/01	Silt loam	45	18	None
Walsh	10/11/00	7/09/01	Sandy clay loam	45	0	None
Irrigated						
Fort Collins	10/10/00	7/26/01	Sand loam	100	20	Furrow
Haxtun	9/21/00	7/14/01	Sandy loam	223	60	Sprinkler

This report is made available at no charge compliments of the Colorado Wheat Administrative Committee.

Description of winter wheat varieties.

NAME AND PEDIGREE	ORIGIN	RWA	HD	HT	SS	COL	WH	LR	WSMV	TW	PC	MILL	BAKE	COMMENTS
2137 W2440/W9488A//2163	KSU-1995	S	6	5	2	4	3	7	4	5	4	5	5	Release by KSU from Pioneer winter wheat program. Semidwarf, medium-early maturity. Good winterhardiness, good straw strength, good barley yellow dwarf virus tolerance, very susceptible to stem rust and stripe rust. Marginal tillering capacity and row cover characteristics in Colorado. Good performance record in irrigated CSU Variety Trials.
Above Tam 110*4/FS2	CSU-TX 2001	S	2	2	4	7	4	9	5	6	6	4	7	Clearfield* winter wheat developed cooperatively by CSU and Texas A&M-Amarillo. White chaff, early maturing, semidwarf. Good performance record in CSU Variety Trials in 2000 and 2001.
Akron TAM 107/Hail	CSU-1994	S	5	5	4	5	3	8	9	5	6	8	5	Semidwarf, medium-early maturity, vigorous fall and spring growth characteristics, closes canopy early in spring and competes well with weeds. Lax spike may contribute to enhanced hail tolerance. Excellent yield performance record in Colorado.
Alliance Arkan/Colt//Chisholm sib	NEB-1993	S	3	5	5	4	2	8	9	6	4	7	6	Medium-early maturing semidwarrf, short coleoptile, above average tolerance to root rot and crown rot. Excellent yield performance record in Colorado.
AP502 CL TXGH12588-26*4/FS2	Agripro-2001	S	1	1	4	6	3	9	5	8	6	6	7	Clearfield* winter wheat marketed through Agripro Wheat seed associates. Red chaff, early maturing, semidwarf.
Avalanche KS87H325/Rio Blanco	CSU-2001	S	5	5	4	6	4	4	5	2	5	2	3	Hard white winter wheat (HWW) released by CSU from KSU-Hays wheat breeding program material. Sister selection to Trego. Two days earlier than Trego in Colorado Variety Trials. High test weight, good stand establishment and fall growth, good milling and bread baking quality, not suited for Asian noodles. Excellent yield performance record in Colorado.
CDC Falcon Norstar*2/Vona//Abilene	CAN-SASK-2000	S	NA	NA	NA	NA	1	NA	NA	NA	NA	NA	NA	Developed by University of Saskatchewan winter wheat breeding program, marketed in the US by Western Plant Breeders. First entered in Colorado Irrigated Variety Trials in 2002.
Cutter Jagger/WI89-189-14	Agripro-2001	S	2	5	NA	NA	3	3	5	2	2	4	5	Developed and marketed by Agripro. Good test weight, good fall growth characteristics. Good performance record in regional breeder trials in Colorado in 2000 and 2001, first entered in Colorado Variety Trials in 2002.
Dumas WI90-425//N84-0758//WI81-297-3	Agripro-2000	S	3	4	4	NA	4	3	8	3	6	1	5	Developed and marketed by Agripro, targeted for irrigated production in the western Great Plains. Good test weight. Good performance record in regional breeder trials in Colorado in 2000, first entered in Colorado Variety Trials in 2002.
Enhancer 1992 Nebraska Bulk Selection	Goertzen-1998	S	5	5	8	5	5	7	6	7	2	8	6	Developed and marketed by Cargill-Goertzen. Medium height and medium maturity. Poor straw strength (just slightly better than Scout 66) and very low test weight. Very good fall growth characteristics, good stripe rust resistance. Excellent yield performance record in Colorado Dryland Variety Trials.
Golden Spike Arbon/Hansel/4/Hansel/3/CI1 4106/Columbia/2/McCall	Utah St.-1999	S	9	7	6	6	NA	NA	NA	8	1	NA	NA	Hard white winter wheat (HWW) developed by Utah State University and marketed by General Mills. Bronze-chaffed, very late maturity, very good noodle quality characteristics, resistant to dwarf bunt and common bunt. Good resistance to stripe rust largely responsible for good performance in Colorado Variety Trials in 2001.

*Russian Wheat Aphid resistance (RWA), heading date (HD), plant height (HT), straw strength (SS), Coleoptile length (COL), winterhardiness (WH), leaf rust resistance (LR), 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.

NAME AND PEDIGREE	ORIGIN	RWA	HD	HT	SS	COL	WH	LR	WSMV	TW	PC	MILL	BAKE	COMMENTS
Halt Sumner/CO820026,F1//PI372129, F1/3/TAM 107	CSU-1994	R	2	1	3	4	4	9	7	6	5	4	1	Developed from a complex cross with 50% TAM 107 parentage. RWA resistant, semidwarf, early maturity, below average test weight, very good milling and baking quality characteristics. Dryland yield record similar to TAM 107 with advantages over TAM 107 seen at higher yield levels. Excellent expression of RWA resistance.
Intrada Rio Blanco/TAM 200	OK-2000	S	5	2	5	4	NA	5	7	4	3	1	2	Hard white winter wheat (HWW) identified by Oklahoma State from material from KSU-Hays breeding program. Medium maturity, semidwarf, good fall growth characteristics, very good millling and baking quality. Marginal performance in 2001 Colorado Dryland Variety Trials.
Jagalene Abilene/Jagger	Agripro-2001	S	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Developed and marketed by Agripro. First entered in Colorado Variety Trials in 2002.
Jagger KS82W418/Stephens	KSU-1994	S	1	4	6	4	8	8	4	5	2	6	3	Developed from cross between a Karl sister selection and a soft white wheat from Oregon. Bronze-chaffed, early maturing semidwarf, good tolerance to WSMV. Below average straw strength and test weight. Breaks dormancy very early, marginal winterhardiness. High grain protein content and good baking quality characteristics.
Kalvesta Oelson/Hamra//Australia 215/3/Karl92	Goertzen-1999	S	3	2	3	4	2	9	8	4	1	2	3	Developed and marketed from Cargill-Goertzen. Originated from a cross with 50% Karl 92 parentage. Medium-early, semidwarf. Good milling and baking quality characteristics.
Lakin Arlin/KS89H130	KSU-2000	S	5	5	4	4	4	9	5	5	4	4	3	Hard white winter wheat (HWW) developed by KSU-Hays, wheat breeding program. Medium height, medium maturity. Suitable for both domestic (bread) and export (Asian noodles) uses. Good yield performance in 2000 Colorado Dryland Variety Trials, stripe rust susceptibility negatively affected yields in 2001.
NuFrontier Undisclosed	General Mills-2000	S	7	6	5	5	4	7	8	4	5	4	5	Hard white winter wheat (HWW), privately developed in the Great Plains and marketed exclusively by General Mills. Medium-late maturing, tall semidwarf. Entered in Colorado Trials in 2001.
NuHorizon Undisclosed	General Mills-2000	S	6	1	3	8	4	4	4	1	4	5	7	Hard white winter wheat (HWW), privately developed in the Great Plains and marketed exclusively by General Mills. Medium maturing semidwarf, excellent test weight. Good stripe rust resistance in 2001 Colorado Variety Trials.
Nuplains Abilene/KS831862	NEB-1999	S	8	3	4	3	2	6	8	3	1	1	3	Hard white winter wheat (HWW). Medium-late maturity, semidwarf, excellent straw strength, good test weight. High protein, very good milling and baking quality characteristics, inconsistent noodle quality evaluations. First entered in Colorado Trials in 2000.
Ok101 OK87W663/Mesa//2180	OK-2001	S	2	5	4	NA	6	5	7	4	7	2	4	Hard red winter wheat from Oklahoma State. 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 production in the High Plains. First entered in CSU Variety Trials in 2002.
Prairie Red CO850034/PI372129//5*TAM 107	CSU-1998	R	1	2	4	6	4	9	5	5	6	4	6	Developed via "backcross transfer" of RWA resistance directly into TAM 107. Bronze-chaffed, semidwarf, early maturity. Very similar to TAM 107 except for its RWA resistance. Poor end-use quality reputation.

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

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NAME AND PEDIGREE	ORIGIN	RWA	HD	HT	SS	COL	WH	LR	WSMV	TW	PC	MILL	BAKE	COMMENTS
Prowers CO850060/PI372129//5* Lamar	CSU-1997	MR	7	8	7	8	2	6	7	1	2	4	2	Developed from the backcross transfer of RWA resistance into Lamar. Moderately resistant to RWA, tall, medium-late maturity, very good milling and baking quality characteristics. Similar to Lamar, except moderately resistant to RWA.
Prowers 99 CO850060/PI372129//5* Lamar	CSU-1999	R	7	8	7	8	2	6	7	1	2	4	2	Developed from reselection within Prowers for improved RWA resistance. Tall, long coleoptile, medium-late maturity, high test weight and very good milling and baking quality characteristics. Very similar to Lamar and Prowers, except for improved RWA resistance.
Stanton PI220350/KS87H57//TAM-200/KS87H66/3/KS87H325	KSU-2000	R	5	6	5	5	4	2	5	4	4	1	4	RWA-resistant (different resistance gene from CSU varieties), medium-tall, medium maturity. Good performance record in CSU Dryland Variety Trials in 2000 and 2001.
TAM 107 TAM 105*4/Amigo	TX-1984	S	1	2	4	6	4	9	5	5	6	5	7	Developed via "backcross transfer" of Greenbug resistance directly into TAM 105. Bronze-chaffed, early maturing semidwarf, medium long coleoptile, good heat and drought tolerance, poor end-use quality reputation. Very susceptible to leaf rust.
TAM 110 (Tam105*4/Amigo)*5// Largo	TX-1995	S	2	2	4	3	4	9	5	7	7	5	7	Developed via "backcross transfer" of an additional Greenbug resistance gene directly into TAM 107. Very similar to TAM 107. Low test weight, marginal end-use quality reputation.
Thunderbolt Abilene/KS90WGRC10	Agripro-1999	S	5	5	3	5	4	1	5	1	3	1	2	Developed and marketed by Agripro. Originated from cross between Abilene and a leaf rust resistant version of TAM 107. Bronze chaffed, medium height and maturity, good straw strength. High test weight, good milling and baking quality, good leaf disease resistance. Targeted for dryland production in the west-central Great Plains.
Trego KS87H325/Rio Blanco	KSU-1999	S	6	4	4	3	4	2	5	1	7	2	5	Hard white winter wheat (HWW) developed by KSU-Hays breeding program. Medium-late maturity, semidwarf, high test weight. Excellent dryland performance record in Colorado Variety Trials.
Venango Random Mating Population	Goertzen-2000	S	6	3	3	3	4	5	5	3	4	NA	NA	Developed and marketed by Cargill-Goertzen. Medium-late maturing, semidwarf, very good straw strength, good test weights. Very good yield performance under irrigated conditions in CSU Variety Trials. Observed to shatter quite severely in 1999 (Lamar, CO dryland testing site).
Wesley KS831936-3//Colt/Cody	NEB-1998	S	4	0	2	4	3	7	7	8	1	4	2	Medium-early, short, excellent straw strength. Good winterhardiness and baking quality characteristics. May be best adapted for irrigated production systems.
Wichita Early Blackhull/Tenmarq	KSU-1944	S	4	9	8	8	5	NA	8	2	3	4	7	Tall, early, very long coleoptile, very poor straw strength, strong tendency to shatter prior to harvest. (Long-term check variety)
Yuma NS14/NS25/2/2*Vona	CSU-1991	S	5	3	3	3	4	8	6	5	7	7	3	Developed from a complex cross with 75% Vona parentage. Medium maturity, semidwarf, very good straw strength, short coleoptile, good baking quality characteristics. Good dryland and irrigated yield performance in CSU Variety Trials.
Yumar Yuma/PI372129//CO850034 /3/4*Yuma	CSU-1997	R	5	4	3	3	4	8	6	4	6	5	3	Developed via "backcross transfer" of RWA resistance directly into Yuma. Medium-maturing semidwarf. Very good straw strength, slightly better than Yuma despite taller stature. Good baking quality characteristics. Good irrigated performance in CSU Variety Trials.

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

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Table 2. Colorado winter wheat dryland Uniform Variety Performance Trial summary for 2001.

	Location								Averages			
				Cheyenne					2001		2-Yr	3-Yr
Variety[1]	Akron	Briggsdale	Burlington	Wells	Genoa	Julesburg	Lamar	Walsh	Yield	Twt	2000/01	1999/00/01
	Yield (bu/ac)								bu/ac	lb/bu	bu/ac	
Trego	56.5	56.4	37.9	42.6	42.3	48.0	47.7	50.7	47.8	58.9	44.5	52.7 [1]
Jagger	56.1	65.0	38.8	35.4	52.4	43.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	42.9	44.0	45.9	45.6	58.8	------	------
Enhancer	60.7	52.5	36.3	[illegible]	47.6	48.7	41.3	36.8	45.5	56.7	42.4	50.9 [1]
Alliance	45.1	65.1	34.3	[illegible]	41.3	41.8	48.9	39.4	44.0	56.1	42.1	51.9 [2]
Akron	52.9	62.6	34.7	[illegible]	37.4	42.3	41.7	40.8	43.2	56.4	41.3	50.4 [3]
Yuma	54.0	56.3	41.7	[illegible]	36.0	44.1	40.3	36.2	43.1	56.0	41.1	50.0
Golden Spike	51.6	51.6	29.3	[illegible]	45.2	41.0	46.6	47.0	43.0	55.2	------	------
Halt	49.6	63.2	35.8	[illegible]	39.0	40.1	42.3	34.1	42.9	56.2	39.2	47.6
Above	45.3	56.1	35.2	35.2	35.6	46.5	41.3	40.4	41.9	55.5	40.8	------
NuFrontier	50.3	49.6	33.1	[illegible]	38.6	45.1	43.1	40.4	41.6	56.9	------	------
Prowers 99	42.5	51.7	35.4	[illegible]	34.0	35.8	47.5	48.9	41.4	58.8	37.2	------
Avalanche	47.3	52.8	33.8	[illegible]	37.9	39.0	39.7	40.9	41.3	57.7	41.1	50.8 [4]
Yumar	46.4	53.1	36.2	[illegible]	36.1	42.4	41.1	36.9	40.7	57.1	38.4	48.5
Prairie Red	47.0	57.1	36.7	[illegible]	32.8	39.0	40.0	36.3	40.7	56.3	39.8	49.1
Kalvesta	52.1	51.9	41.0	[illegible]	32.1	37.6	35.3	31.9	40.3	57.1	38.9	48.1
TAM 107	45.2	56.2	35.8	[illegible]	30.2	37.3	40.6	33.8	40.2	56.5	39.0	47.6
AP502 CL	50.8	57.2	29.6	[illegible]	32.7	41.2	38.2	34.1	39.5	55.2	39.2	------
Intrada	43.4	59.3	36.4	[illegible]	32.3	41.8	36.3	28.9	38.8	56.8	------	------
Lakin	37.4	54.6	35.5	[illegible]	28.1	37.8	43.8	34.0	38.2	57.1	38.9	------
TAM 110	41.6	57.6	38.2	[illegible]	33.0	42.6	29.8	28.1	37.9	55.1	38.8	47.8
2137	31.3	53.9	32.9	[illegible]	33.7	37.4	42.8	36.2	37.8	55.7	39.0	48.8
Venango	42.8	47.9	33.4	[illegible]	27.9	36.2	35.8	39.3	37.2	58.1	38.4	46.7
Nuplains	29.0	56.6	35.8	[illegible]	32.1	30.7	41.0	28.3	35.6	55.8	37.6	------
Wichita	34.5	45.4	30.6	[illegible]	30.3	26.2	36.0	36.9	34.2	58.8	31.5	36.8
Average	**47.1**	**55.8**	**35.6**	**35.7**	**36.9**	**40.5**	**41.0**	**38.3**	**41.4**			
$LSD_{(0.30)}$	6.7	6.0	3.9	6.3	3.6	2.7	3.9	4.3	1.7			

[1]Varieties in table ranked by the average yield over eig[illegible]t locations in 2001.

[1-5]Variety rank based on 3-Yr average yields.

Table 3. Colorado winter wheat Uniform Variety Performance Trial summary for 1999-01.

	Averages							
	1999		2000		2001		3-Yr	
Variety[1]	Yield	Test Wt	Yield	Test Wt	Yield	Test Wt	Yield	Test Wt
	bu/ac	lb/bu	bu/ac	lb/bu	bu/ac	lb/bu	bu/ac	lb/bu
Trego	65.8	58.9	41.3	59.7	47.8	58.9	52.7	58.9
Alliance	67.7	57.3	40.2	56.5	44.0	56.1	51.9	56.5
Enhancer	64.6	56.7	39.2	55.0	45.5	56.7	50.9	55.9
Avalanche	66.3	59.2	41.0	59.3	41.3	57.7	50.8	58.9
Akron	65.1	57.6	39.4	57.0	43.2	56.4	50.4	56.9
Yuma	64.4	57.0	39.0	56.8	43.1	56.0	50.0	56.5
Prairie Red	64.0	57.2	38.9	56.9	40.7	56.3	49.1	56.7
2137	64.4	57.6	40.3	56.1	37.8	55.7	48.8	56.4
Yumar	64.6	57.7	36.1	57.2	40.7	57.1	48.5	57.2
Kalvesta	62.9	58.5	37.5	58.7	40.3	57.1	48.2	57.9
TAM 110	62.2	56.9	39.6	56.7	37.9	55.1	47.8	56.1
Halt	61.1	56.8	35.4	56.1	42.9	56.2	47.6	56.2
TAM 107	61.4	57.2	37.7	56.9	40.2	56.5	47.6	56.7
Venango	60.1	58.9	39.6	58.2	37.2	58.1	46.7	58.2
Wichita	45.2	58.9	28.9	58.3	34.2	58.8	36.8	58.5

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

Table 4. Colorado winter wheat Uniform Variety Performance Trial summary for 2000-01.

	Averages					
	2000		2001		2-Yr	
Variety[1]	Yield	Test Wt	Yield	Test Wt	Yield	Test Wt
	bu/ac	lb/bu	bu/ac	lb/bu	bu/ac	lb/bu
Trego	41.3	59.7	47.8	58.9	44.5	58.9
Stanton	38.6	58.0	46.3	56.8	42.5	57.1
Enhancer	39.2	55.0	45.5	56.7	42.4	55.4
Alliance	40.2	56.5	44.0	56.1	42.1	56.0
Jagger	36.3	55.8	46.7	57.0	41.5	56.1
Akron	39.4	57.0	43.2	56.4	41.3	56.4
Yuma	39.0	56.8	43.1	56.0	41.1	56.2
Avalanche	41.0	59.3	41.3	57.7	41.1	58.7
Above	39.7	57.0	41.9	55.5	40.8	55.9
Prairie Red	38.9	56.9	40.7	56.3	39.8	56.3
Halt	35.4	56.1	42.9	56.2	39.2	55.9
AP502 CL	38.8	56.3	39.5	55.2	39.2	55.4
2137	40.3	56.1	37.8	55.7	39.0	55.6
TAM 107	37.7	56.9	40.2	56.5	39.0	56.5
Lakin	39.5	57.2	38.2	57.1	38.9	56.9
Kalvesta	37.5	58.7	40.3	57.1	38.9	57.5
TAM 110	39.6	56.7	37.9	55.1	38.8	55.6
Venango	39.6	58.2	37.2	58.1	38.4	57.8
Yumar	36.1	57.2	40.7	57.1	38.4	56.9
Nuplains	39.5	59.6	35.6	55.8	37.6	57.4
Prowers 99	32.9	58.1	41.4	58.8	37.2	58.1
Wichita	28.9	58.3	34.2	58.8	31.5	58.2

[1]Varieties in table rank based on 2-Yr average yields.

Table 5. Colorado winter wheat Irrigated Variety Performance Trial summary for 2001.

	Location						2-Yr Average	
	Haxtun			Fort Collins			2000/01	
Variety[1]	Yield	Test Wt	Variety	Yield	Test Wt	Variety[2]	Yield	Test Wt
	bu/ac	lb/bu		bu/ac	lb/bu		bu/ac	lb/bu
Wesley	102.0	63.3	NW97S278	122.8	62.5	Enhancer	104.1	58.2
Enhancer	100.6	63.3	Enhancer	115.2	61.9	Jagger	103.3	58.8
NW97S278	96.7	64.5	Wesley	114.4	60.5	Wesley	102.2	58.2
Golden Spike	93.3	60.9	Jagger	111.0	61.8	Venango	101.1	59.8
NuHorizon	93.1	62.9	GM10001	108.4	62.1	Yuma	100.8	58.3
Jagger	91.5	63.9	AP502 CL	106.8	60.3	Avalanche	96.6	59.5
NuFrontier	87.4	64.0	Yuma	104.2	61.3	TAM 107	95.6	57.8
Avalanche	86.3	63.5	Above	102.2	60.1	Trego	93.8	60.2
Akron	84.7	62.1	Yumar	101.7	61.0	Yumar	93.1	56.6
Venango	84.1	64.2	GM10002	101.2	62.3	2137	92.7	57.6
Trego	83.3	64.0	Prairie Red	100.0	60.3	Prairie Red	91.7	58.2
Yuma	81.5	63.1	Venango	96.7	61.2	Akron	89.3	58.2
AP502 CL	81.3	59.2	Golden Spike	96.3	58.0	Nuplains	89.2	59.0
Above	80.2	60.7	Trego	95.1	62.1	Kalvesta	85.4	58.8
2137	79.4	62.3	Avalanche	94.3	60.8			
Lakin	78.8	60.7	Akron	91.6	60.1			
Yumar	76.4	61.0	TAM 107	90.3	59.6			
Nuplains	75.2	63.2	2137	86.4	59.9			
Intrada	74.4	63.8	Nuplains	85.5	60.7			
Prairie Red	74.0	61.7	Intrada	84.6	62.3			
Kalvesta	72.5	61.8	Lakin	82.0	59.8			
TAM 107	70.8	61.7	Kalvesta	81.3	60.4			
Average	**84.0**	**62.5**	**Average**	**98.7**	**60.9**			
$LSD_{(0.30)}$	5.2		$LSD_{(0.30)}$	14.7				

[1]Varieties in table ranked by the average yield at each location in 2001.
[2]Varietied in table ranked based on 2-Yr average yields.

Table 6. Grain protein content from four UVPT testing locations.

Variety	Akron	Burlington	Julesburg	Walsh	Average
Prowers 99	16.8	18.2	16.6	12.9	16.1
Nuplains	17.1	17.2	16.0	13.2	15.9
Golden Spike	15.2	17.5	16.5	13.1	15.6
Jagger	15.9	17.0	15.2	13.1	15.3
Kalvesta	15.1	16.3	15.1	13.0	14.9
Wichita	15.7	16.0	14.6	13.1	14.9
Enhancer	15.4	15.7	15.4	12.9	14.9
Akron	14.3	16.5	14.4	13.7	14.7
NuHorizon	15.3	16.2	14.1	13.1	14.7
Avalanche	15.4	16.1	14.0	12.3	14.5
Intrada	14.2	16.2	14.9	12.3	14.4
Trego	14.9	15.3	14.9	12.0	14.3
Venango	14.0	15.7	15.0	12.4	14.3
Alliance	15.1	15.6	14.2	12.0	14.2
Lakin	14.5	16.4	14.1	11.8	14.2
Halt	15.0	15.3	13.8	12.3	14.1
2137	14.3	16.9	13.4	11.5	14.0
NuFrontier	14.6	15.0	14.6	11.8	14.0
TAM 110	14.3	15.3	14.0	12.0	13.9
Above	14.1	15.9	14.1	11.5	13.9
Stanton	14.2	15.2	14.0	11.7	13.8
Yumar	13.3	15.2	13.6	12.8	13.7
Prairie Red	13.7	15.5	13.6	12.0	13.7
AP502 CL	14.0	15.5	13.1	12.0	13.7
Yuma	13.7	15.0	13.2	12.0	13.5
TAM 107	13.2	15.0	12.8	12.0	13.2
Average	**14.7**	**16.0**	**14.4**	**12.4**	**14.4**

*Adjusted to 12% moisture basis.

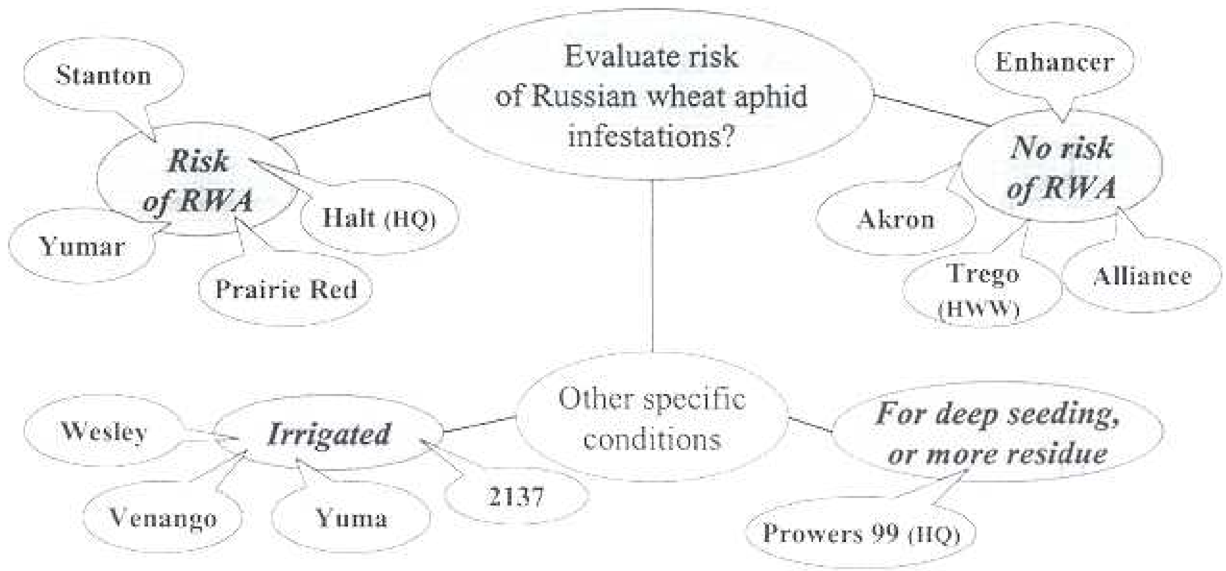
Table 7. Grain protein content from one IVPT testing location.

Variety	Fort Collins
Kalvesta	13.9
Enhancer	13.9
Intrada	13.3
AP502 CL	13.3
Wesley	13.2
Jagger	13.0
Platte	12.8
NuFrontier	12.7
Above	12.6
Venango	12.5
Nuplains	12.5
TAM 107	12.5
Avalanche	12.4
Yumar	12.3
NuHorizon	12.3
2137	12.2
Akron	12.2
Prairie Red	12.0
Yuma	11.6
Golden Spike	11.6
Trego	11.3
Lakin	10.7
Average	**12.5**

*Adjusted to 12% moisture basis.

Decision Tree for Winter Wheat Variety Selection in Colorado

Jerry Johnson and Scott Haley (August 2001)



(HQ) signifies high end-use (milling and baking) quality.
(HWW) signifies Hard White Winter wheat variety.

The best choice of a winter wheat variety in Colorado depends upon variable production conditions. The decision tree combines our knowledge of wheat varieties with their performance in CSU variety trials. Varieties listed in the decision tree are varieties that we think growers should consider for the production conditions specified in the tree. Production risks may be reduced by planting more than one variety and it should be remembered that avoiding poor variety decisions may be as important as choosing the winner among winners.

Dryland Wheat Strips for Forage and Grain Yield at Walsh, 1999-2001

K. Larson, D. Thompson, D. Harn, C. Thompson

Introduction

The purpose of this trial was to determine which wheat varieties are best suited for forage and grain production in Southeastern Colorado.

Fifteen or sixteen winter wheat varieties were planted at Walsh from 1998 to 2000 using 45 lb/ac seed in 20 ft. by 1110 ft. strips with two replications. In all years, the strips were fertilized at or above recommended rates from soil test results. Weeds were controlled using Ally or a combination of Ally and 2, 4-D herbicides. Forage samples (two samples per plot, 2 ft. by 2.5 ft.) were taken at jointing. Fresh forage samples were weighed, oven-dried, and reported at 15% moisture content. Plots were harvested with a self-propelled combine and weighed in a digital weigh cart. Grain yields were corrected to 12% moisture content.

Results

1999 - Jagger produced the highest forage yield and Alliance produced the highest grain yield. Jagger was the best overall variety for grain and forage yields. There was a minor infestation of Russian Wheat Aphid (RWA).

2000 - Jagger produced the highest forage yield at jointing while Ike produced the highest grain yield. The best variety for overall forage and grain yield was TAM 110. There was a minor infestation of RWA, but a severe infestation of greenbug and other aphids. Barley Yellow Dwarf, a viral disease vectored by several aphid species (but not by RWA), impacted this study and Ike appeared to be more tolerant of the BYD virus than any of the other varieties.

2001 - Prowers produced the highest forage yield while Trego produced the highest grain yield. Prowers appears to be the best overall variety for grain and forage yield for 2001. Late planting and low heat units in the fall of 2000 and spring of 2001 combined with drought conditions in the spring led to lower than normal plant size and forage yields.

3-Year Summary - Akron had the highest 3 year average forage yields while Alliance yielded the most grain. This trial indicates that TAM 110 is probably the best variety choice for overall forage and grain yield in Southeastern Colorado.

Table 8. Dryland wheat strips, forage and grain yield at Walsh, 1999.

Variety	Jointing Dry Wt	Yield	Test Weight	Plant Height	Straw Residue
	lb/ac	bu/ac	lb/bu	in	lb/ac
Jagger	4202	61	61	34	5196
Lamar	3328	60	63	41	6089
7805	3096	55	61	36	4485
Baca	2951	59	63	44	6079
Ike	2663	61	64	36	5263
Prowers	2658	57	61	40	5743
Akron	2654	57	61	35	5388
TAM 107	2620	59	60	32	3909
Prairie Red	2617	63	60	32	4130
TAM 110	2548	64	61	32	4677
Halt	2532	58	60	30	3410
Yuma	2445	61	61	35	4476
2137	2309	62	62	34	3918
Yumar	2293	61	61	33	4600
Alliance	2225	66	62	36	5330
Average	**2743**	**60**	**61**	**35**	**4846**
$LSD_{(0.05)}$	594.3	4			

*Planted 9/25/98; 45 lb seed/ac; 5 gal/ac 10-34-0. Jointing sample taken 3/31/99; harvested 7/2/99.

Table 9. Dryland wheat strips, forage and grain yield at Walsh, 2000.

Variety	Jointing Dry Wt	Yield	Plant Height	Straw Residue	Test Weight
	lb/ac	bu/ac	in	lb/ac	lb/bu
Jagger	2514	31	25	4438	56
TAM 110	2491	40	25	3842	58
Akron	2311	32	25	4582	57
T213	2192	34	27	4476	56
Prowers	2034	27	28	4639	58
TAM 107	2005	35	25	3708	58
Halt	1933	32	24	3179	56
Prairie Red	1926	40	25	3842	58
Ike	1864	42	26	4620	59
Baca	1813	27	30	4880	58
Lamar	1740	29	29	4770	59
Alliance	1673	37	25	3929	56
Yuma	1644	28	25	3429	54
2137	1633	35	25	3400	56
Average	**1984**	**34**	**26**	**4124**	**57**
$LSD_{(0.05)}$	232.1	4			

*Planted 9/29/99; 45 lb seed/ac; 5 gal/ac 10-34-0. Jointing sample taken 3/20/00; harvested 6/26/00.

Table 10. Dryland wheat strips, forage and grain yield at Walsh, 2001.

Variety	Jointing Dry Wt	Yield	Test Weight	Straw Residue
	lb/ac	bu/ac	lb/bu	lb/ac
Prowers	1487	47	64	3990
Akron	1283	45	63	3150
Trego	1102	57	64	3006
Ike	1081	43	63	2800
TAM 110	1068	41	62	2497
Prairie Red	1023	38	62	2507
T213	1006	43	63	2838
TAM 107	989	40	61	2310
Alliance	853	49	62	2968
Thunderbolt	848	43	63	2924
Halt	803	39	62	1940
2137	758	34	63	2536
Smoky	713	34	59	2420
Soloman	520	40	63	2800
Average	**967**	**42**	**62**	**2763**
$LSD_{(0.05)}$	340.2	3		

*Planted 10/13/00; 45 lb seed/ac; 5 gal/ac 10-34-0. Jointing sample taken 4/24/01; Straw residue taken 7/20/01; harvested 7/9/01.

Table 11. 3-Yr dryland wheat strips, forage and grain yield summary at Walsh for 1999-01.

Variety	Jointing Dry Wt	Yield	Test Weight	Straw Residue
	lb/ac	bu/ac	lb/bu	lb/ac
Akron	2083	45	60.3	4373
Prowers	2060	44	61.0	4791
TAM 110	2036	48	60.3	3672
TAM 107	1871	45	59.7	3309
Ike	1869	49	62.0	4228
Prairie Red	1855	47	60.0	3493
Halt	1756	43	59.3	2843

Materials and methods - Two wheat varieties, Prairie Red (hard red winter wheat), and Trego (hard white winter wheat), were planted on October 14, 2000 at 15, 30, 45, and 60 lb seed/ac, which corresponds to 250,000, 500,000, 750,000, and 1,000,000 seeds/ac, in 10 ft. by 50 ft. plots with five replications. The soil test recommendation for 40 bu/a wheat was 35 lb N/ac and 30 lb P_2O_5/ac and no other nutrients were required. We applied 50 lb N/ac with a sweep; no P fertilizer was applied. Ally 0.1 oz/ac and 2,4-D 0.38 lb/ac was sprayed for weed control. Aphids were only a minor problem. We harvested the plots on July 10 with a self-propelled combine and weighed them in a digital scale. Grain yields were corrected to 12% seed moisture content.

Results - Grain yields of both wheat varieties increased with higher seeding rates. The yield responses of Trego and Prairie Red were linear from the lowest (15 lb/ac) to the highest (60 lb/ac) seeding rates. Trego produced 4.6 bu/a and Prairie Red produced 5.3 bu/ac for each incremental 15 lb/ac seeding rate increase. No optimum seeding rate could be established for either variety, since grain yields of both varieties were still increasing for the seeding rates tested.

Discussion - Both Trego and Prairie Red increased yields with each increment increase in seeding rate up to the highest seeding rate, 60 lb/ac. We expected Prairie Red would reach its optimum seeding rate around 45 lb/ac, and the same or lower seeding rate optimum for Trego. Undoubtedly, weather played a major role in our lack of achieving seeding rate optimums. The study was planted in dry soil and did not fully emerge until late-winter/early-spring. The spring was wet and cool, ideal f

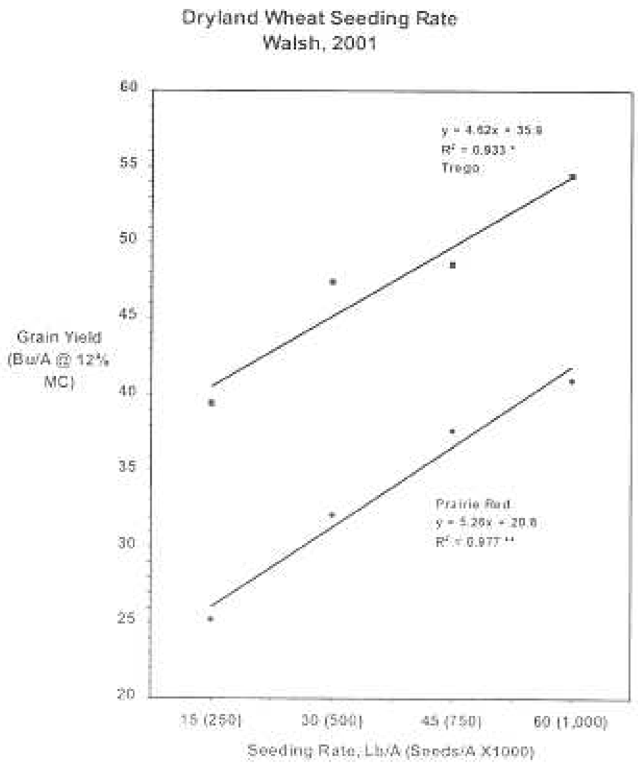


Fig.1. Dryland wheat seeding rate at Walsh. The four seeding rates were 15, 30, 45, and 60 lb seeds/ac, corresponding to 250, 500, 750, and 1,000 seeds/a X 1000. The wheat varieties were Prairie Red, a hard red winter wheat, and Trego, a hard white winter wheat.

Wheat Stripe Rust in Colorado-What Happened!

William Brown and Joe Hill

The same rains that saved much of the state's wheat in 2001 also brought the wheat stripe rust disease. Wheat stripe rust is a fungus that attacked the leaves and in some instances the glumes of wheat. It developed in the unexpected cool and humid conditions that prevailed in the last of May and early June 2001.

We had never seen such a problem with stripe rust on the plains in wheat, although it has occasionally been found at insignificant levels. Early in the season it was seen developing in Texas, then Oklahoma and then in Kansas where it is equally rare. Normally stripe rust would have been stopped by increasingly high temperatures and dryness, but not last year. In mid May 2001 there were no prevalent diseases and the warm temperature and drought had stopped stripe rust in Kansas while wheat was in the boot in Colorado. In late May and the first week of June, stripe rust took off again and moved into Colorado wheat during flowering. It eventually moved all the way to the Front Range. Irrigated wheat, such as Platte, was hard hit. Increased nitrogen and high plant populations in irrigated stripe rust susceptible wheat exacerbated the severity of disease.

Several questions have been posed by growers and wheat workers throughout the state:

Where did it come from? The stripe rust fungus does not normally survive in the US. It generally survives on green host tissue in Mexico and sometimes Texas. In 2001 it was first noted in mid-March in the area around Uvalde, Texas. Very strong winds traveling directly from the Gulf Coast to Kansas probably brought the fungus spores into that area much earlier than would be normal.

How did it develop in Colorado? Wheat stripe rust was first reported in southern Kansas on May 2 at Hutchinson. During the week of May 7, reports of stripe rust were coming from between Dodge City and McPherson and from south of Highway 56 to the Oklahoma border. At this time unusually warm weather from May 14-17 was expected to inhibit further development of the epidemic and rust lesions on most varieties were reported to begin to dry. On May 19, a cool, wet period began which lasted three weeks and the fungus took off again. By May 29, it was in the Goodland, KS area. It was this second burst of spores that got into Colorado and caused our initial infections.

Have we had this problem before? No, we have seen traces of stripe rust on occasion but never at the level seen this year. Dr. Bowden, Kansas State University, noted that it is pretty much the same in Kansas but that 2000 there was a small outbreak of stripe rust in central Kansas that caused an estimated loss of 0.05%. When he examined the official USDA rust loss estimates from 1918 to 1976, there was no data for stripe rust losses in Kansas. However, other records indicate that in 1957 and 1958 stripe rust epidemics occurred in the Southern Plains that pretty much matched the situation in 2000 and 2001. Both 1957 and 1958 were unusually cool and wet across the Southern Plains.

Would fungicides have worked? Yes, foliar fungicides would have worked if applied early enough. Excellent control can be obtained with Tilt if applied before disease severity on the lower leaves reaches 5% at the late boot stage. Work with barley stripe rust in South America also supports this observation. However, Tilt cannot legally be applied beyond boot in Colorado and we had no rust at boot. At that point with wheat at less than $3 and Tilt at about $12/acre it is unlikely anyone would have sprayed. The rust hit us at flowering and the only alternative was to use Quadris, the new Strobilurin fungicide from Syngenta. Quadris would have cost $24-28/acre and even more critical, has a 45-day pre-harvest interval. So effectively we were out of luck. We were able to put out a rescue treatment trial at ARDEC during flowering with the flag leaves about 70-80% rusted. Tilt still helped us better than Quadris, the other Strobilurins from BASF was also effective but is not yet labeled. See the trial summary and Table 1 at the end of this article.

Will stripe rust be a problem this year? If the present drought continues-**NO**. It takes rain to get rust going. It is unlikely that we will see this kind of a problem again for another long time. If the kind of weather that we saw spring 2001 occurs again and the fungus gets into Kansas early enough then the possibility does exist. Barley stripe rust (similar problems) in the early 1900s, can be attributed to four conditions (most outside of Colorado):

1) unusually cool, wet weather in Texas helped develop stripe rust early on,
2-strong southerly winds transported a heavy spore shower into Kansas in mid-April,
3) unusually cool wet weather in Kansas in May allowed the rust to develop to the levels that then served as the source of the fungus for eastern Colorado, and
4) unusually cool, wet weather developed in late May and early June on the High Plains that allowed the fungus to develop once it arrived.

It seems unlikely that we will get all this together again this year. But we are starting out much the same with drought conditions now (April 2001). Our best approach is still to follow the development of disease in Kansas and base our action on what develops there.

Should we have planted non-susceptible varieties last fall? Not necessarily so. Even though is unlikely we will see this kind of situation again it is always a good idea to use a mix of varieties in your fields. There is always the potential for different problems to develop. The major problem in most years is more likely to be Russian wheat aphid. This year we saw susceptibility to stripe rust but we want to avoid over compensating for stripe rust and getting hit hard with another kind of problem. The fungus is well developed in Arkansas and areas to the east but is not a problem in the adjacent states as of this writing (5-5-02).

What's happening now? As of this writing, stripe rust has been observed in many areas east and south of Kansas and Oklahoma but leaf rust is much more prevalent and possibly more of a threat.

Bob Hunger, plant pathologist- OSU, reported last week that wheat leaf rust is increasing around Stillwater, and he expects throughout the state. He read hundreds of breeder plots for reaction to leaf rust at Stillwater on Friday (May 3rd), and had severities of 50-80 S (anywhere from 5-8 on a scale of 1-9) on susceptible lines. These included Above, TAM- 107, TAM-110, and Chisholm. The variety, Above, was clearly the most susceptible of these. He reports very low levels of stripe rust.

The rust newsletter reported earlier that in mid-April, wheat leaf rust was found in fields in trace to light amounts, and was severe on susceptible cultivars in research plots from central Texas to South Carolina. In early April, sufficient moisture conditions in central and southern Texas allowed leaf rust to increase to 70% severity levels on flag leaves in plots at College Station and McGregor.

From northeastern Louisiana, through Alabama and Georgia to North Carolina, trace to light amounts of leaf rust have been observed in research plots. Leaf rust is widely present in at least trace amounts throughout the winter wheat area of the southern plains and the southeastern states. Leaf rust incidence and severity should increase in the next few weeks with increased rainfall and warmer temperatures. Stripe rust in Arkansas has been very severe on susceptible varieties according to Gene Milus, wheat pathologist at Fayetteville.

If stripe rust or leaf rust begin to develop prior to or at boot spraying should be considered only if there is a forecast for rain and some rust is detectible.

In Colorado Tilt cannot be used after boot but we have been successful in getting a supplemental label for the use of PropiMax EC. PropiMax EC is a 50% a.i. propiconazole fungicide from Dow AgroSciences and should do as well and can be used post boot (i.e., during flowering from 10 to 10.5 Feakes) use in Colorado.

2001 Wheat Stripe Rust Fungicide Evaluation at Flowering

A field trial was conducted at the Agricultural Research Development and Education Center (ARDEC) Fort Collins, CO to identify fungicides that effectively control stripe rust (*Puccinia striiformis*) on Prairie Red wheat (*Triticum aestivum*), a cultivar that is highly susceptible to stripe rust. The incidence of stripe rust in the field was very high at the time of fungicide application. Treatments were arranged in a randomized complete block design with four replications. Fungicides were evaluated for effectiveness in controlling stripe rust on infected winter wheat and reducing yield loss. Individual plots were two rows wide and measured 5 x 26 ft. A single fungicide application was made on 19 June. Fungicides were applied at 2.1 pt per 520 sq ft using a CO_2-powered backpack sprayer equipped with two 8003 Tee-Jet nozzles at 40 psi. Plots were harvested with a small plot combine. Grain samples from each plot were used to determine test weight for each treatment.

Table 1.

Treatment and Rate/A	Test Weight	Grain Yield
	lb/bu	bu/a
1. Tilt 4 oz	60.35	94.13
2. Quadris 18.5 oz	59.50	79.65
3. BAS 500 7.5 oz	59.57	91.57
4. Untreated check	57.73	77.03
LSD (P=0.05)	**0.76**	**18.93**

SCOUT—DO NOT SPRAY IF THERE IS NO RUST!

Caterpillar Pests of Wheat in Colorado

Frank Peairs

Several species of caterpillars attack wheat in Colorado, including army cutworm and pale western cutworm, which attack in early spring. These can be easily distinguished from each other by the lack of markings on the body of pale western cutworm. Wheat head armyworm and the armyworm are later season pests.

Army cutworm - Army cutworm has one generation per year. Eggs hatch in the fall following a rainfall, and the small caterpillar feed on warmer days throughout the winter. In the spring they feed more and grow more rapidly. Army cutworms are found under soil clods and other debris during the day, and climb plants at night and on cloudy days to feed. They attack many different plants, including wheat, alfalfa and sugar beet. They often prefer broadleaf weeds over wheat plants. They pupate in the soil and adult moths (a.k.a. "millers," a household nuisance) emerge in May and June and migrate to higher elevations in the Rocky Mountains to escape high summertime temperatures. In late summer and early fall, the moths return to the plains to lay their eggs in wheat fields and other cultivated areas.

Monitor wheat fields periodically during late winter and early spring. Army cutworm is a foliage feeder but usually hides during the day. Larvae can be found under soil clods and surface debris, usually near the base of the plant. Occasionally they are found feeding on cloudy days and during the evening. Consider treatment with a pyrethroid insecticide based on following guidelines:

Table 1. Guidelines for treatment for army cutworm.

Condition of crop	Treat if larvae exceed
Thin or moisture stressed	2 or more per square foot
Healthy	4 or more per square foot

Pale western cutworm - Pale western cutworm moths emerge from the soil in late summer and fall. They deposit eggs in loose soil in late August and September. Eggs usually hatch in late winter, although hatch may be delayed if moisture and temperature conditions are unfavorable. Larvae prefer loose, sandy or dusty soil and are found most easily in the driest parts of the field, such as hilltops. Pale western cutworm is a subterranean cutworm, feeding on stems at the crown. It will attack many crops, although it is mostly a pest of winter grains and corn. Feeding results in severed stems, and entire fields may be lost in a matter of days. After feeding is complete, larvae move to pupal chambers constructed several inches below the soil surface.

Outbreaks are associated with dry conditions in the previous spring. If the preceding May and June had fewer than 10 days on which rainfall exceeded 1/4 inch, expect pale western cutworm populations to increase. If the preceding May and June had more than 15 days on which rainfall exceeded 1/4 inch, pale western cutworm will almost totally disappear. Rainfall of more than 1/4 inch drives pale western cutworms to the soil surface and exposes them to natural enemies such as birds.

Scouting is particularly important if high adult activity is detected during the previous summer and fall and weather conditions are dry. Pale western cutworms tend to concentrate in favorable parts of the field, so it is important to sample the entire field before making any decisions. Larvae can occur at least three inches below the soil surface. Leaf feeding, wilted leaves and dead tillers are good signs of cutworm feeding. Studies in Wyoming found losses of 5 to 15 percent per larva per foot of row. Consider treatment with a pyrethroid insecticide as shown in Table 2. Spot-treating heavily infested areas can save chemical application costs and prevent the spread of damage.

Table 2. Guidelines for treatment for pale western cutworm.

Condition of crop	Treat if larvae exceed
Good yield potential	1 per square foot
Low yield potential	2 per square foot

Armyworm - Armyworm moths migrate into Colorado in early summer. It is mostly a pest of corn and spring grains, with only occasional infestations occurring in winter wheat. They lay their eggs in rows or clusters on the lower leaves of various grass crops, mostly in denser vegetation. Larvae feed at night and on cloudy days, and hide under crop debris during sunny periods. One or more generations may occur per year. Mature larvae are about 1.5 inches in length, smooth-bodied, and dark grey to greenish-black. They have five stripes, three on the back and two on the sides, running the length of the body. While the stripes on the back are variable in color, the stripes on the sides are pale orange with a white outline. The head capsule is remarkable for its "honeycomb" of black markings.

Scout for armyworm in field margins, low areas with rank growth or areas of lodged plants. Look for feeding damage, frass (droppings) around base of plant, or plant material that has been severed by armyworm feeding and fallen to the ground. Check for larvae in and under debris around damaged plants and in heads of barley or wheat.

Consider treating armyworm infestations if worms are 0.75 to 1.25 inches long; most larvae are not parasitized (look for white eggs behind the head or small brown cocoons attached to the body); leaf feeding or head clipping is evident; and the guidelines below are exceeded:

Table 3. Guidelines for treatment for armyworm.

Condition of crop	Treat if larvae exceed
Preheading - defoliation in lower leaves	5 per square foot
Headed - head clipping	2 per square foot

Wheat head armyworm - Moths emerge from the soil to lay eggs in the spring, and larvae can be found in wheat in June. First generation larvae feed on the heads of wheat at night and hide near the base of the plant during the day. Damage to grain is similar in appearance to that caused by weevils in stored grain. Pupation occurs again in the soil, and a second moth flight occurs in late August. Wheat head armyworm feeds on the heads of a variety of grasses and cereal crops and seems to prefer the heads.

Wheat head armyworm is generally considered to be a minor pest, but it has the potential to be a serious problem because it directly damages grain. No treatment guidelines are available. A sweep net can be used for sampling for this pest. Infestations often are limited to field margins. If an outbreak occurs, any registered contact insecticide should be effective.

Weed Science Update

Phil Westra and Tim D'Amato

New Herbicide Use in Wheat

Aim - (FMC Chemical Co.), is labeled for broadleaf weed control in wheat and barley. This product is a contact, or burn-down type herbicide with no residual activity. Coverage is critical and weed size should be four inches or less for effective results. Aim may be applied as a tank mix partner with other herbicides registered for use in wheat.

Maverick - (Monsanto Chemical Co.), is labeled for use in wheat in wheat/fallow rotations. Maverick is a selective herbicide for control of annual brome species (in the Great Plains region - downy brome, cheatgrass, Japanese brome), as well as control of flixweed and pennycress, and suppression of blue mustard. Maverick provides post and soil residual activity, and is most effective when applied in the fall.

Paramount - (BASF Chemical Co.), is labeled for use in fallow with rotation to wheat or milo, pre-emergence to wheat or milo, and in-crop milo. Paramount has excellent residual activity and is effective for management of field bindweed, as well as providing control of barnyard grass and foxtail species. The Paramount label is expected to be expanded to in-crop wheat, and rotations that include millet and corn.

Starane - (United Agri Products), is a post emergence herbicide registered for use in small grains. Starane has excellent crop safety in wheat, barley, and oats and applied in a tank mix with 2,4-D or MCPA will provide control of a wide spectrum of susceptible broadleaf weeds.

Clearfield Wheat - BASF and regional universities are developing "IMI Wheat" or wheat lines resistant to imidazolinone herbicides. Clearfield wheat is developed for resistance by way of selection, not gene insertion, and is not classified as a GMO (genetically modified organism). Locally adapted Clearfield wheat seed should be available in the Central Great Plains Region by planting time in 2002. The herbicide labeled for use in Clearfield wheat goes by the trade name **Beyond** and provides selective control of winter annual grasses such as downy brome, jointed goatgrass, and feral rye.

Integrated Management Systems - A large-scale experiment near Platner, CO, is evaluating the effects of cultural practices (variety, tillage, plant density, date of planting, and nitrogen application) on severity of jointed goatgrass infestation. No-till increased jointed goatgrass reproductive tillers over that of conventional-tillage or reduced-tillage. Increasing planting rate from 40 to 60 lb/ac decreased jointed goatgrass growth characteristics. Delayed planting resulted in lower wheat yields and more jointed goatgrass. The variety "Akron" yielded the highest, however "TAM 107" seemed to suppress jointed goatgrass infestations.

Implementation of Best Management Practices for Management of Jointed Goatgrass - The National Jointed Goatgrass Research Program has funded the establishment of four large scale, on-farm trials in the Great Plains for economic analysis and demonstration of current practices compared to new integrated approaches. Crop rotations and cropping systems have been adapted to environmental conditions and surrounding cultural practices of each cooperator. Results are not yet available but field days will be held at several of these sites this summer.

Managing Nitrogen in Wheat under Drought Conditions

Jessica Davis and Dwayne Westfall

The severe drought conditions in many parts of the state this year have led to reduced spending on fertilizer, as well as other farm inputs. Here are a few options which may help you get the most yield and protein from the fertilizer investment you do make.

1) **Soil sample**

Soil sampling costs about $1.00-$2.50 per acre. If your test results cause you to reduce your N fertilization rate by 10 lbs or more per acre, you'll be saving money in the long run.

2) **Fertilizer type**

Anhydrous ammonia is still the cheapest fertilizer per pound of N, and ammonium nitrate is still the most expensive, with UAN and urea in between these extremes. Assuming proper fertilizer placement, there is no difference in the effectiveness of different N sources.

3) **Fertilizer placement**

Be sure to place your fertilizer appropriately in order to reduce N volatilization losses to the air. Anhydrous ammonia should be placed 4-6 inches deep. Volatilization risk is high when surface applying UAN and urea during hot, dry weather. Early spring applications usually do not result in significant volatilization losses. Banding will reduce N loss, and subsurface banding will conserve even more N for use by the crop, thus increasing fertilizer efficiency, assuming soil moisture is adequate.

4) **Timing of fertilizer application**

A 3-year study at 19 sites around eastern Colorado showed that under conventional tillage, spring-applied N increased both grain yield and protein more than the same amount of fall-applied N. Fall-applied N requires about 20% more N to achieve the same yield and quality as spring-applied N. Therefore, you'll get more return on your fertilizer investment if you wait till spring greenup to apply. In addition, if winter precipitation is inadequate or other factors limit your stand or yield potential, you can reduce your N fertilizer rate accordingly in the spring. Applying N in the fall involves greater risk because you don't know what the conditions and yield potential will be in the spring. For spring topdressing, apply up to 60 lbs N/acre as UAN (dribbled on) or broadcast ammonium nitrate if it's windy.

5) **Selection of fields to fertilize**

Apply fertilizer on fields with the greatest probability of response. In general, the lower the soil nitrate level, soil organic matter content, or historic grain protein concentration (below 12%), the greater your chances of getting a yield and/or protein response to N application. However, if something else is limiting yield, like drought, applying N will not overcome those limitations. Don't waste your money on N in these situations.

6) **Applying N to get a protein premium**

It takes 20-30 lbs N/acre to increase protein by 1% (above 12%). Compare fertilizer costs with your protein premium and see if it will pay off for you. Remember, in years of low yield the protein content is usually high. We expect protein content to be higher than normal under drought conditions, consequently, millers may not pay for high protein wheat because there is so much in the market place.

With low precipitation and reduced yield potential, farmers need to do all they can to be sure their fertilizer investment pays off. Consider the above options when making your fertilizer decisions this year.

Detection and Management of Jointed Goatgrass Using Remote Sensing and Site-Specific Technology

Chris Woodward, Raj Khosla, and Phil Westra

Jointed goatgrass is a nationwide problem estimated to cost producers over $145 million annually. In Colorado alone over 200,000 acres are infested with Jointed Goatgrass annually causing severe losses to farmers. Effective control and management of jointed goatgrass is a growing need.

The objectives of this study were two fold. First, this study was conducted to determine if jointed goatgrass could be detected remotely in wheat fields at wheat maturity using digital color infrared aerial imagery. The second objective was to control jointed goat grass via site-specific application of Imazamox (Beyond herbicide) and to test herbicide efficacy in controlling weed infestation and to measure the impact on grain yield.

The study was conducted on five winter wheat fields located in Northeastern Colorado that had infestations of jointed goatgrass during 2000 - 2001 wheat growing season. These fields were planted with both standard wheat and Clearfield wheat. Data collected during the growing season include: digital color infrared imagery, weed locations using a global positioning (GPS) system, and field samples including: above ground biomass, wheat and jointed goatgrass density, and jointed goatgrass weed seed banks.

The study results indicate jointed goatgrass can be detected and mapped at accuracies of 53% to 86%. Jointed goatgrass detection accuracy was positively influenced by the degree of weed infestations. Spatial statistical procedures used in an innovative approach were able to detect wheat density with up to 68% accuracy, jointed goatgrass seed banks with up to 100% accuracy, and biomass with 62% predictive accuracy. Our site-specific control and management of joint goatgrass study indicated that the efficacy of the herbicide when applied site-specifically versus uniform conventional application was same. Such a finding indicates that site-specific control of jointed goatgrass would save money to farmers on expensive herbicide and also be beneficial to the environment.

The Figure 1 below shows the visible distinction between standard wheat (left) and Clearfield wheat (right) at a study field. Figure 2, shows the color infrared imagery for the same field with jointed goatgrass and kochia patches indicated.

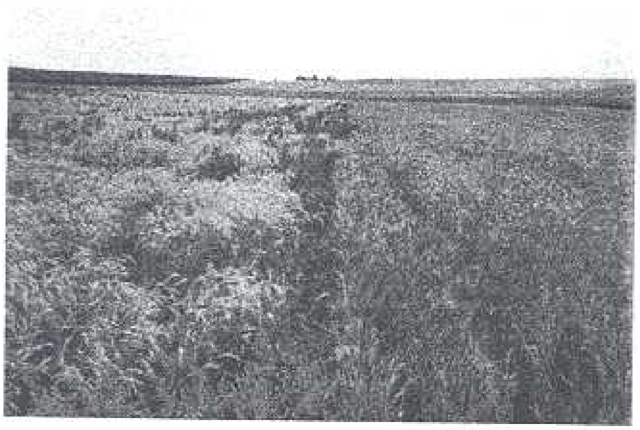


Figure 1. Visible distinction between standard wheat (left) and Clearfield wheat (right) at Study Field 3.

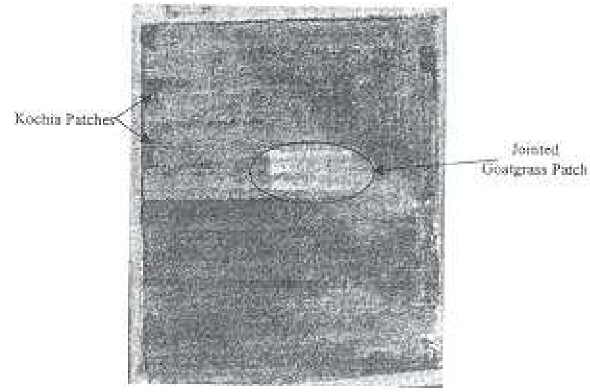


Figure 2. Color infrared imagery obtained overhead Study Field 3 with a jointed goatgrass and kochia patches indicated.

Making Better Marketing Decisions in 2002

Darrell Hanavan

Six years ago, U.S. and worldwide wheat stocks were the lowest in history which resulted in record-high wheat prices. U.S. wheat ending stocks are now projected to exceed the 10-year average by 15 percent on May 31, 2002 and should continue to decline during the 2002-03 marketing year. Wheat prices will remain below the 10-year average price of $3.29 per bushel, until ending stocks fall to the 10-year average of 640 million bushels.

Projected plantings of all U.S. wheat for harvest in 2002 is expected to be down approximately 1 percent, but are down more then 13 percent from the 10-year average and the lowest planted acreage since 1972. Actual acres harvested and yield will be the keys to the price of wheat in the 2002-2003 marketing year. Although U.S. wheat stocks are presently high, world wheat stocks are below the 10-year average. As world demand reduces U.S. wheat stocks in the coming year, prices should rise.

Understanding historical market trends can help Colorado wheat producers make better marketing decisions. Only 32 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). Fifty-eight percent (58%) of Colorado's wheat production is sold prior to December when market prices have been the lowest. On average, there has been a 59-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 59 cents per bushel after November in the 2002-2003 marketing year. The price of wheat during the 2001-2002 marketing year has been erratic and uncharacteristic of long-term trends. 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.

Table 1. Colorado Average Wheat Prices, 1991-2001 (July-June)

Marketing Year	July Average Price/Bu.	Highest Monthly Average Price/Bu.	Price/Bushel Gain	Month	12-Month Average
1991-92	2.47	3.88	1.41	February	3.28
1992-93	3.06	3.36	.30	January	3.12
1993-94	2.70	3.58	.88	January	3.15
1994-95	3.02	3.71	.69	January	3.53
1995-96	4.20	5.67	1.47	April	4.92
1996-97	4.78	4.78	0.00	July	4.20
1997-98	3.20	3.33	.13	August	3.16
1998-99	2.52	2.76	.24	January	2.51
1999-00	2.12	2.37	.25	June	2.24
2000-01	2.47	2.96	.49	December	2.77
10-Year Average	**3.05**	**3.64**	**0.59**	**December-April**	**3.29**

Western Winter Wheat at Hayden

Calvin Pearson and Scott Haley

Growers in northwest Colorado are limited to only a few crops they can grow because of constraints created by dryland production conditions, a short growing season, limited precipitation, and isolation to markets. The principal cash crop grown in northwest Colorado is wheat.

Each year small grain variety performance tests are conducted at Hayden, Colorado to identify varieties that are adapted for commercial production in northwest Colorado (Fig.1).

Fig 1. 1999 winter wheat variety test plots at Hayden, Colorado. August 2, 1999. Photo by Calvin Pearson.

Twenty-three winter wheat varieties and lines were evaluated during the 2000-2001 growing season at the Mike and Dutch Williams Farm near Hayden, Colorado. The experiment design was a randomized complete block with four replications. The seeding rate was 56 lb/ac. An application of 2,4-D at 0.50 lb/ac was made on May 17, 2001. No insecticides were applied.

Precipitation during the 2001 growing season was 0.98" in April, 1.37" in May, 0.69" in June, 1.49" in July, 1.51" in August, 0.90" in September, and 0.99" in October. Precipitation in the Craig/Hayden area varies considerably from month to month and year to year and is the most limiting factor for dryland grain yields.

Table 12. Description of winter wheat varieties in western trials.

Variety Name	Class	Origin
2137	Hard Red	Kansas
Blizzard	Hard Red	Idaho
Boundary	Soft White	Idaho
Brundage	Soft White	Idaho
Avalanche	Hard White	Colorado
CO950043	Hard Red	Colorado-EXP
CO970498	Hard Red	Colorado-EXP
CO970940	Hard Red	Colorado-EXP
CO970943	Hard Red	Colorado-EXP
Daws	Soft White	Washington
Fairview	Hard Red	Colorado/Idaho
Garland	Hard Red	Utah
NuFrontier	Hard White	General Mills
NuHorizon	Hard White	General Mills
Golden Spike	Hard White	Utah
Halt	Hard Red	Colorado
Hayden	Hard Red	Colorado/Idaho
ID513	Hard Red	Idaho
ID517	Hard Red	Idaho
ID548	Hard Red	Idaho
ID550	Hard White	Idaho
Jeff	Hard Red	Idaho
Lakin	Hard White	Kansas
Madsen	Soft White	Washington
Manning	Hard Red	Utah
MTW9432	Hard White	Montana
MTW9441	Hard White	Montana
Nuplains	Hard White	Nebraska-USDA
OR941044	Hard White	Oregon
OR942496	Hard White	Oregon
Platte	Hard White	Agripro Bio. Inc.
Prairie Red	Hard Red	Colorado
Presto	Triticale	Colorado
Promontory	Hard Red	Utah
Stephens	Soft White	Oregon
Tomahawk	Hard Red	Agripro Bio. Inc.
Trego	Hard White	Kansas
UT203032	Hard Red	Utah
Wesley	Hard Red	Nebraska
WPB470	Soft White	Western Plant Breeders
Yuma	Hard Red	Colorado
Yumar	Hard Red	Colorado

Table 13. Dryland winter wheat variety performance trial at Hayden[1] in 2001.

Variety	Yield	Grain Moisture	Test Weight	Plant Height	Lodging[2]
	bu/ac	%	lb/bu	in	0.2-9.0
Golden Spike	47.0	9.3	53.9	26	2.3
ID550	44.2	9.1	54.0	25	2.7
UT203032	40.5	8.3	56.2	26	0.8
Hayden	35.6	8.5	53.9	26	0.8
Presto	34.5	9.8	50.9	31	1.3
Manning	34.2	9.5	55.2	24	1.9
Promontory	33.9	9.4	55.0	23	0.9
Blizzard	33.7	8.8	54.3	24	0.7
ID548	33.4	9.9	53.3	23	2.2
Jeff	32.8	8.9	56.3	27	3.7
Fairview	32.1	8.8	54.5	25	0.9
Boundary	31.8	9.5	49.2	20	0.2
OR941044	27.2	9.3	53.0	24	0.7
MTW9432	23.4	9.3	54.3	24	0.4
ID517	22.6	9.2	49.8	20	0.7
NuHorizon	22.0	9.3	54.1	19	0.5
Trego	21.6	9.1	55.5	20	0.7
MTW9441	21.3	8.3	53.9	25	0.7
NuFrontier	20.9	9.9	51.9	20	0.8
Lakin	19.2	10.0	52.7	20	0.7
Avalanche	18.5	9.8	52.3	20	0.8
Nuplains	17.8	9.3	54.2	20	0.8
OR942496	17.5	9.3	51.3	21	0.9
Average	**28.9**	**9.2**	**53.5**	**23**	**1.1**
$LSD_{(0.05)}$	5.8				

[1]Trial conducted on the Dutch and Mike Williams farm; seeded 10/3/00 and harvested 8/29/01.

[2]0.2 = no lodging, 9.0 = total area lodged flat.

Western Winter Wheat at Yellow Jacket

Mark Stack and Abdel Berrada

Table 14. Dryland winter wheat variety performance trial at Yellow Jacket[1] in 2001.

Entry	Yield[2]	Test Weight	Grain Moisture	Plant Height	Heading Date[3]	Grain Protein	Grain Hardness[4]
	bu/ac	lb/bu	%	in	date	%	rating
Presto	8.77	51.0	9.7	25.5	5/29	15.9	-6
ID548	7.66	55.9	12.2	21.5	6/2	17.9	73
Promontory	7.39	55.5	12.5	20.0	6/2	17.4	75
Jeff	7.35	57.5	12.1	24.0	6/8	17.5	79
ID550	7.14	56.0	----	19.8	6/8	17.4	59
Manning	7.00	56.0	12.3	22.0	6/2	17.7	87
Trego	6.51	56.3	12.4	17.5	6/2	18.8	62
Golden Spike	5.73	55.7	12.2	20.0	6/8	17.6	78
OR941044	5.49	53.7	12.2	17.0	6/8	17.8	55
Avalanche	5.34	52.8	12.7	17.5	5/3	18.3	70
UT203032	5.17	55.4	12.2	21.5	6/5	17.9	68
Fairview	4.99	55.6	12.1	23.0	6/5	18.2	76
NuFrontier	4.73	53.8	----	18.2	6/2	17.7	62
Hayden	3.93	55.1	12.2	20.5	6/8	19.0	68
Boundary	3.60	48.9	13.6	14.5	6/11	18.7	54
Blizzard	3.47	55.1	12.2	17.5	6/11	18.5	90
Lakin	3.23	48.9	13.5	18.5	6/2	17.6	72
Nuplains	3.17	54.8	12.6	14.0	6/8	14.1	62
MTW9432	3.10	55.8	12.2	21.0	6/8	18.7	44
NuHorizon	3.09	55.6	12.5	15.5	6/2	17.3	34
OR942496	2.90	54.2	12.3	18.0	6/5	18.0	33
ID517	2.43	50.5	12.7	15.0	6/2	18.3	50
MTW9441	2.04	----	----	16.0	6/8	19.2	79
Average	**4.97**						
LSD $_{(0.05)}$	1.95						

[1]Trial conducted at the Southwestern Colorado Research Center; seeded 10/16/00 and harvested 8/8/01.

[2]Bushel yield based on 60 lb/bu and 12% moisture.

[3]Date 50% of plants headed.

[4]Grain hardness: Hard wheats >35; Soft wheats <35.

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
Herbicide: Harmony Extra 0.5 oz/ac + 2,4-D Ester 4 oz/ac
Precipitation: April thru June 2.2 inches (2.76 inches long-term average)

Comments:

The yields were very low due to two years of below normal winter and spring precipitation. There was no noticeable damage to the heads from a freeze that occurred on June 14 (31° F). However, some area farmers attributed their low winter wheat yields in part to the freeze.

Dwarf bunt was observed in Avalanche, Nuplains, MTW9432, MTW9441, and OR942496. No significant Russian wheat aphid damage was noted.

Western Winter Wheat at Fruita

Calvin Pearson and Scott Haley

Irrigated winter wheat in western Colorado (Mesa, Montrose, and Delta Counties) was grown on 6,000 acres in 2000. This compares to 1500 acres of barley and 4200 acres of oats grown in these same counties during 2000. Winter wheat in western Colorado is grown for two primary reasons. First, winter wheat is produced as a cash crop and second, it is grown for rotational purposes. Winter wheat is often planted as a rotational crop prior to fall-planting alfalfa. A irrigated winter wheat cultivar performance test was conducted during 2001 at the Western Colorado Research Center at Fruita to identify varieties that are adapted for commercial production in western Colorado.

Twenty-three entries were evaluated in 2001. The experiment design was a randomized complete block with four replications. The previous crop was dry beans. The seeding rate was 120 lb/ac. Fertilizer applications were 11-52-0 disced in at 104 lb P_2O_5/ac and 22 lb N/ac on October 4, 2000. Top-dressed fertilizer using ammonium nitrate was applied at 65 lb N/ac on March 21, 2001. Harmony Extra herbicide at 0.6 oz/ac and 2,4-D herbicide at 8 oz/acre (4 lb/gal formulation) plus 1 pint/ac of Activator 90 were applied as a tank mixture on March 20, 2001. Six irrigations were applied during the growing season.

Calvin Pearson evaluating winter wheat plots during the 2000 growing season at the Western Colorado Research Center in Fruita. Photo by Daniel Dawson.

Table 15. Irrigated winter wheat variety performance trial at Fruita[1] in 2001.

Variety	Yield	Grain Moisture	Test Weight	Plant Height	Lodging[2]	Heading Date[3]	Protein	Grain Hardness[4]
	bu/ac	%	lb/bu	in	0.2-9.0	days	%	rating
OR941044	160.7	9.0	61.3	42	0.9	137	9.3	81
Brundage	152.8	9.4	58.6	36	0.4	131	10.2	3
Lakin	152.3	9.6	60.3	40	1.3	130	10.5	58

Western Winter Wheat at Center

Merlin Dillon

Table 16. Irrigated winter wheat variety performance trial at Center[1] in 2001.

Variety	Yield[2]	Grain Moisture	Test Weight	Heading Date[3]	Plant Height	Plant Lodging	Grain Protein	Grain Hardness[4]
	bu/ac	%	bu/ac	days	inches	%	%	rating
NuHorizon	143.7	9.9	63.1	19	39	0.0	8.0	59
Yuma	137.6	10.1	60.0	15	42	11.3	10.9	53
Prairie Red	134.6	9.1	60.7	13	41	2.5	11.2	56
Tomahawk	131.1	9.8	60.8	13	40	1.3	11.8	49
Platte	130.5	9.8	63.6	18	38	0.0	11.7	56
Brundage	129.9	9.8	60.0	22	38	0.0	11.1	10
WPB470	129.4	9.4	61.9	22	39	0.0	11.7	19
CO970940	128.2	10.2	61.2	17	44	3.8	11.4	61
Yumar	127.2	9.7	61.3	17	43	15.0	10.4	63
Golden Spike	126.4	9.7	60.1	26	49	26.3	10.5	55
Halt	124.4	9.2	60.2	14	41	5.0	11.0	49
CO950043	124.2	9.4	60.0	15	43	0.0	11.4	59
Daws	122.6	9.1	60.4	28	43	12.5	10.7	44
CO970943	122.3	9.3	58.9	14	44	15.0	10.3	65
2137	119.6	9.9	61.6	19	42	0.0	10.0	75
NuFrontier	119.4	10.3	61.4	19	47	5.0	12.0	57
Nuplains	116.4	9.9	62.8	22	42	0.0	10.3	52
Wesley	111.4	10.1	60.9	14	38	0.0	11.7	62
CO970498	105.9	9.8	61.2	13	40	0.0	12.5	43
Stephens	97.8	9.4	60.0	26	42	0.0	10.7	19
Average	**124.1**	**9.7**	**61.0**	**18**	**42**	**4.9**	**11.0**	**50.2**
$LSD_{(0.10)}$	NS	0.49	0.55	1	1	8.1	1.8	23.4

[1]Trial conducted on the San Luis Valley Research Center; seeded 10/2/00 and harvested 8/31/01.

[2]Yield based on 12% moisture and 60 lb/bu.

[3]Number of days after June 1.

[4]Grain hardness reading of <40 indicates soft wheat and >40 indicates hard wheat.

Site Information:

Nitrogen: 75 lb/ac in Fall + 75 lb/ac at greenup + 20 lb/ac early boot.

Herbicide: 2,4-D

Freeze damage on June 13 & 14 was light here; severe in farmer fields.

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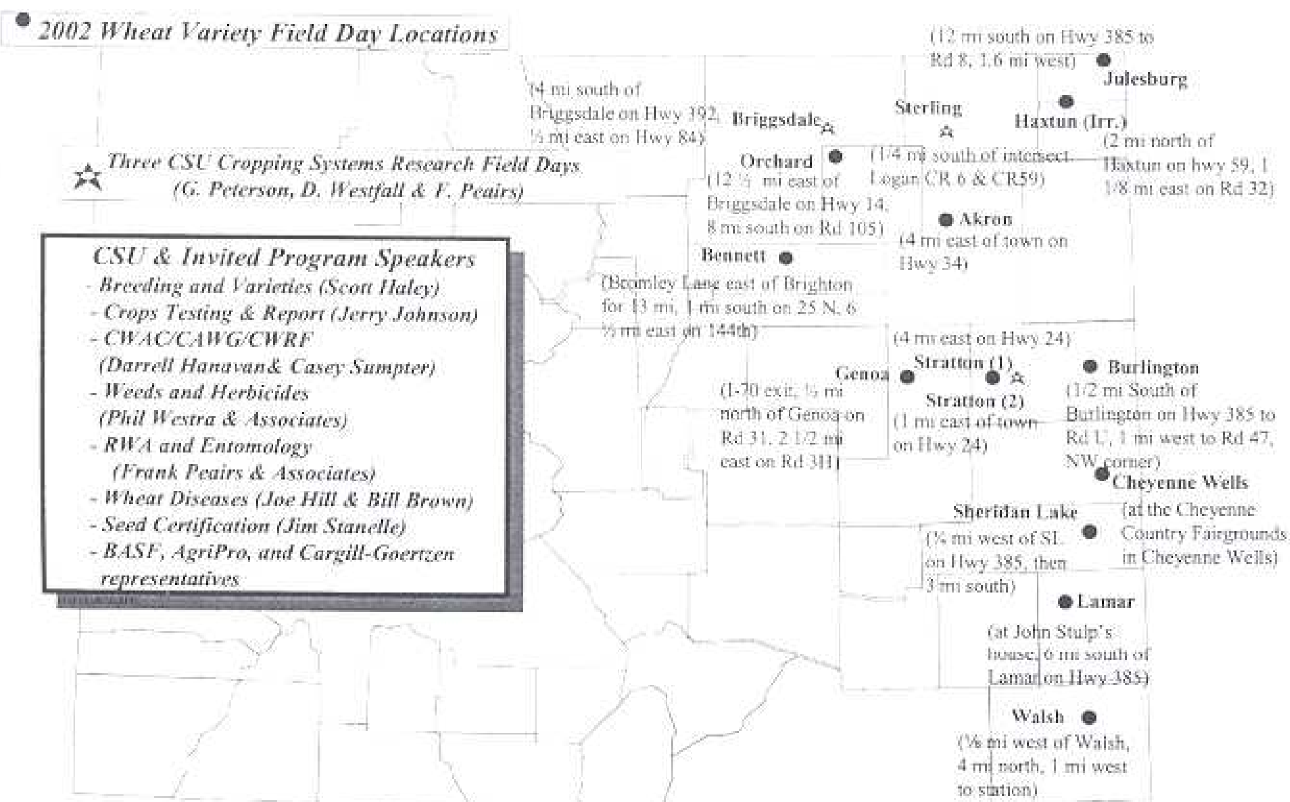
Colorado Wheat Field Days 2002

Stratton (1)	*June 6 (Thurs) 5 p.m. at Miltenberger Bros. farm, Kit Carson County*
Sterling	*June 7 (Fri) 5 p.m. at Gilbert Linstrom farm, Logan County*
Walsh	*June 10 (Mon) 9 a.m. at Plainsman Research Center, Baca County*
Lamar	*June 10 (Mon) 5 p.m. at John Stulp's house, Prowers County*
Sheridan Lake	*June 11 (Tues) CANCELLED (due to drought)*
Cheyenne Wells	*June 11 (Tues) 1 p.m. at the Cheyenne County Fairgrounds*
Burlington	*June 11 (Tues) 5 p.m. at Barry Hinkhouse farm, Kit Carson County*
Genoa	*June 12 (Wed) 8 a.m. at Ross Hansen farm, Lincoln County*
Haxtun (Irrigated)	*June 12 (Wed) 5 p.m. at Steve Smith farm, Phillips County*
Julesburg	*June 13 (Thurs) 8 a.m. at Joe Kinnie farm, Sedgwick County*
Orchard	*June 13 (Thurs) 3 p.m. at Cary Wickstrom farm, NW Morgan County*
Briggsdale	*June 13 (Thurs) 5 p.m. at Stan Cass farm, N Weld County*
Stratton (2)	*June 17 (Mon) 10 a.m. at Kenny Pottorff farm, Kit Carson County*
Bennett	*June 17 (Mon) 5 p.m. at John Sauter farm, Adams County*
Akron	*June 19 (Wed) 8 a.m. at Central Great Plains Res. Station, Washington County*



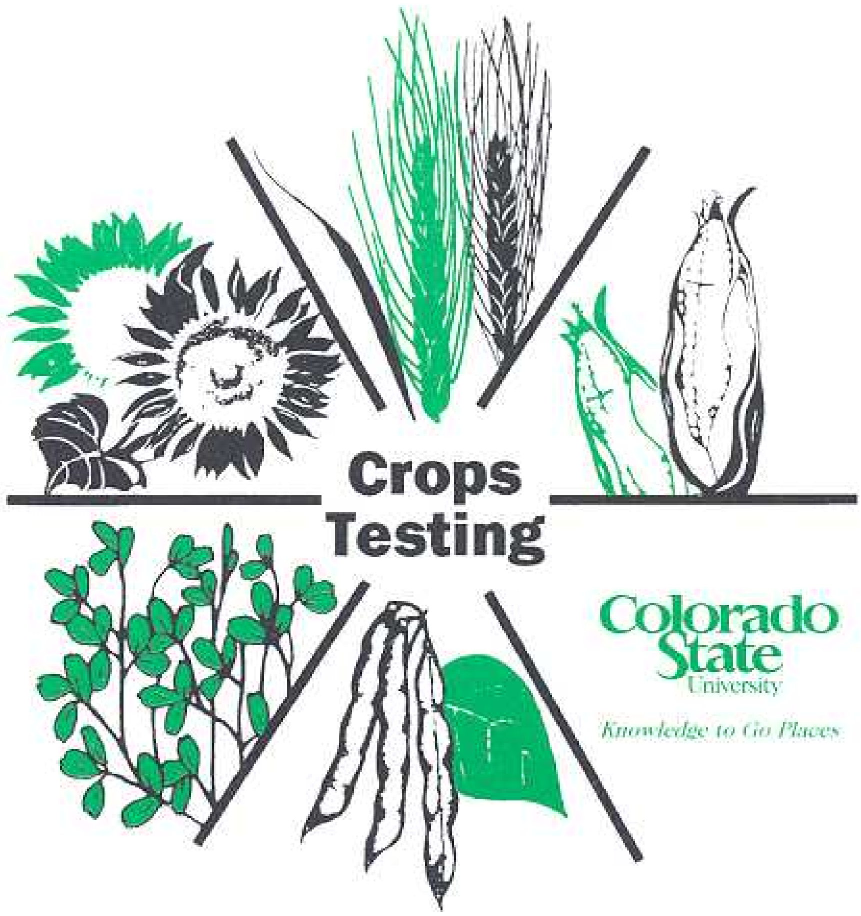
2001-2002 Colorado Winter Wheat UVPT

Variety	Plot #	Comments
Prowers 99	101	
Stanton	102	
Halt	103	
Prairie Red	104	
Yumar	105	
Yuma	106	
2137	107	
Jagger	108	
Venango	109	
Enhancer	110	
Akron	111	
Alliance	112	
Trego	113	
Avalanche	114	
Lakin	115	
G970209W	116	
TAM 110	117	
Above	118	
AP502 CL	119	
Thunderbolt	120	
Cutter	121	
Dumas	122	
Jagalene	123	
G970246	124	
G970380A	125	
G970447	126	
G970466	127	
TX95A3091	128	
Ok101	129	
CO99508	130	
CO99534	131	
CO970547	132	
CO980376	133	
CO980607	134	
CO980630	135	
CO980719	136	
CO980829	137	
CO00D007	138	
CO00D011	139	
CO00D019	140	
CO00D032	141	
CO991057	142	
CO991132	143	
CO991350	144	
CO991407	145	
CO99141	146	
CO99148	147	
CO99177	148	

Variety	Plot #	Comments
CO99314	149	
CO99W013	150	
CO99W033	151	
CO99W076	152	
CO99W078	153	
CO99W081	154	
CO99W183	155	
CO99W188	156	
CO99W192	157	
CO99W254	158	
CO99W277	159	
CO99W329	160	

2001-2002 Colorado Winter Wheat IVPT

Variety	Plot #	Comments
Yuma	101	
Yumar	102	
Venango	103	
Enhancer	104	
Wesley	105	
2137	106	
Jagger	107	
TAM 107	108	
Prairie Red	109	
Above	110	
Avalanche	111	
Trego	112	
Lakin	113	
Nuplains	114	
Platte	115	
Dumas	116	
Jagalene	117	
TX95A3091	118	
Ok101	119	
CDC Falcon	120	
Akron	121	
CO99508	122	
CO99534	123	
CO970547	124	
CO980376	125	
CO980607	126	
CO980630	127	
CO980719	128	
CO980829	129	
NW97S278	130	



Colorado State University

Knowledge to Go Places

Jerry Johnson, Extension Specialist Crop Production

COOPERATIVE EXTENSION
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