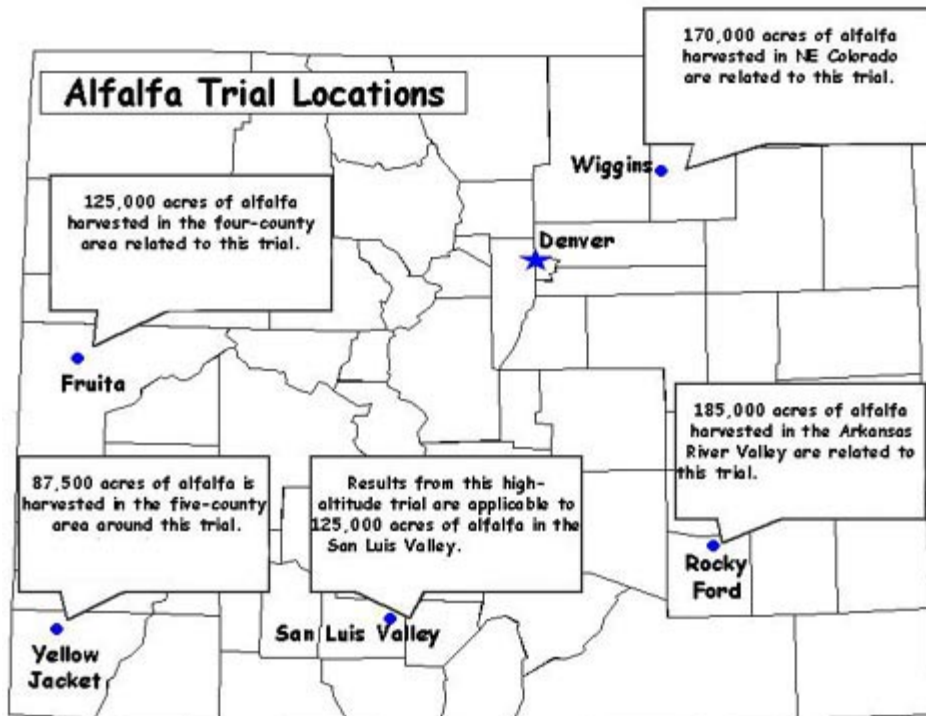


Colorado Alfalfa Variety Performance Results

Introduction to Colorado's alfalfa variety trials

Colorado alfalfa producers annually cut 850,000 acres valued at over \$280 million. To help hay producers make better alfalfa variety decisions, Colorado State University researchers evaluate alfalfa varieties at multiple locations. The objective of these trials is to provide Colorado hay producers with reliable and unbiased alfalfa variety information obtained from local trials. Participation by the seed companies in the state trials is completely voluntary. All commercial alfalfa seed companies are given the opportunity to enter one or more varieties at any location. Reference to commercial companies or varieties is made with the understanding that no discrimination is intended and no endorsement is implied by Colorado State University.

A randomized complete block design with four replications is used for each of the five alfalfa variety trials conducted in Colorado in 1998. Information on date of planting, fertilization and herbicide or insecticide applications made during the cropping year is provided at the bottom of each table of trial results. Hay yields are calculated on an air-dry basis. The least significant difference (LSD) and coefficient of variation (CV) are reported by cutting and for the total annual yield.



Western Colorado Alfalfa Variety Trial at Fruita

Forage yields of 20 alfalfa varieties at the Western Colorado Research Center at Fruita in 1999

Variety	Brand/Source	1st Cut	2nd Cut	3rd Cut	4th Cut	1999
		May 28	July 7	Aug 19	Oct 12	Total
tons/acre*						
DK142	Monsanto	2.76	2.61	1.92	1.46	8.74
Pinnacle	Arkansas Valley Seed Co.	2.81	2.46	2.14	1.33	8.74
WL 232HQ	Germaines	3.00	2.50	1.99	1.22	8.70
ZX 9451	ABI	2.72	2.51	2.13	1.35	8.70
Garst 6420	Garst	2.83	2.42	2.02	1.41	8.69
Millennia	IFA	2.83	2.53	1.99	1.32	8.68
ZX 9453	ABI	2.47	2.59	2.09	1.45	8.60
Archer	America's Alfalfa	2.60	2.57	1.96	1.42	8.55
Archer II	America's Alfalfa	2.61	2.46	2.10	1.34	8.51
DK140	Monsanto	2.77	2.41	1.94	1.38	8.51
TMF Multiplier II	Mycogen	2.69	2.46	2.02	1.27	8.44
ABT 350	ABT	2.64	2.50	2.00	1.26	8.40
WL 325 HQ	Germaines	2.65	2.58	1.88	1.28	8.39
Baralfa 54	Seekamp Seed	2.51	2.44	2.14	1.31	8.39
Innovator+Z	America's Alfalfa	2.69	2.30	1.90	1.30	8.20
Reno	Novartis	2.41	2.45	2.01	1.31	8.18
TMF 421	Mycogen	2.67	2.45	1.80	1.16	8.08
DK134	Monsanto	2.30	2.42	1.98	1.29	7.99
Ranger	public	2.31	2.09	1.87	1.18	7.45
Ladak	public	2.07	2.14	1.90	1.08	7.20
Average	-	2.62	2.44	1.99	1.31	8.36
CV%	-	11.24	5.17	6.80	5.85	4.16
LSD _(0.05)	-	0.42	0.18	0.19	0.11	0.49

Trial conducted at the Fruita Research Center located near Fruita, Colorado; seeded August 27, 1998.

*Yields are calculated on an air-dry basis.

Elevation 4510 feet. Average annual precipitation is 8.4 inches. Average frost-free days - 181.

Last spring frost - April 17, 1999; first fall frost - October 17, 1999. Frost-free days - 183 days (28 F base).

Fertilizer: 416 lbs P₂O₅/acre and 88 lbs N/acre broadcast as 11-52-0 on August 13, 1998 and plowed down prior to planting. Applied Pursuit at 1.44 oz/acre on February 24, 1999 for weed control.

Soil series: Billings silty clay loam.

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Arkansas Valley Alfalfa Variety Trial at Rocky Ford

(Note that the results below represent two years of a three-year trial. A new trial will be planted in summer 2000 and entries for this trial are being solicited. See entry form on the CSU alfalfa page)

Yields of 28 alfalfa varieties at the Arkansas Valley Research Center, 1998 and 1999

Variety	Brand/Source	1st Cut	2nd Cut	3rd Cut	4th Cut	1999	1998	2-yr
		June 2	July 6	Aug. 16	Oct. 5	Total	Total	Total
		tons/acre						
WS 210*	W-L Research	2.49	1.67	1.55	1.32	7.03	5.86	12.89
WL 324	Germain's	2.54	1.57	1.27	1.14	6.52	5.74	12.26
Depend + EV	Agripro Seeds Inc.	2.39	1.67	1.40	1.17	6.63	5.60	12.23
DK 143	Monsanto	2.21	1.63	1.46	1.22	6.52	5.67	12.19
3L104*	Novartis	2.61	1.43	1.36	1.19	6.59	5.57	12.16
Cimarron 3i	Great Plains Research	2.56	1.58	1.30	1.18	6.62	5.54	12.16
Millennia	Union Seed Co.	2.47	1.57	1.35	1.25	6.64	5.48	12.12
ZX 9352*	ABI Alfalfa	2.40	1.57	1.44	1.14	6.55	5.46	12.01
631	Garst Seed Co.	2.40	1.62	1.41	1.17	6.60	5.38	11.98
Leaf Master	Union Seed Co.	2.59	1.57	1.30	1.27	6.73	5.24	11.97
ZC 9651*	ABI Alfalfa	2.33	1.62	1.25	1.19	6.39	5.56	11.95
5454	Pioneer Hi-Bred	2.36	1.59	1.32	1.22	6.49	5.43	11.92
Big Horn	Cargill Hybrid Seeds	2.46	1.58	1.30	1.14	6.48	5.41	11.89
Affinity +Z	America's Alfalfas	2.42	1.53	1.30	1.19	6.44	5.44	11.88
TMF Multi-plier II	Mycogen Seeds	2.39	1.51	1.34	1.16	6.40	5.44	11.84
Pinnacle	Arkansas Valley Seed	2.34	1.70	1.29	1.15	6.48	5.35	11.83
DK 142	Monsanto	2.34	1.54	1.32	1.27	6.47	5.34	11.81
Innovator + Z	America's Alfalfas	2.18	1.60	1.34	1.15	6.27	5.43	11.70
DK 127	Monsanto	2.26	1.59	1.28	1.16	6.29	5.24	11.53
Archer	America's Alfalfas	2.19	1.56	1.36	1.18	6.29	5.24	11.53
Haygrazer	Great Plains Research	2.25	1.49	1.34	1.16	6.24	5.29	11.53
630	Garst Seed Co.	2.21	1.58	1.28	1.12	6.19	5.34	11.53
ZC 9650*	ABI Alfalfa	2.11	1.53	1.28	1.09	6.01	5.30	11.31
WL 325HQ	Germain's	2.19	1.50	1.24	1.08	6.01	5.25	11.26
Lahontan	USDA NV-AES	2.18	1.42	1.35	1.11	6.06	5.13	11.19
6L271*	Arkansas Valley Seed	2.04	1.44	1.46	1.17	6.11	5.07	11.18
Ranger	USDA NE-AES	1.85	1.30	1.17	0.93	5.25	4.71	9.96
Vernal	USDA WI-AES	1.91	1.41	1.17	0.90	5.39	4.51	9.90
Average		2.31	1.55	1.33	1.16	6.35	5.36	11.71
CV%		7.78	5.88	5.96	4.98	4.72	4.12	3.38

LSD (0.05)	0.25	0.13	0.11	0.08	0.42	0.31	0.56
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Trial conducted on the Arkansas Valley Research Center at Rocky Ford, CO; planted 8/29/97.

Yields calculated on oven-dry basis.

*Indicates experimental entry

Elevation 4178 feet. Average annual precipitation 11.79 inches. Average frost-free days-158

Last spring frost-April 26 1999; First fall frost-September 29, 1999; 1999 frost-free days-156

Fertilizer: 150 lbs P₂O₅/acre plus 31 lbs N/acre prior to planting and Nov. 30. 1998.

Soil series: Rocky Ford silty clay loam

Herbicide: Sencor 75DF .50 + Gramoxone .31 lb.s AI/Acre - Feb 16, 1999.

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San Luis Valley Alfalfa Trial at Center

Results from the San Luis Valley alfalfa variety trial are applicable to other high mountain areas of Colorado. Colorado's high altitude alfalfa acreage is nearly 200,000 acres. The 1999 season was cool early and especially rainy in July and August. Growers yields were down slightly; especially the third cutting. The third cutting was reduced because rains again delayed getting the second cutting off the fields. Harvest times were about normal this year; first cutting was June 16; second cutting was July 22; third cutting was September 24. The total yield this year was 5.9 tons/acre. First cutting was 2.2, second was 2.1 and third cutting was 1.6 tons/acre. These yields are slightly higher than many growers yields, especially the third cutting. Most growers baled the first and third cuttings without rain. Rain showers began in early July; rain damage for second cutting was very common. Highly significant differences in winter injury were noted in May 1998. These differences were not important for following yields; except two varieties with low damage yielded highest in both 1998 and 1999. As usual, Ranger (check variety) yielded the lowest. The advantage of newer varieties is usually 0.7 tons/acre; more than enough to pay the higher seed cost of newer varieties.

Forage yields of 20 alfalfa varieties at the Richard Ramstetter Farm, Center, CO in 1997-99.

Variety	Brand/Source	1997	1998	1999	3-Year Total	Winter Injury Rating
		-----tons/acre-----				-
Class	Union Seed Co.	6.5	5.1	6.0	17.7	1.5
Pinnacle	Arkansas Valley Seed	6.3	5.0	6.2	17.5	2.3
Extend	Grassland West	6.3	5.2	5.9	17.2	4.0
ZN 9540	ABI Alfalfa	6.1	5.1	5.9	17.1	3.3
Webfoot MPR	Great Lakes Hybrids	6.2	4.5	5.9	17.0	2.8
Innovator+Z	America's Alfalfa	6.1	5.0	6.0	17.0	3.5
Rainier	Northrup King	6.1	5.0	5.9	16.9	3.5
Depend+EV	Agripro Seeds Inc	5.9	5.0	6.0	16.8	4.0

WL 325HQ	W-L Research	5.8	5.1	6.1	16.8	4.3
ABI 9142	ABI Alfalfa	6.1	5.1	5.7	16.7	4.0
DK 127	DeKalb Genetics	6.1	4.8	5.8	16.7	2.0
AmerGraze 401+Z	America's Alfalfa	5.9	5.0	5.9	16.6	3.8
Vernal	USDA WI-AES	5.9	5.2	5.7	16.5	3.8
DK 122	DeKalb Genetics	6.0	4.6	5.6	16.3	3.3
Alfaleaf II	Plains Alfalfa Assoc.	6.0	5.0	5.4	16.2	3.8
ZG 9543	ABI Alfalfa	5.2	5.1	6.1	16.1	3.0
WL 324	W-L Research	5.3	4.9	6.0	16.0	3.3
Affinity+Z	America's Alfalfa	5.3	5.0	5.8	16.0	4.0
WL 252HQ	W-L Research	5.1	4.7	5.8	15.4	2.8
Ranger	USDA NE-AES	4.9	4.5	5.5	14.7	3.5
Average	-	5.7	5.0	5.9	16.5	3.3
CV%	-	8.4	8.4	7.0	6.3	-
LSD (0.10)	-	0.57	NS	NS	1.13	-

Yields calculated on an air-dry basis. Winter Injury Rating based on observation of plant injury and death in May 1998: 5 = Severe damage; 1 = No damage. Trial planted: August 2, 1996 at 16 lbs/acre.

Fertilizer: 104 lbs/acre phosphate plus 22 lbs/acre nitrogen broadcast.

Experiment design: randomized complete block with four replications.

Soil series: Norte gravelly sandy loam.

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High-Altitude Alfalfa in Colorado

Alfalfa is the most valuable crop besides potatoes in the San Luis Valley. The San Luis Valley acreage was 140,000 with a value of \$40 million. The San Luis Valley is a large, flat intermountain valley surrounded by snow-capped mountains. The elevation of 7600 feet makes for a cool, short growing season. The average precipitation is only 7-9 inches. The average frost-free period is 88 days; from June 10 to September 6. Growers are more and more using a 3-cut system. Winter hardiness and persistence are important variety selection factors; as are yield and pest resistance. Alfalfa stands in the San Luis Valley usually last 5-7 years which means about 20- to 25,000 acres are seeded each year. About half of the acreage is sprinkler irrigated under center pivots and the remainder is flood irrigated. The average yield for the area is about 3.5 tons/acre; however, the typical center pivots yield close to 5.0 or 5.5 tons/acre.

Researcher

Merlin A. Dillon, Area Agronomy Extension Agent, has conducted alfalfa trials in the San Luis Valley for 18 years. Raised on a dryland farm in southeast Colorado (Baca County), Merlin received a B.S. in Agronomy from Panhandle State University in Goodwell, Oklahoma, and an M.S. in Agronomy from Colorado State University. Merlin worked for Kansas State University, as an irrigated farm consultant, and as an independent fertilizer applicator prior to joining the San Luis Valley Research Center in 1982. Research has included small grain variety trials (wheat, barley, and oats) as well as work on quinoa, canola, and alternate crops.

Northeastern Colorado Alfalfa Trial Results at Wiggins

Planted in its present location on 3 September 1997, two cuttings were made in 1998 and all four cuttings were made in 1999. Stands were excellent in 1999 and no major pest problems were observed. We are grateful to our cooperator, Martin Smits, for his contributions to the success of this trial.

Forage yields of 26 alfalfa varieties at Wiggins in 19991

Variety	Brand/Source	1st Cut	2nd	3rd	4th Cut	1999	1998	2-yr
		May 28	Cut July 1	Cut Aug 6	Sept 13	Total	Total	Total
tons/acre								
Pioneer brand 5396	Pioneer Hi-Bred Int'l, Inc.	2.48	2.15	1.66	1.76	8.05	3.71	11.76
Legacy	Grassland West Company	2.31	2.01	1.68	1.91	7.92	3.72	11.64
AlfaLeaf II	Sharp Bros. Seed Co.	2.19	2.05	1.64	1.88	7.76	3.87	11.63
Reno	Novartis Seeds	2.28	2.13	1.71	1.87	8.00	3.58	11.58
Total + Z	America's Alfalfa	2.35	1.97	1.65	1.74	7.71	3.83	11.54
Shamrock	Sharp Bros. Seed Co.	2.39	2.08	1.69	1.76	7.92	3.61	11.53
Complete	Arrow Seed Co.	2.35	2.00	1.67	1.80	7.81	3.72	11.53
Excalibur II	Allied Seed	2.29	2.01	1.62	1.82	7.74	3.69	11.43
Magnum III	Dairyland Seed Company	2.23	2.05	1.73	1.80	7.80	3.59	11.39
Innovator+Z	America's Alfalfa	2.30	2.03	1.74	1.74	7.81	3.58	11.39
DEKALB DK142	Monsanto	2.30	2.10	1.69	1.68	7.78	3.58	11.36
TMF Multi-plier II	Mycogen Seeds	2.28	2.05	1.68	1.78	7.80	3.56	11.36
Big Horn	Cargill Hybrid Seeds	2.21	2.06	1.65	1.73	7.66	3.69	11.35
Spartan	Allied Seed	2.37	1.93	1.62	1.75	7.67	3.67	11.34
WL 325HQ	W-L Research, Inc.	2.34	2.04	1.65	1.75	7.77	3.54	11.31
Garst Seed 631	Garst Seeds	2.28	2.07	1.67	1.82	7.84	3.45	11.29
DEKALB DK127	Monsanto	2.20	1.94	1.62	1.77	7.54	3.59	11.13
Depend+EV	Agripro Seed, Inc.	2.30	2.08	1.71	1.69	7.77	3.36	11.13
Garst Seed 630	Garst Seeds	2.32	2.05	1.65	1.76	7.78	3.32	11.10
AmeriGraze 401 + Z	America's Alfalfa	2.31	1.95	1.65	1.69	7.59	3.50	11.09
Pioneer brand 5312	Pioneer Hi-Bred Int'l, Inc.	2.29	1.96	1.57	1.74	7.56	3.52	11.08
Webfoot MPR	Great Lakes Hybrids	2.08	2.04	1.73	1.60	7.44	3.55	10.99
Pinnacle	Arkansas Valley Seeds	1.85	2.01	1.57	1.76	7.18	3.80	10.98
Alpha 2001	Great Lakes Hybrids	2.25	2.04	1.72	1.76	7.77	3.17	10.94
Tahoe	Novartis Seeds	1.77	1.98	1.53	1.71	6.98	3.75	10.73

Evergreen-2	Arkansas Valley Seeds	1.63	2.03	1.56	1.66	6.87	3.63	10.50
Average	-	2.23	2.03	1.66	1.76	7.67	3.60	11.27
CV%	-	5.50	4.91	5.20	6.85	2.96	9.40	-
LSD(0.30)	-	0.09	0.07	0.06	0.09	0.17	-	-
LSD(0.05)	-	0.17	0.14	0.12	0.17	0.32	0.50	-

Trial conducted on the Martin Smits farm (NW 1/4 of Section 4, T 3N, R 60W), seeded 9/3/97.
Yields calculated on oven-dry basis and adjusted to 14% moisture.

Elevation: 4750 ft.

Soil series: Valent loamy sand with some bijou loamy sand characteristics

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Southwestern Colorado Alfalfa Trial Results at Yellow Jacket

Planted in its present location in 1996, two cuttings were made in 1996 and all cuttings were made in 1997-1999. Frequent rains in late July and throughout August delayed the second and third cuttings in 1999, which resulted in poor hay quality at the second cutting and low to very low yields at the third cutting. The plot area was somewhat weedy in 1999, which could also have contributed to the relatively low yields. A new alfalfa variety trial will be established at a new location in the spring of 2000.

Forage yields of 20 alfalfa varieties at the Southwestern Colorado Research Center at Yellow Jacket, Colorado in 1996-1999

Variety	Brand/Source	1st Cut	2nd Cut	3rd Cut	1999	1998	1997	1996	4-yr
		Jun 25	Aug 2	Oct 4	Total	Total	Total	Total	Total
-----tons/acre-----									
Blazer XL	Sharp Bros. Seed Co.	2.35	1.87	1.08	5.31	7.15	7.95	3.68	24.09
5472	Pioneer Hi-Bred	2.40	2.16	1.18	5.74	7.57	7.34	3.28	23.93
330	Union Seed Co.	2.22	1.85	1.12	5.19	7.54	7.78	3.33	23.85
Reward	Drussel Seed & Supply	2.30	2.15	1.26	5.71	7.59	7.09	3.37	23.78
5454	Pioneer Hi-Bred Int'l	2.22	2.07	1.07	5.36	7.49	7.26	3.24	23.35
Sterling	Cargill Hybrid Seeds	2.10	1.91	1.07	5.08	7.02	7.46	3.61	23.16
Rushmore	Novartis	2.14	1.86	0.98	4.98	7.44	7.48	3.17	23.08
ZX 9345	America's Alfalfa	2.11	1.90	1.10	5.11	7.09	7.35	3.48	23.03
Innovator + Z	America's Alfalfa	2.15	1.83	0.98	4.96	7.12	7.17	3.36	22.61
Archer	America's Alfalfa	2.22	1.99	1.03	5.24	7.01	7.15	3.22	22.61
Evergreen	Arkansas Valley Seed	2.03	1.83	0.91	4.77	7.00	7.16	3.53	22.46
WL 323	W-L Research, Inc.	2.07	1.77	0.81	4.65	7.04	7.57	3.20	22.45
Affinity + Z	America's Alfalfa	2.10	1.83	0.85	4.78	6.90	7.29	3.31	22.27
Vernema	Southwest Seed, Inc.	2.18	1.83	0.93	4.94	6.97	7.08	3.21	22.20

WL 325	W-L Research, Inc.	2.14	1.96	1.06	5.17	7.08	6.86	3.03	22.15
AlfaLeaf II	Cal/West Seeds	2.14	1.67	0.80	4.61	7.15	7.26	3.06	22.08
Depend + E	America's Alfalfa	2.16	1.93	0.94	5.02	6.79	6.99	3.11	21.91
DK 127	DeKalb Genetics Corp.	1.91	1.87	0.97	4.76	7.05	6.89	2.95	21.64
WL 252HQ	W-L Research, Inc.	2.05	1.75	1.02	4.81	6.84	6.90	3.08	21.62
Ranger	Arkansas Valley Seed	1.78	1.80	0.77	4.35	6.77	6.71	2.93	20.75
Average	-	2.14	1.87	1.00	5.03	7.13	7.24	3.26	22.65
CV%	-	-	-	-	12.22	5.56	6.20	7.00	6.51
LSD(.05)	-	-	-	-	0.87	0.32	0.63	0.44	2.09

Trial conducted on the Southwestern Colorado Research Center at Yellow Jacket, CO; seeded 5/15/96. Yields were calculated on an oven-dry basis.

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