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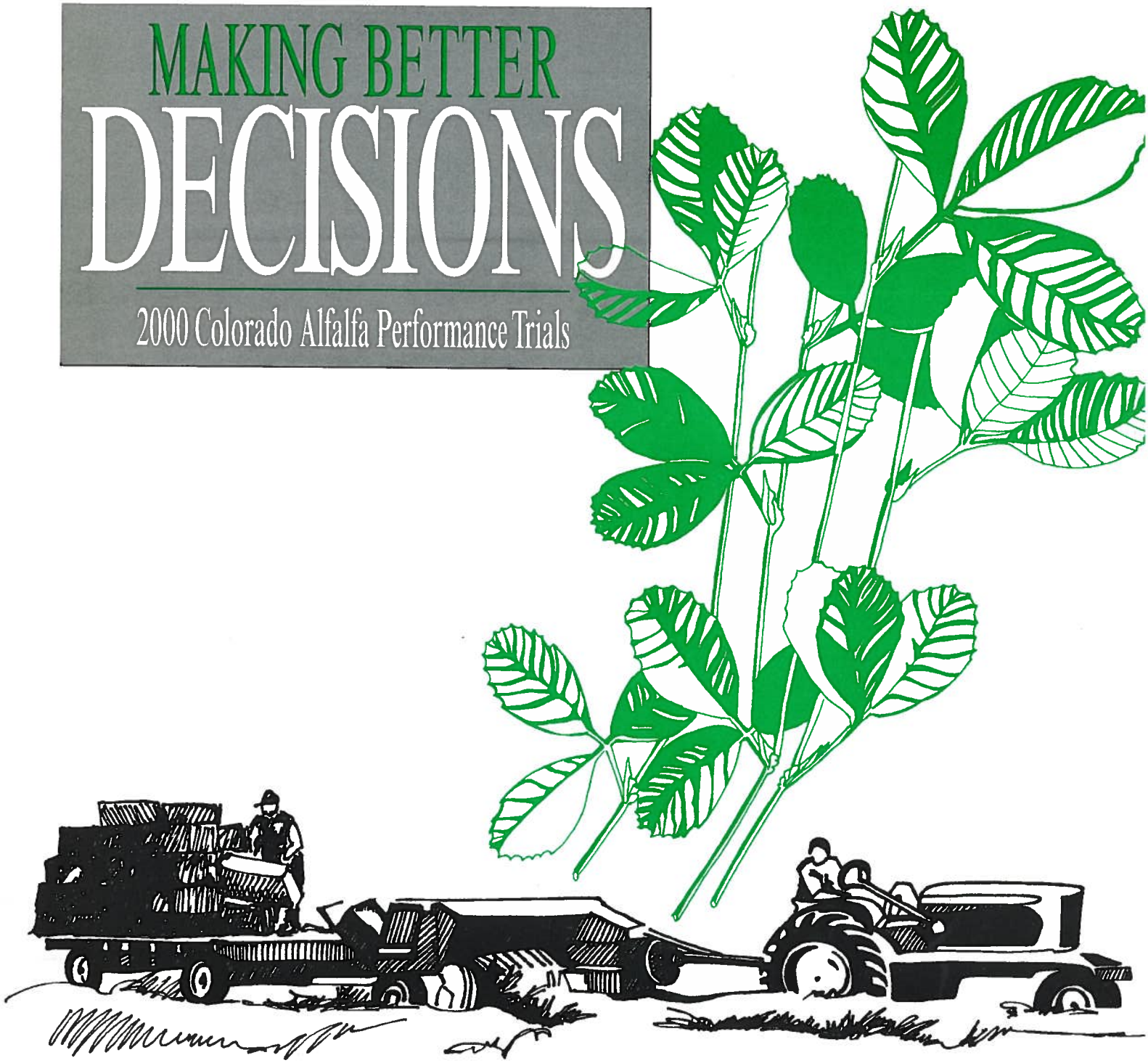
2000 Colorado Alfalfa Performance Trials



Agricultural Experiment Station

Colorado State University

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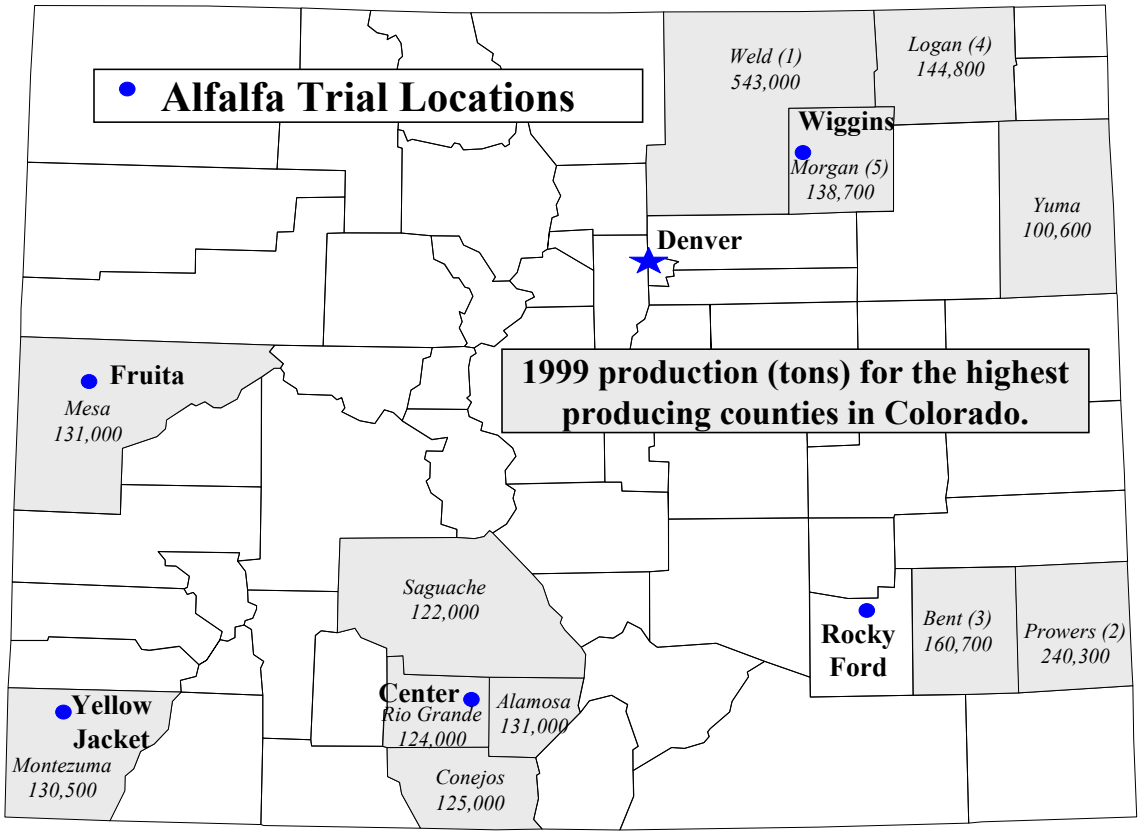

ACKNOWLEDGMENTS

The authors wish to express their gratitude to Martin Smits and the Colorado State University Research Centers who generously contributed the use of their land, equipment, and time to conduct these trials for the good of all Colorado alfalfa producers: Center - San Luis Valley Research Center; Fruita - Western Colorado Research Center; Rocky Ford - Arkansas Valley Research Center; and Yellow Jacket - Southwestern Colorado Research Center. We thank Western Colorado Research Center staff (Lot Robinson, Fred Judson, and Shane Max) and also Daniel Dawson (part-time hourly employee) who assisted with this research.

Technical Report TR 00-12

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2000 COLORADO ALFALFA PERFORMANCE TRIALS

Introduction

Alfalfa hay is an important crop in Colorado with over 800,000 irrigated and 100,000 dryland acres harvested in 1999, producing 3.4 million tons, and worth an estimated $246 million. Dozens of new varieties are sold in each year and Colorado hay producers need current, reliable, and unbiased performance information to make the best alfalfa variety decision. Alfalfa is grown in a wide range of different agricultural environments in Colorado which requires variety performance results for local conditions. Colorado State University researchers evaluate alfalfa varieties at multiple locations every year to provide Colorado hay producers with locally adapted alfalfa variety performance results. Participation by alfalfa seed companies in the state trials is completely voluntary and 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.

Note that no results are included for the San Luis Valley's Center location. A new trial was replanted and good stands were obtained but there was some carryover herbicide effect that stunted growth this summer. Trial researcher, Merle Dillon, is hopeful for full recovery next year.

A randomized complete block design with four replications is used for all five alfalfa variety trials conducted in Colorado. 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. The least significant difference (LSD) and coefficient of variation (CV) are reported for yield.

With good reason, Dr. Frank Schweissing is proud of his Rocky Ford alfalfa variety trial

Arkansas Valley Alfalfa Variety Trial at Rocky Ford

Frank C. Schweissing

The Arkansas Valley, in southeastern Colorado, extends from the mountains on the west to the Kansas border. Alfalfa is the most important irrigated crop in the Valley being produced on 165,000 acres. Furrow or flood irrigation predominates, but about 3,000 acres are produced under sprinklers and there are an additional 5,000 dryland acres. The elevation varies from 3,400 feet in the east to 4,700 feet at Pueblo. The average annual precipitation along the Valley is 11 inches.

The average frost-free period is 158 days from May 1 to October 6 which results in four cuttings per season as a standard practice. Successful varieties need winter hardiness (temperatures go below 0^{o}F), but they also must take advantage of a relatively long growing season. The average alfalfa yield in the Valley is 4.35 tons/acre. The most persistent pests are the alfalfa weevil, stem nematode, and tansy mustard/flixweed.

Researcher comments

This was the third harvest season for this trial, established in the fall of 1997. The trial was irrigated prior to the first cutting and after each of the four cuttings. Rainfall from April through September was 5.6 inches compared to the long term average of 9 inches. Irrigation water was adequate and all four cuttings were harvested without rain damage. The average trial yield was 5.84 tons, compared to 6.35 tons in 1999 and 5.36 tons in 1998.

Researcher

Dr. Frank Schweissing, Superintendent-Entomologist, has conducted alfalfa trials at the Arkansas Valley Research Center (AVRC) for 30 years. He received his B.S. and M.S. in Entomology from Colorado State University and Ph.D. in Entomology from Kansas State University. He began working at the AVRC in 1961 as an Entomologist and became Superintendent in 1980. His major research efforts have been with the insect and mite pests of alfalfa, corn, sorghum, and onions.

Table 1. Forage yields of 28 alfalfa varieties at Rocky Ford[1] in 1998-00.

Variety	Brand /Source	1st Cut May 30	2nd Cut July 5	3rd Cut Aug 10	4th Cut Sept 28	2000	1999	1998	3-Yr
						----------Total----------			
		----------tons/acre[2]----------							
WL 334RK	W-L Research	1.87	1.82	1.57	1.39	6.65	7.03	5.86	19.54
3L104*	Novartis	1.95	1.74	1.40	1.34	6.43	6.59	5.57	18.59
DK143	DeKalb	1.88	1.68	1.36	1.42	6.34	6.52	5.67	18.53
Millennia	Union Seed Co	2.02	1.70	1.37	1.27	6.36	6.64	5.48	18.48
Leaf Master	Union Seed Co	1.99	1.72	1.43	1.30	6.44	6.73	5.24	18.41
Cimarron 3i	Great Plains Research	1.90	1.61	1.39	1.34	6.24	6.62	5.54	18.40
Pinnacle	Arkansas Valley Seed	1.98	1.66	1.49	1.23	6.36	6.48	5.35	18.19
Depend + EV	Agripro Seeds Inc	1.56	1.58	1.35	1.25	5.74	6.63	5.60	17.97
TMF Multiplier II	Mycogen Seeds	1.77	1.62	1.28	1.33	6.00	6.40	5.44	17.84
Big Horn	Cargill Hybrid Seeds	1.76	1.56	1.38	1.24	5.94	6.48	5.41	17.83
ZX 9352*	ABI Alfalfa	1.50	1.53	1.38	1.40	5.81	6.55	5.46	17.82
WL 324	Germain's	1.50	1.49	1.34	1.21	5.54	6.52	5.74	17.80
5454	Pioneer Hi-Bred Int'l	1.57	1.62	1.35	1.32	5.86	6.49	5.43	17.78
DK142	DeKalb	1.79	1.57	1.29	1.30	5.95	6.47	5.34	17.76
631	Garst Seed Co	1.61	1.58	1.24	1.26	5.69	6.60	5.38	17.67
ZC 9651*	ABI Alfalfa	1.46	1.57	1.34	1.29	5.66	6.39	5.56	17.61
Archer	America's Alfalfa	1.54	1.64	1.35	1.34	5.87	6.29	5.24	17.40
WL 325HQ	Germain's	1.86	1.62	1.38	1.26	6.12	6.01	5.25	17.38
Innovator + Z	America's Alfalfa	1.62	1.54	1.32	1.20	5.68	6.27	5.43	17.38
Affinity + Z	America's Alfalfa	1.46	1.46	1.25	1.27	5.44	6.44	5.44	17.32
DK127	DeKalb	1.67	1.61	1.30	1.16	5.74	6.29	5.24	17.27
Lahontan	USDA NV-AES	1.77	1.68	1.38	1.25	6.08	6.06	5.13	17.27
630	Garst Seed Co	1.57	1.60	1.28	1.19	5.64	6.19	5.34	17.17
Haygrazer	Great Plains Research	1.61	1.42	1.29	1.14	5.46	6.24	5.29	16.99
6L271*	Arkansas Valley Seed	1.40	1.58	1.32	1.44	5.74	6.11	5.07	16.92
ZC 9650*	ABI Alfalfa	1.42	1.55	1.28	1.21	5.46	6.01	5.30	16.77
Ranger	USDA NE-AES	1.28	1.28	1.17	1.10	4.83	5.25	4.71	14.79
Vernal	USDA WI-AES	1.29	1.25	1.01	0.94	4.49	5.39	4.51	14.39
Average		**1.67**	**1.58**	**1.33**	**1.26**	**5.84**	**6.35**	**5.36**	**17.55**
CV%		10.28	5.32	6.82	7.25	5.90	4.72	4.12	3.79
$LSD_{(0.05)}$		0.24	0.12	0.13	0.13	0.48	0.42	0.31	0.94

[1]Trial conducted on the Arkansas Valley Research Center, seeded 8/29/97.
[2]Yields calculated on oven-dry basis.
*Indicates experimental entry

Trial Site Information:
(Elevation 4178 ft.) Average annual precipitation 11.88 inches. Average frost-free days - 158 (32°F base). Last spring frost - April 25, 2000: First fall frost - September 25, 2000; 2000 frost free days - 153.
Soil series: Rocky Ford silty clay loam; ca 1.5% o.m.; ca 7.8pH.
Seeding rate: 10.2 lbs. seed/acre
Fertilizer: 150 lbs. P_2O_5 + 31 lbs. N/acre prior to planting and Nov. 30, 1998.
Herbicide: Sencor 75 DF .50 + Gramoxone .31 lbs. AI/Acre - Feb. 16, 1999 & Feb. 22, 2000.
Insecticide: Furadan 4F .75 lbs. AI/Acre - April 21, 1999; Furadan 4F 1.0 lb. AI/Acre - April 25, 2000.

Northeastern Colorado Alfalfa Variety Trial at Wiggins

Jerry J. Johnson and Bruce D. Bosley

Twenty counties in northeast and east-central Colorado that might draw information from the Wiggins trial produce about half of Colorado's alfalfa hay. This twenty-county area has about 260,000 acres of irrigated and about 55,000 acres of dryland alfalfa with annual hay production valued at over $135 million.

Researcher comments

Most of Colorado's alfalfa variety trials are conducted on research stations due to practical harvest and handling considerations. There are no research stations in the irrigated alfalfa area of northeastern Colorado therefore we are grateful for the cooperation of Martin Smits who sacrifices an acre of land and some of his harvest flexibility to make this trial possible.

Alfalfa stands in the plots remained excellent in 2000, the second full year of results at Wiggins. This trial will be harvested one more year and a new trial will be planted somewhere in NE Colorado in the late summer of 2001.

Researchers

Jerry Johnson is extension specialist for crop production and, since 1995, has been the leader of the Crops Testing program at CSU in the Department of Soil and Crop Sciences. He obtained his M.S. and Ph.D. from Washington State University where he studied crop variety testing.

Bruce Bosley is the Morgan County Cooperative Extension Director/Agronomist. He has worked in Extension for 13 years and served as the education outreach coordinator on the Colorado Hay Days management committee from 1988 through 1991. He was an independent crop consultant for five years in the mid 80's. He obtained his M.S. at Colorado State University (crops horticulture).

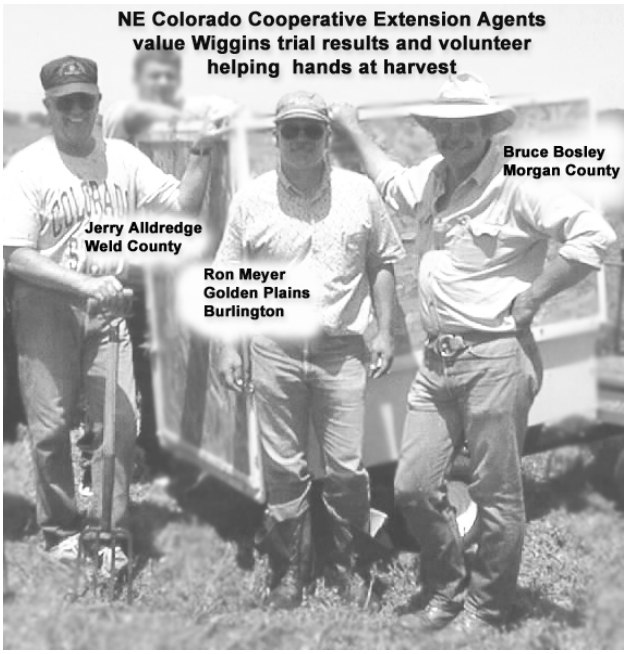

Table 2. Forage yields of 26 alfalfa varieties at Wiggins[1] in 1999-00.

Variety	Brand/Source	1st Cut May 23	2nd Cut Jun 23	3rd Cut July 31	4th Cut Aug 31	2000 Total	1999 Total	2-Yr Total
		tons/acre[2]						
DK142	DeKalb	2.73	2.85	1.96	1.73	9.27	7.78	17.05
DK127	DeKalb	2.79	2.72	2.02	1.72	9.26	7.54	16.80
Depend+EV	Agripro Seed Inc	2.78	2.75	1.91	1.79	9.24	7.77	17.01
Big Horn	Cargill Hybrid Seeds	2.65	2.94	1.92	1.69	9.19	7.66	16.85
Legacy	Grassland West Company	2.78	2.74	1.80	1.87	9.19	7.92	17.11
Reno	Novartis Seeds	2.83	2.72	1.86	1.71	9.11	8.00	17.11
TMF Multiplier II	Mycogen Seeds	2.86	2.67	1.83	1.73	9.09	7.80	16.89
Pioneer brand 5312	Pioneer Hi-Bred Int'l Inc	2.77	2.64	1.82	1.78	9.01	7.56	16.57
AlfaLeaf II	Sharp Bros. Seed Co.	2.78	2.60	1.87	1.74	8.98	7.76	16.74
Pioneer brand 5396	Pioneer Hi-Bred Int'l Inc	2.82	2.64	1.72	1.70	8.88	8.05	16.93
Shamrock	Sharp Bros. Seed Co	2.78	2.61	1.75	1.74	8.88	7.92	16.80
Garst Seed 631	Garst Seeds	2.68	2.59	1.81	1.78	8.86	7.84	16.70
AmeriGraze 401+Z	America's Alfalfa	2.78	2.58	1.85	1.64	8.86	7.59	16.45
WL 325HQ	W-L Research Inc	2.78	2.59	1.82	1.66	8.84	7.77	16.61
Garst Seed 630	Garst Seeds	2.61	2.63	1.88	1.72	8.84	7.78	16.62
Tahoe	Novartis Seeds	2.26	2.70	1.91	1.89	8.76	6.98	15.74
Excalibur II	Allied Seed	2.77	2.59	1.78	1.61	8.75	7.74	16.49
Magnum III	Dairyland Seed Company	2.64	2.61	1.81	1.68	8.74	7.80	16.54
Innovator+Z	America's Alfalfa	2.73	2.60	1.84	1.48	8.64	7.81	16.45
Complete	Arrow Seed Co	2.66	2.64	1.75	1.53	8.58	7.81	16.39
Spartan	Allied Seed	2.63	2.50	1.75	1.69	8.57	7.67	16.24
Alpha 2001	Great Lakes Hybrids	2.59	2.61	1.74	1.60	8.54	7.77	16.31
Pinnacle	Arkansas Valley Seeds	2.42	2.59	1.76	1.69	8.46	7.18	15.64
Total + Z	America's Alfalfa	2.68	2.37	1.67	1.71	8.43	7.71	16.14
Evergreen-2	Arkansas Valley Seeds	2.30	2.53	1.80	1.73	8.36	6.87	15.23
Webfoot MPR	Great Lakes Hybrids	2.52	2.50	1.66	1.65	8.32	7.44	15.76
Average		**2.68**	**2.64**	**1.82**	**1.70**	**8.83**	**7.67**	**16.51**
CV%		4.44	6.42	7.70	8.51			
$LSD_{(0.05)}$		0.09	0.12	0.10	0.11			

[1]Trial conducted on the Martin Smits farm, seeded 9/3/97.
[2]Yields calculated on oven-dry basis.

Trial Site Information:
(Elevation 4750 ft.)
Soil series: Valent loamy sand with some bijou loamy sand characteristics**.**


Crops Testing personnel use front-end loader to move hay off of Wiggins trial plots

Southwestern Alfalfa Variety Trial at Yellow Jacket

Mark W. Stack, Abdel Berrada, and Thomas Hooten

Southwestern Colorado has a rolling topography with slopes ranging from 1 to 12%. Alfalfa is the main crop in terms of acreage, production, and cash value. In 1999, 82,000 acres of alfalfa were harvested in the five southwestern Colorado counties of Archuleta, Dolores, La Plata, Montezuma, and San Miguel. Approximately 85% of this acreage was irrigated. The majority of the irrigated areas are served by older water delivery systems. The Dolores Project, a new system developed by the Bureau of Reclamation, supplies irrigation water to 28,000 acres in the Dove Creek/Yellow Jacket area and to 7,500 acres on the Ute Mountain Ute Indian Reservation south of Cortez. Approximate alfalfa acreage harvested in the Dove Creek/Yellow Jacket area is 20,000 acres and 4,300 acres by the Ute Mountain Ute Indian Tribe. The average growing season is 120 days with annual precipitation of 16 inches with one-half received as snow. June is the driest month. The major soil series is Wetherill silty clay loam with a water holding capacity of 1.8 to 2.0 inches per foot and average soil organic matter content of 1%. The soils are generally low in phosphorus and high in potassium. The elevation where alfalfa is produced ranges from over 5,500 to over 7,000 ft.

Average irrigated alfalfa yields in 1999 ranged from 2.25 tons/acre in Archuleta County to 3.75 tons/acre in Montezuma County. The Dolores Project lands in the Dove Creek/Yellow Jacket area averaged 3.6 tons/acre in 1999.

There are usually three cuttings per year: early June, late July, and September. Recommended alfalfa varieties have dormancy ratings of 3 to 4 in most areas. The major pests in the area are pea aphids, crown and root rots, and alfalfa weevil in the lower elevation areas. Stem nematodes and their relationship with crown and root rots is receiving increased attention.

Alfalfa hay quality in southwestern Colorado is good to excellent due to dry weather and relatively few disease and insect problems. The older irrigated areas of southwestern Colorado produce alfalfa targeted either for their own livestock operations or for livestock operations in the Four Corners area. A significant market for alfalfa hay has been developed with members of the nearby Indian tribes. A majority of the alfalfa produced under the Dolores Project is marketed to dairies in the southwestern United States.

Researcher comments

The alfalfa variety trial was planted on June 2, 2000. One cutting on September 21, 2000 was made during the establishment year. A Carter Forage Plot Harvester (sickle bar) was used to harvest the plots. The growing season was very dry and marked by above average temperatures. Frequent irrigations were necessary to ensure alfalfa seedling survival. Pursuit herbicide was applied after the second trifoliate stage to achieve a weed-free stand. A good to excellent stand was obtained. Caution should be used when interpreting the data for this initial year. Three full years of variety performance results are planned for this trial starting next year.

Researchers

Mark Stack has been a Research Associate at the Southwestern Colorado Research Center since 1985 and Manager since 1999. Mark has a B.S. in Agronomy from Colorado State University and experience in production agriculture.

Abdel Berrada, a native of Morocco, has been the Research Scientist at the Southwestern Colorado Research Center since October 1993. He earned a Ph.D. in Agronomy in 1983 from the University of Nebraska.

Thomas Hooten has been a Research Associate at the Southwestern Colorado Research Center since 1998. Tom graduated from Utah State University with an M.S. in Plant Science/Crop Physiology with an emphasis on plant nutrition.

Table 3. Forage yields of 20 alfalfa varieties at Yellow Jacket[1] in 2000.

Variety	Brand/Source	1st Cut Sept 21
		tons/acre[2]
Abound	Asgrow Seed Co	2.30
ZX 9652*	ABI Alfalfa	2.10
Pro Gro	MBS Genetics	1.97
AmeriGraze 401+Z	America's Alfalfa	1.94
Baralfa 54	Barenbrug USA	1.94
Millennia	Intermountain Farmers Assoc	1.93
Geneva	Novartis Seeds	1.91
Archer II	America's Alfalfa	1.90
WL 327	Germain's Seed	1.82
ZG 9650A*	ABI Alfalfa	1.81
DK143	DeKalb	1.81
WL 325HQ	Germain's Seed	1.77
Aspire	Asgrow Seed Co	1.67
Forecast 1001	Dairyland Seed Co	1.55
DK142	DeKalb	1.54
Ranger	Public	1.39
Award	Asgrow Seed Co	1.35
Magnum V	Dairyland Seed Co	1.27
Pinnacle	Arkansas Valley Seeds	1.22
DK134	DeKalb	1.09
Average		**1.71**
CV%		35.49
$LSD_{(0.05)}$		0.86

[1]Trial conducted on the Southwestern Colorado Research Center, seeded 6/2/00.
[2]Yields were calculated on an oven-dry basis and adjusted to 12% moisture.
*Indicates experimental entry.

Trial Site Information:
(Elevation 6960 ft.)
Soil series: Wetherill silty clay loam
Previous crop: Small grain
Seeding rate: 20 lb/ac (6 in. row spacing)
Fertilizer: None
Herbicide: Pursuit DF at 1.44 oz/ac on July 7, 2000
Insecticide: None
Precipitation: 3.5 in. (June 2 to Sept. 21, 2000)
Irrigation: 13 in. (7 sprinkler applications)

Note: The establishment year for the trial was very dry and marked by above average temperatures. A good alfalfa stand was obtained. However, dry strips from the last irrigation resulted in low yields for some plots and, consequently, a high coefficient of variation for the initial cutting.

Western Colorado Alfalfa Variety Trial at Fruita

Calvin H. Pearson & Joe E. Brummer

Summary

Numerous alfalfa varieties are available for farmers to plant. With so many varieties in the marketplace, selecting one to plant can be overwhelming to a farmer. Agronomic performance data for alfalfa varieties provides quantitative information to aid farmers and others in deciding which varieties should be planted. Testing all available alfalfa varieties at any one location is not feasible. A variety performance test is conducted at the Western Colorado Research Center at Fruita in which selected alfalfa varieties are evaluated for a three-year testing period. The performances of these varieties are evaluated under local conditions; thus, the results obtained from this test are relevant to similar production environments. This is a progress report for an ongoing study. Forage yields in the first, second, third, and fourth cuttings in the 2000 alfalfa variety performance test, averaged across all twenty varieties, were 2.97, 2.85, 2.65, and 1.08 tons/acre, respectively. Total 2000 forage yield in the alfalfa variety performance test averaged 9.55 tons/acre and the 2-year total yield averaged 17.91 tons/acre. Crude protein and digestibility were determined in 1999 for each of the 20 varieties included in the test. There were statistically significant differences among the 20 alfalfa varieties for each of the four cuttings for both crude protein and digestibility. These data provide good evidence that alfalfa varieties can and do differ in forage quality.

Introduction

Evaluating varieties under local production conditions provides site-specific information that can be useful to growers in that area and to growers in other areas with similar environments and production practices. Local variety performance information is also of value to breeding and seed companies in knowing how to develop and market seed of their varieties.

Prior to planting the test plots, alfalfa breeding and seed companies are solicited for varieties to enter into the test. One or more public check varieties are selected by university researchers to include in the test. Company representatives

determine which of their varieties to include.

Methods

Plots were harvested for yield using a John Deere swather outfitted with a weight bin and electronic scales. As plots were harvested for yield, a subsample was obtained for moisture determination. After moisture was determined, samples were oven-dried at 60 °C and then ground in a Wiley Mill. Ground samples were kept frozen until forage quality analyses were conducted. Samples were sent to the Mountain Meadow Research Center at Gunnison, Colorado where they were fine ground through a 1 mm screen in a Cyclone Mill prior to being analyzed for digestibility and crude protein. Digestibility was determined using standard *in vitro* procedures. Samples were incubated in test tubes for 48 hours with 40 ml of buffer solution and 10 ml of rumen fluid that was collected from a steer being fed a diet of grass and alfalfa hay. Samples were then acidified with 6 ml of hydrochloric acid followed by the addition of 2 ml of pepsin and incubated for an additional 24 hours. Crude protein was determined using the Hach method (sulfuric acid/hydrogen peroxide digest) for total Kjedahl nitrogen x 6.25.

Results

The 2000 forage yield results of Colorado State University's alfalfa variety performance test at Fruita are shown in Table 1. Data obtained in 2000 are for the second year of the three-year testing period. Stands are excellent. Summer 2000 in western Colorado was typical in many respects. Thundershowers made haymaking a challenge for some of the four cuttings. Hay yield in the first cutting averaged across all twenty varieties was 2.97 tons/acre. There were no statistically significant differences for yields among the twenty alfalfa varieties in the first cutting. Hay yield in the second cutting averaged 2.85 tons/acre. There were also no statistically significant differences for yields among the varieties in the second cutting. Hay yield in the third cutting averaged 2.65 tons/acre. Nine alfalfa varieties had high third cutting yields. Hay yield in the fourth cutting averaged 1.08 tons/acre. Four varieties (ZX 9453, Garst 6420, ZX 9451, and Millennia) had high fourth cutting yields. Total forage yield in 2000 averaged 9.55 tons/acre and the average yield for the 2-year total was 17.91 tons/acre. Thirteen of the twenty varieties had high 2000 total yields. Thirteen varieties also had high 2-yr total yields. Many of these thirteen varieties had both high 2000 total yields and high 2-yr total yields. This finding indicates several of the varieties included in this test would likely be good candidates for planting in western Colorado. Ranger and Ladak had the lowest 2-year total yields.

Crude protein and digestibility obtained in 1999 for each of the 20 varieties in the performance test are shown in Table 2. These data are for the first year of production. There were statistically significant differences among the twenty alfalfa varieties for each of the four cuttings for both crude protein and digestibility. These data provide good evidence that alfalfa varieties can and do differ in forage quality. TMF 421 and WL 232HQ had high crude proteins across all four cuttings in 1999. There was no alfalfa variety that had a high digestibility in each of the four cuttings. Some varieties had high digestibilities in only one or two of the four cuttings. If significant differences in forage quality among these varieties occur in other years of production, the evidence for differences among alfalfa varieties will be more compelling. Alfalfa varieties that consistently produce high yields and high forage quality across cuttings and years of production will be popular with many farmers for planting.

Table 4. Forage yields of 20 alfalfa varieties at Fruita[1] in 2000.

Variety	Brand/Source	1st Cut May 17	2nd Cut July 7	3rd Cut Aug 23	4th Cut Oct 2	2000 Total	2-Yr Total
		tons/acre[2]					
ZX 9453	ABI	3.03	2.90	2.76	1.24	9.94	18.54
Garst 6420	Garst	3.16	2.92	2.65	1.14	9.87	18.56
Pinnacle	Arkansas Valley Seed Co	2.94	2.96	2.84	1.12	9.85	18.59
DK142	Monsanto	3.05	2.96	2.73	1.09	9.83	18.57
Millennia	IFA	3.01	2.89	2.67	1.14	9.72	18.40
ZX 9451	ABI	2.96	2.77	2.79	1.14	9.66	18.36
TMF Multiplier	Mycogen	3.07	2.89	2.58	1.11	9.65	18.09
Reno	Novartis	2.97	2.91	2.66	1.09	9.64	17.82
ABT 350	ABT	3.07	2.95	2.53	1.03	9.57	17.98
WL 232 HQ	Germains	3.00	2.93	2.54	1.05	9.57	18.27
Archer	America's Alfalfa	2.85	2.81	2.80	1.09	9.54	18.09
Baralfa 54	Seekamp Seed	2.92	2.84	2.68	1.08	9.52	17.91
Archer II	America's Alfalfa	2.91	2.90	2.64	1.07	9.52	18.03
DK134	Monsanto	2.90	2.86	2.64	1.07	9.47	17.45
DK140	Monsanto	3.07	2.77	2.53	1.06	9.42	17.93
WL 325 HQ	Germains	2.89	2.74	2.61	1.09	9.34	17.73
Ranger	public	2.81	2.82	2.66	1.02	9.31	16.76
Innovator + Z	America's Alfalfa	2.94	2.78	2.63	0.94	9.29	17.49
TMF 421	Mycogen	2.93	2.82	2.48	0.99	9.21	17.29
Ladak	public	2.82	2.64	2.61	1.01	9.09	16.29
Average		**2.97**	**2.85**	**2.65**	**1.08**	**9.55**	**17.91**
CV%		5.64	4.97	4.96	7.57	3.14	2.87
$LSD_{(0.05)}$		NS	NS	0.18	0.12	0.42	0.73

[1]Trial conducted on the Western Colorado Research Center, seeded 8/27/98.
[2]Yields were calculated on an air-dry basis.

Trial Site Information:
(Elevation 4510 ft.) Average annual precipitation is 8.4 inches. Average frost-free days are 181. The last spring frost in 2000 was April 4 and the first fall frost was November 2, thus, the frost-free days in 2000 were 212 (28°F base).
Soil series: Billings silty clay loam
Seeding rate: 13 lbs/acre
Fertilizer: 416 lbs P_2O_5/acre and 88 lbs N/acre broadcast as 11-52-0 on August 13, 1998 and plowed down prior to planting.
Herbicide: Pursuit was applied for weed control during 2000 at 1.44 oz/acre on 3 March.

Table 5. Crude protein and digestibility of 20 alfalfa varieties at the Western Colorado Research Center at Fruita in 1999.

Variety	Crude protein (%)				Digestibility (%)			
	1st Cut	2nd Cut	3rd Cut	4th Cut	1st Cut	2nd Cut	3rd Cut	4th Cut
Archer	23.0	19.3	20.8	25.3	67.3	60.2	62.0	70.7
Archer II	21.3	18.4	20.3	22.9	68.4	59.9	62.6	70.8
ABI 350	21.1	17.6	20.5	23.1	68.4	61.2	63.0	72.8
Baralfa 54	22.0	18.7	19.5	23.3	67.6	60.7	61.7	70.8
DK134	24.4	19.8	20.9	25.0	71.7	62.1	63.8	73.5
DK140	23.0	21.1	21.3	23.2	69.6	63.0	63.5	72.1
DK142	22.4	20.9	21.1	22.9	69.7	61.9	63.7	72.6
Garst 6420	21.8	18.9	19.9	24.2	68.5	60.9	62.7	72.8
Innovator + Z	23.3	22.1	20.2	24.4	69.3	62.4	63.2	73.0
Ladak	22.8	19.9	20.7	25.7	69.0	62.4	63.3	73.7
Millennia	22.1	20.0	20.8	26.1	68.2	60.1	62.3	73.0
Ranger	22.4	20.6	20.9	25.0	69.4	63.7	63.6	73.2
Reno	23.5	21.2	20.4	24.0	71.0	62.2	62.2	72.7
TMF Multiplier II	22.5	19.7	20.1	25.1	69.2	61.2	63.9	73.3
TMF 421	23.1	20.4	22.2	26.5	69.6	61.9	64.9	74.6
WL 232 HQ	24.5	21.4	21.8	26.5	70.2	61.0	64.4	73.9
WL 325 HQ	24.4	19.7	21.7	25.5	70.0	61.9	64.9	73.5
ZX 9451	24.6	19.2	20.4	22.3	68.6	61.7	62.5	70.2
ZX 9453	23.1	17.7	19.3	22.2	68.8	59.6	61.3	69.9
Pinnacle	22.0	20.4	20.9	25.0	68.7	61.5	62.5	72.8
Average	**22.9**	**19.9**	**20.7**	**24.4**	**69.1**	**61.5**	**63.1**	**72.5**
CV%	6.8	7.6	4.2	5.4	1.9	2.9	2.3	0.9
$LSD_{(0.05)}$	2.2	2.1	1.2	1.9	1.9	2.5	2.0	1.0

New Trials in 2001

Entries will be solicited for the Northeastern Colorado and the Western Colorado Research Center trial at Fruita. Entry forms may be obtained from the Department of Soil and Crop Sciences, Colorado State University, Cynthia Johnson, C-4 Plant Science Building, Fort Collins, CO 80523-1170; Telephone (970) 491-1914; Fax (970) 491-2758; e-mail *cjohnson@agsci.colostate.edu* or web site *http://www.colostate.edu/Depts/SoilCrop/extension/CropVar/index.html*.

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www.colostate.edu/Depts/SoilCrop/extension/CropVar/index.html

	Image Not Available	Image Not Available
Winter Wheat 2000 results	Dry Beans 2000 results	Corn 2000 silage results 2000 dryland and irrigated grain results
Crop Variety Performance for Colorado Crops		
Sunflower 2000 results oil and confection hybrids	Alfalfa 2000 results	Spring Wheat Barley, & Oats 1999 results