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FROM THE GROUND UP

Agronomy News

Forages

INSIDE THIS ISSUE

Forages in Colorado

Forage crops have increased in their contribution to Colorado's economy relative to other crops and the state's market demand for forages still justify increasing acreage.

Forage crops are a significant part of the agricultural sector within Colorado's economy. The cattle industry, which depends upon forages, dominates Colorado's agriculture. Commercial turfgrass as well as the Green industry hold a strong second place. Alfalfa and other hay crops collectively contribute more to Colorado's agricultural economy than other agronomic crops. The 2002 Colorado Agricultural Statistics report indicates that in 2001, alfalfa produced more farm sales revenues than either corn for grain or winter wheat (Figure 1). Their figures only consider the economic contribution of forages harvested with farm equipment and exclude the value of direct grazing on irrigated or dryland pastures and rangeland.

Colorado Agricultural Statistics records demonstrate that the sales value for both alfalfa hay and other hay crops have increased over the past 17 years (Figures 1 & 2).

continued on page 2

Colorado State University
Knowledge to Go Places

Forages in Colorado (continued)

During this same time period sales of other crop sectors have remained relatively flat or declined in value (i.e.: dry edible beans). The total acreage of irrigated alfalfa hay harvested has been increasing since 1993. Yield per acre has also been gradually increasing (Figure 3). In addition, the market price received per ton of alfalfa or other hay has remained strong and in some years has improved over previous price levels (Figure 4).

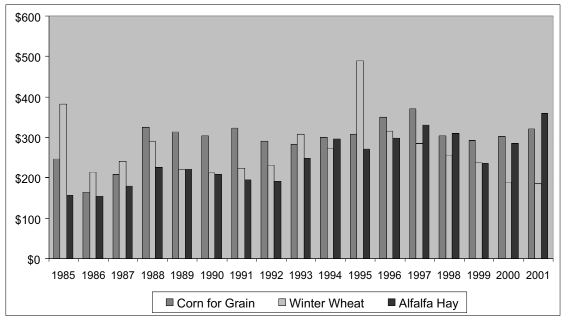

Figure 1. Colorado crop sales value ($ millions)

It is noteworthy that during the past decade the net increase in hay production has not dampened the market price received by farmers. There are two market trends and probably a third which have caused alfalfa and other hay producers to increase acreage and demand higher prices for their hay.

The first trend is people purchasing small rural acreages in an effort to improve their quality of life. Many of these new residents include horses, or livestock and exotic species in their homestead plans. Nearly all of these small acreage require owners to purchase forage and feed resources. In general, these small acreage buyers pay premium prices for small lots of hay, delivery to their homes, and for their self determined hay qualities.

The second significant trend is the dramatic increase of milk production by Colorado's dairies. Total net production of milk in this state has increased by 84.6% from 1985 to 2001. This has been accomplished by a modest increase in number of milk cows, 16.7%, but more significantly by increased yearly production of milk per cow 52.8%, and improving overall dairy efficiencies. Improvements in dairy production efficiencies have enhanced the market for dairy quality alfalfa hay and beginning to add to the demand for corn silage and alfalfa haylage. Today's dairy hay buyers along with their nutritional consultants require lab testing on all forage purchases. However, they are also willing to pay premium prices for quality hay.

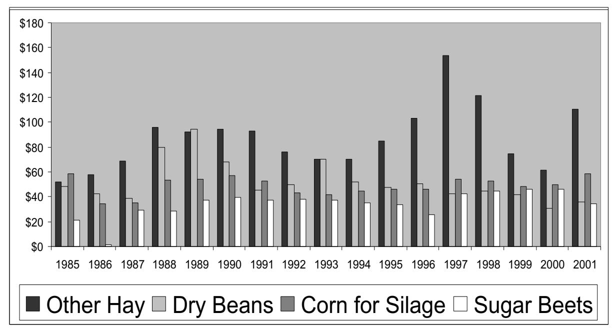

Figure 2. Annual Colorado crop sales value ($ millions)

The third trend may be the change in farmers perceptions on crops they raise and market. Essentially all crop producers recognize that their net return on many field crops has shrunk during the past decades. Increased equipment replacement costs,

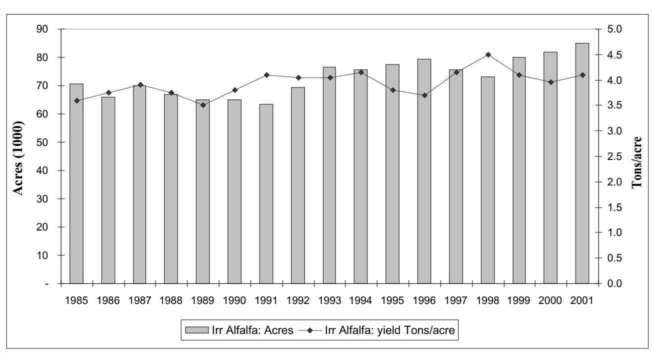

Figure 3. Colorado alfalfa annual acreage and yield

continued on page 3

FROM THE GROUND UP

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Forages in Colorado (continued)

rising land prices and personal living costs, and a general inflation of input costs have outpaced crop income gains in yields and sales price. Unlike the commodity markets which don't have differentiated markets, alfalfa and other hay crops have many different markets, each with their own different quality specifications. In addition, hay crops are not supported by Federal farm payment supports. Most farmers who have added or increased forage production in their crop rotations have been required to become better at marketing. In addition, they have had to rethink relationships to farm programs. In making these changes, farmers have increased their agricultural skills and modified their farm risk management.

Alfalfa and grass hay prices have generally maintained a net positive return for hay producers throughout the past ten years despite increasing yields and acreages. The 2001 Colorado Farm Enterprise Budgets developed by Colorado State University's Agriculture and Business Management team demonstrates the better return from forages (Table 1). The average hay prices for 2001 were especially high and prices for some other crops, corn, and wheat, were low. However, during the 1990's and into the 2000 and 2001 crop years, alfalfa hay has nearly always provided more net income than other major agronomic crops. Agricultural specialists recommend that farm producers need to cover their production expenses in most years. Figure 5 presents a composite (non-weighted mean) of enterprise budget data from Table 1.

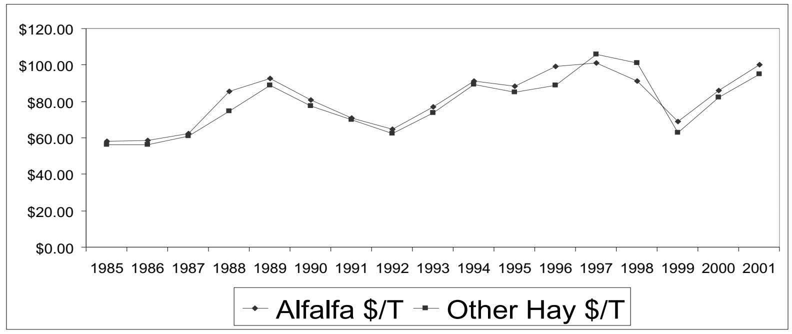

Figure 4. Average price/ton received by farmers

Crops that show positive net returns include corn silage, pinto beans, grass hay and alfalfa. Net returns are defined as production gross revenue minus direct production costs (Figure 5). In addition to covering direct costs of production, farm managers are said to have an economic profit, or a positive return to management and risk, if revenue is great enough to cover a return to land, labor, and capitol. Figure 6 shows the level of returns to a producers management and risk for the crops presented in Table 1.

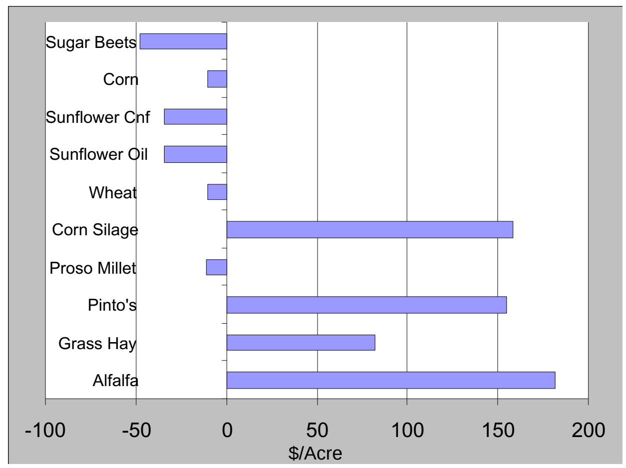

Figure 5. 2001 Net return (gross minus production expenses)

It is important that farm businesses meet this second profitability objective in most years in order to remain sustainable and competitive. Agriculture will probably not reverse the trends of operator aging and land conversions to non-agricultural uses. However, enhancing farm profitability will serve to slow these trends.

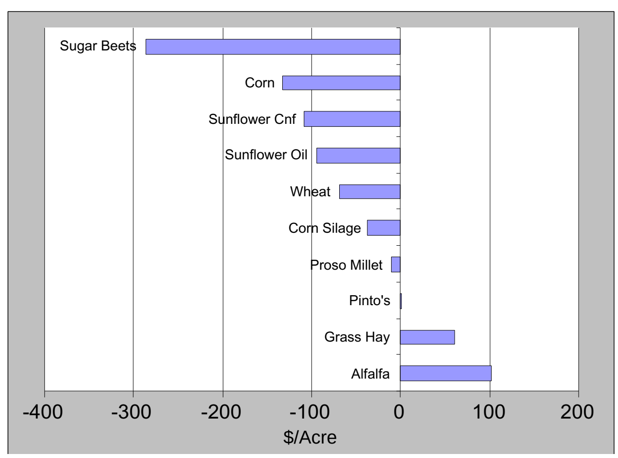

Figure 6. Return to management and risk (minus land, labor, capitol payments)

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Lower South Platte;
Logan, Morgan, & Sedgwick Counties

continued on page 4

Forages in Colorado (continued)

Table 1.

2001 Crop Enterprise Budget Summaries - *From CSU Ag & Business Management Handbook*										
						Farm			**Return to**	**Break-**
Colorado		**Irrigation**	**Avg Mkt**			**gate**	**Production**	**Net**	**Mgmt.**	**even**
Region	**Crop**	**Method**	**Price**	**Yield**		**Gross**	**Costs**	**Return**	**& Risk**	**Price ***
Northern	Alfalfa	Surface	$100.00	5	T/a	$500	$263	$237	$189	$62.15
Northeast	Alfalfa	C. Pivot	$100.00	6.75	T/a	$675	$393	$282	$171	$74.73
SE Ark Valley	Alfalfa	Surface	$100.00	4.5	T/a	$450	$295	$155	$69	$84.66
San Luis Valley	Alfalfa	C. Pivot	$100.00	4.15	T/a	$415	$277	$138	$52	$87.53
Western Colorado	Alfalfa	Surface	$100.00	3.25	T/a	$325	$230	$95	$29	$91.00
Northeast	Pinto's	C. Pivot	$19.00	23.1	cwt/a	$439	$331	$108	$15	$18.37
Northern	Pinto's	Surface	$21.00	22	cwt/a	$462	$322	$140	-$162	$28.35
Western Colorado	Pinto's	Surface	$21.00	21	cwt/a	$441	$225	$216	$148	$13.96
Northeast	Corn	Dryland	$2.15	60	bu/a	$129	$160	-$31	-$91	$3.67
Northeast	Corn	C. Pivot	$2.15	185	bu/a	$398	$416	-$18	-$123	$2.82
Northern	Corn	Surface	$2.15	175	bu/a	$376	$371	$5	-$296	$3.84
S Platte Valley	Corn	C. Pivot	$2.15	179	bu/a	$385	$443	-$59	-$165	$3.07
SE Ark Valley	Corn	Surface	$2.15	172	bu/a	$370	$357	$13	-$91	$2.68
Western Colorado	Corn	Surface	$2.15	160	bu/a	$344	$317	$27	-$32	$2.35
Northern	Corn Silage	Surface	$22.00	25	T/a	$550	$389	$161	-$146	$27.83
Western Colorado	Corn Silage	Surface	$22.00	22	T/a	$484	$328	$156	$71	$18.75
Mountain	Grass Hay	Surface	$100.00	1.35	T/a	$135	$94	$41	$19	$86.12
Western Colorado	Grass Hay	Surface	$100.00	2.2	T/a	$220	$96	$124	$102	$53.56
Northeast	Proso Millet	Dryland	$4.00	28.5	bu/a	$114	$125	-$11	-$73	$6.56
Northern	Sugar Beets	Surface	$32.00	23	T/a	$736	$626	$110	-$215	$41.36
Northeast	Sugar Beets	C. Pivot	$23.85	26	T/a	$620	$765	-$145	-$337	$36.82
S Platte Valley	Sugar Beets	C. Pivot	$23.85	24	T/a	$572	$681	-$109	-$305	$36.55
Northeast	Sunflower Oil	Dryland	$9.62	11.5	cwt/a	$111	$187	-$76	-$153	$22.93
SE Ark Valley	Sunflower Oil	Dryland	$8.30	15.25	cwt/a	$127	$120	$7	-$34	$10.56
Northeast	Sunflower Cnf	Dryland	$12.00	13.5	cwt/a	$162	$199	-$37	-$114	$20.44
Northeast	Sunflower Cnf	C. Pivot	$13.50	21	cwt/a	$284	$315	-$31	-$104	$18.47
Northeast	Wheat, Wntr	Dry Convntl	$2.75	43.5	bu/a	$120	$111	$9	-$52	$3.94
Northeast	Wheat, Wntr	Dry R. Till	$2.75	48.5	bu/a	$133	$113	$20	-$33	$3.43
Northern	Wheat, Wntr	Dryland	$2.75	30	bu/a	$83	$79	$3	-$46	$4.29
SE Ark Valley	Wheat, Wntr	Dryland	$2.75	31.5	bu/a	$87	$63	$24	$1	$2.72
Western Colorado	Wheat, Wntr	Dryland	$2.75	18	bu/a	$50	$79	-$30	-$51	$5.59
Northeast	Wheat, Wntr	C. Pivot	$2.75	57	bu/a	$157	$230	-$74	-$166	$5.66
San Luis Valley	Wheat, Spr.	C. Pivot	$2.70	86.5	bu/a	$234	$260	-$26	-$137	$4.28
* Break even price is calculated based on 2001 yields and covers Labor, Land, and Capital expenses										

Little or No-Cost Management Practices Increases Hay Profits

Alfalfa producers can implement practical production management practices to enhance this crop enterprise's net return to their farm incomes.

Over a nearly 30-year period, average yield levels of alfalfa hay in Colorado have been on the increase. In 1972, alfalfa hay yields in Colorado averaged 2.7 ton/acre, by 2000, yields had increased by a full ton to 3.7 tons/acre. Keep in mind this 37% increase is a statewide average based on thousands of growers operating in a broad diversity of environments and production situations. Similar increases in alfalfa hay yields have likely occurred in other hay-producing states. What is responsible for these impressive yield gains?

No doubt better hay production technology is a major contributing factor to these higher yields. We have seen advances in weed and other pest control practices. We have seen improvements in hay-making and handling equipment. Irrigation technology has also improved. We have new varieties that produce higher yields and have increased disease resistance. Certainly, other technologies have also contributed to increased hay yields. However, unless growers had made the decision to use the new, proven technologies these improvements would have been of no value.

Implementing the use of new hay production techniques into farm operations requires growers to make conscious management decisions. Many management decisions require little or no out-of-pocket expense, yet, making good management decisions requires an investment of time to learn new production technology and how to use it effectively.

Technological advancements are discounted over time as they are used by more and more farmers. Farmers who find and use new, proven technology are more likely to obtain higher profits than those who wait until the technology becomes commonplace. Waiting too long to use new technology often requires growers to adopt just to stay in business. It takes good management skills to decide if and when to adopt new technology.

I have driven by a large field of alfalfa nearly everyday for several years. A couple of years ago the field was split and sold to different owners. The field is the same variety and was very uniform prior to the split. Today, the two parts of the field look very different and is clearly the result of two different management styles being imposed on it. A noticeable difference is irrigation practices. One side of the field has been over-irrigated and has significant plant stunting and yellowing. It is expected that yields on the over-irrigated side of the field will be considerably lower than on the other side.

Presented below are several management decisions and approaches that can be used on your farm that when used properly will have a positive impact on hay profits. Certainly, there are many other management decisions that can be made that will positively or negatively affect hay profits.

Selecting an appropriate alfalfa variety can affect profits. The yields of two alfalfa varieties over a four-year period are shown in Table 1. The seed for "New" variety is more expensive but outyields "Old" variety. Yields over a four-year period show that the net returns for "New" variety was 21% higher per acre than for "Old" variety, resulting in $214 more profit over the 4-year testing period. These numbers illustrate how profits can be increased just by picking a high yielding alfalfa variety that is adapted for the production area.

Timeliness of operations is essential to good haymaking, just as it is to many crop production practices. When to control weeds and other pests, when to irrigate, when to plant, when to prepare the seedbed, when to harvest, when to haul bales, along with many other operations are all important and can ultimately effect hay yield and quality. I have also seen many fields over the years where haymaking was done very well only to let the bales sit in the field while the next cutting grows up around the bales. By the time the grower gets around to picking up the bales not only is the quality of the hay bales reduced, but the next cutting is severely damaged by equipment traffic used to pick up bales.

continued on page 6

Little or No-Cost Management Practices Increases Hay Profits (continued)

Regular monitoring of fields helps to identify problems early and gives growers more lead time to schedule remedies to problems. Using the management approach of regular field monitoring will often encourage growers to deploy more timely and effective control operations. Waiting too long to check fields only to find a critical problem that requires immediate attention generally results in a hurried reaction and a remedy that is not nearly as favorable if the problem had been discovered and dealt with sooner.

When conducting field operations, growers should not only focus on performing the task at hand as precisely as possible, but they should also consider how the current operation will affect subsequent operations. For example, if a grower considers baling while he is swathing he is more likely to make uniform windrows that will dry more evenly. Uniform windrows that dry more evenly will allow for baling that can be accomplished sooner and result in bales with a more consistent bale moisture.

No doubt hay yields over the past thirty years have improved. What we can expect in the next thirty years remains to be seen, but if the past is any indication we should expect to see more innovation and improvements in hay production in the years ahead. But remember, to increase profits, it takes farmers making good management decisions to put new, proven technology to work on their farms.

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Table 1. Net receipts per acre, comparing a "new" variety (relatively high seed cost, high yield) with an "old" variety (relatively low seed cost, low yield) using yield data and production information based on agronomic research conducted in western Colorado. This scenario assumes similar decreasing yields with older stands for both varieties and selling price of $80.00 per ton. Figures are based on data collected from research plots in western Colorado.

PRODUCTION YEAR	"NEW" VARIETY $/acre	"OLD" VARIETY $/acre	DIFFERENCE $/acre
First year	$406.00	$341.00	$65.00
Second year	$348.00	$289.00	$59.00
Third year	$249.00	$202.00	$47.00
Fourth year	$210.00	$167.00	$43.00
TOTAL	$1,213.00	$999.00	$214.00

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Relative Forage Quality

This article reviews the benefits and challenges inherent with a new forage lab technique proposed for quality analysis.

A new test, called Relative Forage Quality (RFQ), is advocated by the Natural Resource Council (NRC) and several Extension agencies. It is based on proximate analysis, neutral detergent fiber (NDF) analysis, and the in vitro digestibility of the NDF fraction. The proponents of this system claim that it provides more accurate estimates of forage energy value than the use of NDF and acid detergent fiber (ADF) to estimate relative feed value (RFV).

At first past, I see several weaknesses in using the new system. First, it will require greater expense and time in conducting analyses. Second, the small gains in analytical accuracy will likely be overshadowed by unavoidable sampling variability.

The in vitro digestibility assays have been used for decades (since 1964) and they too were subject to errors. These errors are unavoidable and will be retained in the analysis system even if NIR is used to conduct the analyses. Finally, where is the evidence that we need a new system? I assume that cows are producing at all-time high levels, and we are likely getting all we can out of alfalfa, given the fact that our major problem with analysis is accounting for variability in the final product.

You can see my biases here. Even so, the new procedures will likely become the standard if the dairy industry decides it provides better data for ration balancing purposes, even if it really doesn't. The following article gives a brief explanation of the procedures and some general background. If you hear of labs that are going to offer the test, let me know.

Dan H. Smith,
Department of Soil and Crop Sciences

Relative Forage Quality
Indexing Legumes and Grasses for Forage Quality

The Relative Forage Quality lab analysis and calculation procedure is presented in this article.

Relative Feed Value (RFV) has been of great value in ranking forages for sale or inventorying and assigning forage to animal groups according to their quality needs. With the introduction of the new approaches to determining animal requirements in National Research Council Nutrient Requirements for Dairy Cattle (2001), there is an opportunity to improve upon this quality index through use of newer analyses and equations.

Relative Feed Value was based on the concept of digestible dry matter intake relative to a standard forage according to the following:

RFV = (DMI, % of BW) * (DDM, % of DM) / 1.29

Where:
DMI = dry matter intake
DDM = digestible dry matter
BW = body weight

Dry matter intake was estimated from NDF and DDM from acid detergent fiber. The constant, 1.29, was chosen so that RFV = 100 for full bloom alfalfa. The constant was the expected DDM intake, as % of BW, for full-bloom alfalfa based on animal data.

We propose to keep the same concept and format for Relative Forage Quality (RFQ) except that Total Digestable Nutrients (TDN) will be used rather than DDM. Thus RFQ will be as follow:

RFQ = (DMI, % of BW) * (TDN, % of DM) / 1.23

Where the divisor, 1.23, is used to adjust the equation to have a mean and range similar to RFV (Moore and Undersander, 2002).

continued on page 8

Relative Forage Quality Indexing Legumes and Grasses for Forage Quality (continued)

Total digestible nutrients are calculated from the new NRC recommendations using in vitro estimates of digestible NDF as follows:

TDN= [(NFC*.98) + (CP*.93) + (FA*.97*2.25) +(NDF * (NDFD*.75/100)] – 7 *(NRC, 2001)*

Where:
- CP = crude protein (% of DM)
- EE = ether extract (% of DM)
- FA = fatty acids (% of DM) = ether extract - 1
- NDF = Neutral detergent fiber (% of DM)
- NDFD = 48-hour in vitro NDF digestibility (% of NDF)
- NFC = non fibrous carbohydrate (% of DM) = 100 – (NDF+CP+EE+ash)

Dry matter intake calculations will vary for different forage types. Currently, two forage types are recognized:

1) Alfalfa, clovers, and legume/ grass mixtures where dry matter intake is estimated as:

DMI = ((.0120 *1350 / (NDF/100)) + (NDFD – 45) * .374) / 1350 * 100 (Mertens, 1987 with NDFD adjustment proposed by Oba and Allen (1999). 45 is an average value for fiber digestibility of alfalfa and alfalfa/grass mixtures.

Where DMI is expressed as % of body weight (BW), NDF as % of DM and NDFD as % of NDF.

2) Warm and cool season grasses where dry matter intake is estimated as:

$$DMI = -2.318 + 0.442*CP - 0.0100*CP^2 - 0.0638*TDN + 0.000922*TDN^2 + 0.180*ADF - 0.00196*ADF^2 - 0.00529*CP*ADF$$

Where DMI is expressed as % of BW, and CP, ADF, and TDN are expressed as % of DM (Moore and Kunkle, 1999).

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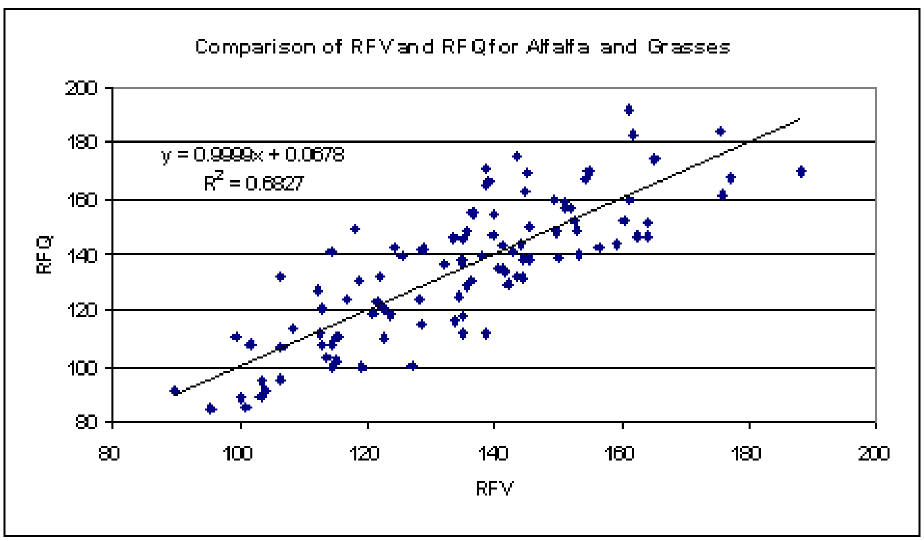

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Irrigated Forages Trial

Twenty one irrigated grass or grass & legume mixed forages are evaluated in a northeastern Colorado High Plains region trial.

Introduction

High Plains producers have become more interested in producing irrigated perennial and/or annual forages. Forages are considered a potential alternative to producing cash grain crops under irrigation. Furthermore, forages can be put up as hay or directly grazed by livestock. Perennial forages have relatively low input costs after they have been established: primarily related to water, fertilizer and harvesting costs. Annual forages offer producers flexibility in their cropping systems. Research and information regarding currently available grass and legume forages is limited. The purpose of this study is to look at both yield and quality of irrigated annual and perennial forages in order to help producers determine the suitability of this option.

Methods

An irrigated forage trial was established in 2001 on the USDA Central Great Plains Research Station at Akron, CO. Perennial and annual grasses were planted with a no-till drill in the spring of 2001. The plots were irrigated with a solid set irrigation system. Scheduling of irrigation was done by the checkbook method with estimated crop water use obtained from a weather station at Akron. Water use of alfalfa was multiplied by a coefficient of 0.85 to determine water use for irrigated grasses. This trial was established to evaluate the relative suitability of fifteen perennial and five annual forages.

Perennial grass planting was initiated in the spring of 2001. Three legumes (alfalfa, trefoil, and sainfoin) were inter-seeded with orchard grass, allowing for a comparison of a legume grass mixture and how that mixture would impact the quality and yield as compared to orchard grass alone. An experimental perennial bromegrass was also planted in April of 2002. The study was planted in a randomized complete block design with four replications.

Forage harvest was accomplished using a Carter plot flail harvester. Each Treatment was harvested when the grasses reached the boot stage of maturity for optimum quality and yield. Samples were taken for moisture content and laboratory analysis of crude protein, acid detergent fiber, net energy, calcium and phosphorus. Samples were sent to an independent laboratory for analysis. Harvest intervals were typically between 25 and 30 days depending on regrowth.

continued on page 10

Table 1. The species of forages used in this study and the 2002 result summary.

2002 Irrigated Forages Trial Summary				
		2002 total	Season Average	
		yield	Dry Matter (100%)	
Treatment		10% DM	CP	ADF
Number	Treatment Description	Tons/acre	%	%
1	Triticale/Sorghum X Sudan	6.4 a	14.4 de	30.5 a
2	Wheat / Forage Millet	4.2 bc	8.9 f	31.9 abc
3	Experimental Bromegrass	1.6 g	17.1 ab	34.8 ef
5	Meadow Brome	2.9 f	14.8 cde	36.2 fg
6	Orchard Grass	3.2 def	17.3 ab	32.3 abc
7	Smooth Brome	3.2 ef	16.2 bcd	36.0 f
8	Perennial Ryegrass	2.9 f	14.7 cde	32.1 abc
9	Tall Fescue	4.5 b	14.0 de	33.3 bcde
10	Orchard Grass	3.9 bcd	17.7 ab	32.3 abc
12	Switchgrass	3.6 cdef	9.8 f	34.5 def
13	Orchardgrass/Alfalfa	3.6 cdef	17.0 abc	31.7 ab
14	Orchardgrass/Treefoil	3.5 def	16.8 abc	32.9 bcde
15	Orchardgrass/Sainfoin	3.8 bcde	15.8 bcd	33.1 bcde
16	Wheatgrass - Newhi	3.8 bcde	14.7 cde	32.9 bcde
17	Tall Wheatgrass	2.9 f	13.2 e	33.8 cde
18	Pubescent Wheatgrass - Luna	3.0 f	18.5 a	32.8 bcd
19	Bromegrass, Matua	2.1 g	14.7 cde	38.1 g
	Experimental Mean	3.5	15.0	33.5
	Least Significant Difference (.05)	0.725	2.3	2

[1]*Means followed by the same letter are not significantly different.*

Irrigated Forages Trial (continued)

In the fall of 2001, nitrogen fertilizer was applied to half the plot area. Fertilizer was broadcast applied as ammonium nitrate (34-0-0). This was done to investigate nitrogen response of fall applied fertilizer. An application of 40 lbs. N was applied to half the plot area. Nitrogen applications for 2002 were 120 lbs. of N per acre. This application was made after May 30, 2002, following the first cutting.

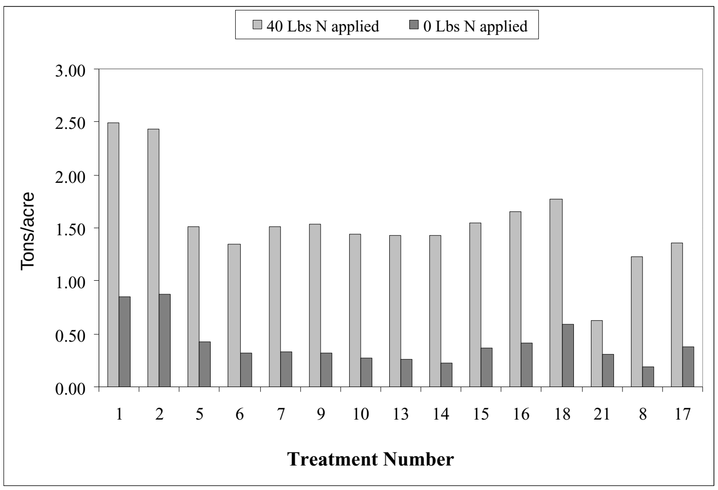

Figure 1. Forage yield as affected by nitrogen fertilizer

Results

Fall applied nitrogen increased yields of irrigated grass compared to no fall applied nitrogen (Figure 1). Total forage yield increased with the application of 40 lbs. of N and ranged from as little as two times to over six times the yield of the untreated check depending upon the forage variety. Statistical analysis was not performed because the treatment pairs were not randomized across each of the individual treatment blocks.

Total forage production for 2002 is shown in Figure 2. Overall, the greatest production was from an annual system of triticale and sorghum-sudan with yields of 6.5 tons/acre adjusted to 10% moisture content. Tall fescue, a perennial grass, produced the highest yield of 4.5 tons/acre. Annual systems such as triticale and sorghum-sudan resulted in greater forage production than any perennial system in 2002. The majority of perennial grasses produced yields between 3 and 4 tons/acre.

The addition of legumes into a grass mixture did not appear to increase production as compared to a grass monoculture. Production of a pure orchard grass was similar to that of orchard grass with alfalfa, sainfoin or trefoil added into the mixture. Average yields of orchard grass were 3.5 tons/acre compared to 3.6 tons/acre when a legume was added to the mixture.

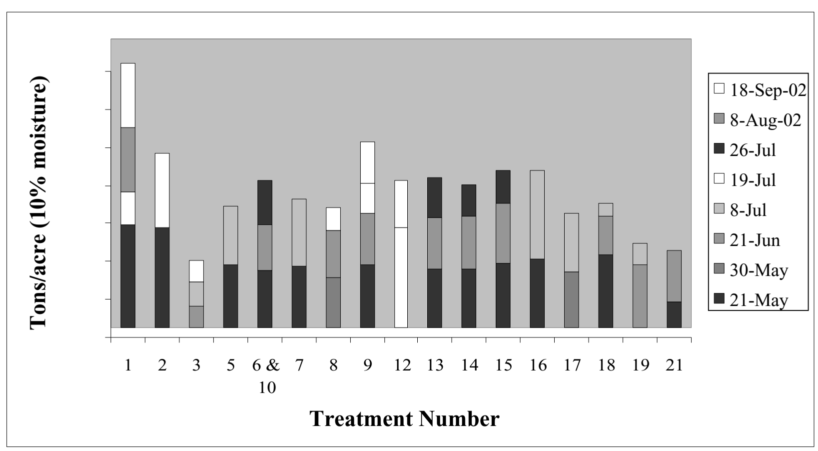

Figure 2. 2002 Seasonal forage yields

<u>Quality:</u> Forage quailty was measured by crude protein and acid detergent fiber (Table 1). The Crude Protein content was more variable than Acid Fiber Content (ADF). However, the energy content is most important in determining the feed value of a grass forage for livestock. Most livestock producers can readily and inexpensively supplement protein to livestock rations by feeding with concentrates. The forage energy content is inversely related to the fiber content as measured by acid detergent fiber. The differences in ADF measured in this trial may be more indicative of proper timeliness of harvesting the plots than in real differences in the relative quality potential of the treatments.

The addition of a legume did not increase the nutrient content of the forage. The lack of increase of either yield or quality by addition of a legume may be due to the lack of adequate legume establishment. Legumes were present after planting in 2001 but stands were found reduced in 2002. This may have been caused by orchard grass competitiveness.

<u>Competitiveness:</u> Each treatment was visually evaluated for its competitive ability against grassy

continued on page 11

Irrigated Forages Trial (continued)

and broad-leafed weeds. The following grasses were found the most competitive: orchard grass, meadow brome, tall fescue, and perennial ryegrass. The annual small grains, sorghum-sudan and foxtail millet were found competitive with annual weeds. Wheatgrasses were rated only moderately competitive with Newhi wheatgrass being the most competitive followed by Luna pubescent wheatgrass.

The warm season grasses, switchgrass, eastern gamagrass, and big bluestem were found to be very slow to establish and consequently poor competitors even after two years. Switchgrass establishment was greater than all other warm season perennials with the first harvest being taken in the late summer of 2002.

Matua bromegrass established well in 2001 but was a poor competitor to weeds and reduced vigor in 2002. The experimental bromegrass planted in 2002 established well in the test plots but failed to fill between the plants and was a poor competitor to the weeds. Both species appear to produce seed heads rapidly, which may have a negative impact on forage quality.

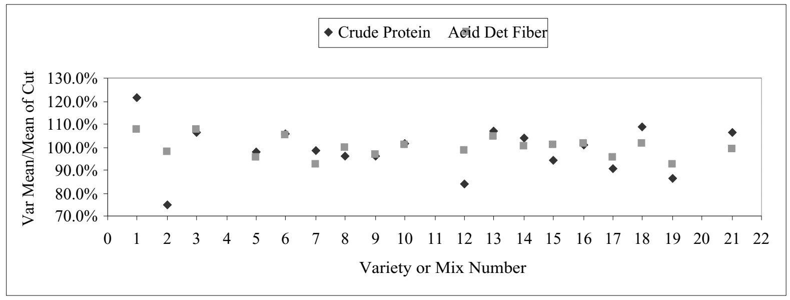

Figure 3. Forage quality indexed to cutting mean

Conclusion: It should be noted that the 2002 growing season was hot and dry. The irrigation system was able to minimize water stress, but the excess heat may have influenced some varieties more than others. It was also noted that many plant species showed nitrogen deficiency symptoms during the latter half of the growing season and yield potential may have been influenced. This was the first year of the study. Recommendations for irrigated grass production will be made after the growing season of 2003.

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Websites

National Forage Testing Association:
http://www.foragetesting.org

California Alfalfa Website:
http://alfalfa.ucdavis.edu

Wisconsin Extension Forage:
http://www.uwex.edu/ces/crops/uwforage/

Oregon State Extension:
http://forages.orst.edu/

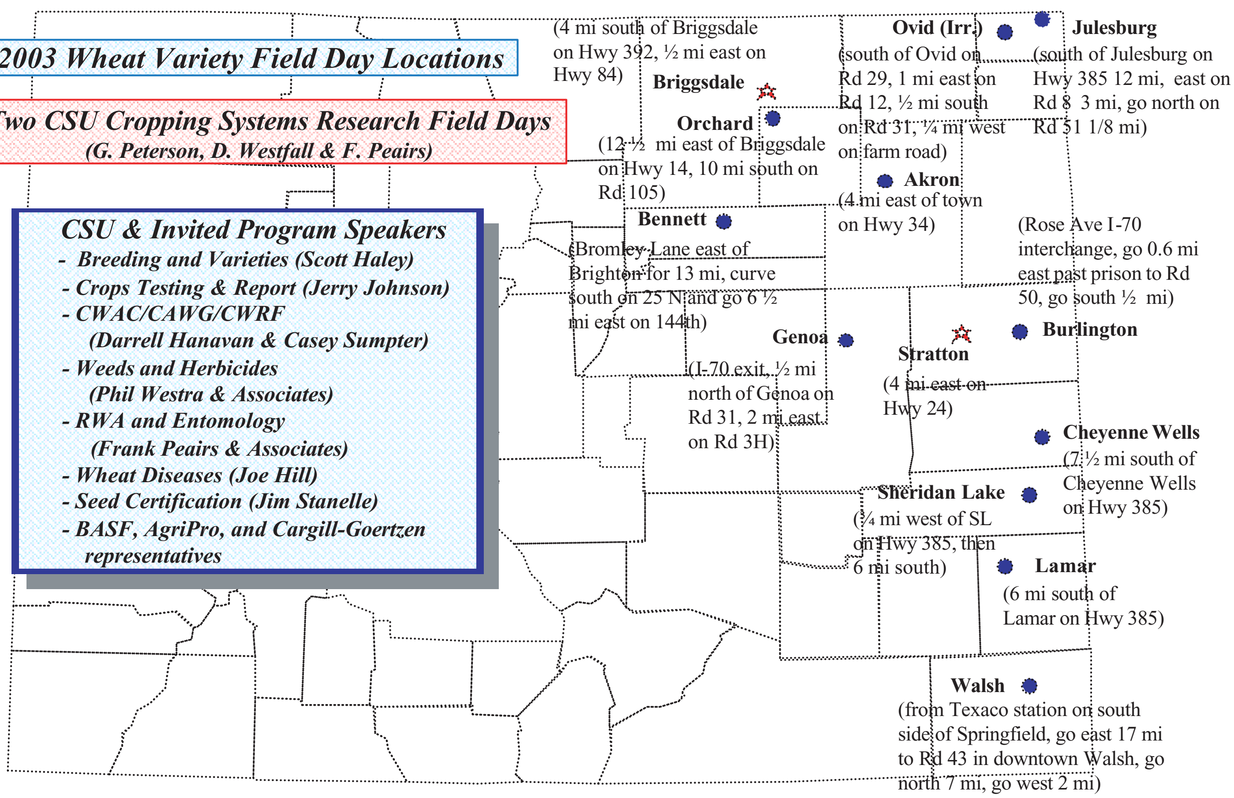
Penn State Extension:
http://www.forages.psu.edu/topics/index.html

Oklahoma State Extension:
http://forage.okstate.edu/index.htm

Colorado State University Cooperative Extension

Colorado Wheat Field Days 2003

Stratton	*June 3 (Tues)*	*5 p.m. at Miltenberger Bros. Farm, Kit Carson County*
Walsh	*June 9 (Mon)*	*9 a.m. at Plainsman Research Center, Baca County*
Lamar	*June 9 (Mon)*	*5 p.m. at John Stulp's house, Prowers County*
Sheridan Lake	*June 10 (Tues)*	*9 a.m. at Eugene Splitter Farm, Kiowa County*
Cheyenne Wells	*June 10 (Tues)*	*1 p.m. at Tom Heinz Farm, Cheyenne County*
Burlington	*June 10 (Tues)*	*5 p.m. at Barry Hinkhouse Farm, Kit Carson County*
Genoa	*June 11 (Wed)*	*9 a.m. at Ross Hansen Farm, Lincoln County*
Julesburg	*June 11 (Wed)*	*3 p.m. at Walt Strasser Farm, Sedgwick County*
Ovid (Irr)	*June 11 (Wed)*	*5 p.m. at Jim Carlson Farm, Sedgwick County*
Orchard	*June 12 (Thurs)*	*9 a.m. at Cary Wickstrom Farm, NW Morgan County*
Briggsdale	*June 12 (Thurs)*	*11:30 a.m. at Stan Cass Farm, N Weld County*
Bennett	*June 17 (Tues)*	*5 p.m. at John Sauter Farm, Adams County*
Akron	*June 18 (Wed)*	*8 a.m. at Central Great Plains Res. Station, Washington County*



CSU & Invited Program Speakers

- *Breeding and Varieties (Scott Haley)*
- *Crops Testing & Report (Jerry Johnson)*
- *CWAC/CAWG/CWRF (Darrell Hanavan & Casey Sumpter)*
- *Weeds and Herbicides (Phil Westra & Associates)*
- *RWA and Entomology (Frank Peairs & Associates)*
- *Wheat Diseases (Joe Hill)*
- *Seed Certification (Jim Stanelle)*
- *BASF, AgriPro, and Cargill-Goertzen representatives*