6-1-2004

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ARKANSAS AGRICULTURAL EXPERIMENT STATION
Division of Agriculture University of Arkansas
June 2004 Research Report 973

This publication is available on the web at: http://www.uark.edu/depts/agripub/Publications/bulletins/

Technical editing by Camilla Romund; cover design and technical editing by Amalie Holland; editing by Shelia Kidd

ISSN:1539-5944 CODEN:AKABA7

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Evaluation of Small Grain Forage Crops and Cultivars of Soft Red Winter Wheat for Stocker Cattle[1]

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Impact Statement

Use of small grain forage crops for stocker cattle production was extensively evaluated in two separate three-year research projects at the Livestock and Forestry Branch Research Station near Batesville, Ark.

The first section of this Research Report presents results of a study in which 216 commercial crossbred steers (Avg. body weights 463 lb) grazed forage of wheat, oats, rye, ryegrass, wheat + rye, wheat + ryegrass, rye + ryegrass, and wheat + rye + ryegrass during the winter and spring months from 1999 through 2002. Grazing of these forages during the winter and spring provides excellent gains in stocker cattle and could increase the agricultural income for the state by over 100 million dollars per year.

The second section presents the results of an evalutation of cultivars of soft red winter wheat for use as forage in stocker cattle operations. The cultivars tested are those commonly planted for grain production in Arkansas. One hundred twenty-eight steers of approximately 500 lb body weight grazed forage of eleven cultivars of soft red winter wheat (Delta King 9027, Pioneer 2580, Agri Pro Shiloh, Agri Pro Foster, Agri Pro Elkheart, Jaypee, Coker 9543, Coker 9663, Coker 9704, Patton, and Roane) from November 1998 to April 2001. There were no differences in ADG of steers that grazed these cultivars of soft red winter wheat except during the winter and spring of 2001. All cultivars evaluated produced forage that supported over two pounds of gain per steer per day. The cultivars Delta King 9027, Pioneer 2580, Patton, Agri Pro Shiloh, and Coker 9543 had more cold tolerance than the other cultivars tested. These data show that most cultivars of soft red winter wheat planted for grain production in Arkansas have the quality and production of forage to support a sizable stocker cattle industry.

Evaluation of Small Grain Forage for Stocker Cattle Production During Winter and Spring

Introduction

Forage of small grains has been used as pasture for cattle in Arkansas for years. However, small grains have primarily been over-seeded into bermudagrass pastures during late September and October. Coffey et al. (2000) over-seeded either Marshall ryegrass, Marshall ryegrass + 'Madison' soft red winter wheat, or Marshall ryegrass + Bonel rye during late September into a bermudagrass-dallisgrass sod. Total weight gain and return ($/animal) were greater, and cost of gain was lower for calves that grazed forage from small grains than calves fed hay and grain. Weight gains did not differ among calves that grazed forage of Marshall ryegrass, Marshall ryegrass + 'Madison' soft red winter wheat, or Marshall ryegrass + Bonel rye, but cost of gain was lowest and return per animal highest ($/animal) for those calves that grazed ryegrass followed by rye + ryegrass. Daniels et al. (2000) reported excellent growth of steers that grazed soft red winter wheat forage seeded in early September in a tilled seed bed from November through April. Therefore, it was the objective of this study to evaluate the growth of stocker steers grazing wheat, rye, oats, ryegrass, wheat + rye, wheat + ryegrass, rye + ryegrass, and wheat + rye + ryegrass, which was seeded in a tilled seedbed and grazed during winter and spring.

Experimental Procedures

Twenty-four 2-acre pastures were seeded on September 27, 28, and 29, 1999; 10 and 11, 2000 and 2001 into a prepared seedbed as follows:

1. 120 lb/acre of soft red winter wheat (Jaypee in 1999 and Delta King 9027 in 2000 and 2001)
2. 120 lb/acre of Elbon rye
3. 120 lb/acre of Bob oats
4. 40 lb/acre of Marshall ryegrass

[1] Research was supported in part by the Arkansas Wheat Promotion Board.
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5. 75 lb/acre of soft red winter wheat plus 75 lb/acre Elbon rye
6. 90 lb/acre of soft red winter wheat plus 20 lb/acre Marshall ryegrass
7. 90 lb/acre of Elbon rye plus 20 lb/acre Marshall ryegrass
8. 75 lb/acre soft red winter wheat plus 75 lb/acre Elbon rye and 20 lb/acre Marshall ryegrass.

All pastures were fertilized at seeding according to soil analysis. Seventy-two preconditioned, commercial crossbred steers (avg. body weight in 1999 = 500 lb; 2000 = 400 lb and 2001= 400 lb) were placed on their respective pastures at a stocking density of 1.5 steers/acre (750 lb beef/acre in 1999; 600 lb beef/acre in 2000; and 600 lb beef/acre in 2001) on January 6, 2000, October 23, 2000, and October 30, 2001. Steers grazed continuously except when pastures were covered with ice and snow. During this period of time, steers were fed bermudagrass hay plus 2 lb corn per head per day. All steers were implanted with Ralgro® and were fed 2 lb corn per head per day containing 70 mg/lb Rumensin®. Steers were weighed, using a 12-h shrunk weight, initially and every 28 days thereafter. A commercial trace mineral salt and vitamin mixture was fed free choice. The data were analyzed by ANOVA using the GLM procedure of SAS (SAS Inst. Inc, Cary, NC).

Results and Discussion

1999-2000

The average daily gain (ADG), total gain (TG), and gain per acre (G/A) of steers that grazed small grain forage are reported in Table 1. No differences in ADG, TG, or G/A ($P>0.05$) were observed for steers grazing from January 6 through April 18. Numerically, ADG was highest for those steers that grazed wheat + ryegrass (3.07 lb); followed by rye + ryegrass (2.99 lb); oats (2.94 lb); wheat + rye + ryegrass (2.93 lb); wheat + rye (2.90 lb); rye (2.77 lb); wheat (2.75 lb); and ryegrass (2.59 lb). These gains are greater than those reported by Coffey et al. (2000) for steers that grazed over seeded ryegrass (2.36 lb), rye + ryegrass (2.16 lb), or wheat + ryegrass (2.12 lb) and by Daniels et al. (2001) for steers that grazed wheat forage (2.5 lb) seeded in a prepared seedbed. These data show that wheat, oats, rye, ryegrass, or combinations of these seeded in a prepared seedbed produce excellent forage for stocker cattle.

2000-2001

There were no differences in ADG, TG, or G/A of steers due to forage grazed from October 23, 2000 to December 21, 2000 when an ice storm occurred (Table 2). ADG ranged from 2.43 lb for ryegrass to 2.93 lb for wheat + rye + ryegrass. TG ranged from 141 lb to 170 lb for ryegrass and wheat + rye + ryegrass, respectively, and 211 lb to 255 lb of G/A for ryegrass and wheat + rye + ryegrass, respectively. Gains were limited from December 19, 2000 to approximately January 15, 2001 because pens were too muddy to graze until January 25, 2001. High temperature was 61°F on January 6, 2001, and low temperature was 6°F on December 22, 2000 (Table 3). Calves that grazed pastures containing rye had higher ($P<0.05$) ADG, TG, and G/A than those calves that grazed other small grain forage from January 25, 2001 to March 20, 2001. The combination of consecutive cold days and three consecutive weeks of ice cover caused severe winter kill of oat forage that eliminated grazing from January 25, 2001 to March 20, 2001 and caused considerable winter kill of wheat forage. Delayed growth of ryegrass also occurred. However, it appeared that rye was not greatly affected by the cold temperature. ADG, TG, and G/A for the duration of the study favored steers that grazed rye pastures.

2001-2002

The ADG, TG, and G/A of steers that grazed small grain forage from October 30, 2001 to February 22, 2002 are reported in Table 4. Steers that grazed wheat + ryegrass forage had the highest rate of gain (ADG = 3.0), followed by those steers that grazed wheat forage (ADG = 2.6) and those that grazed ryegrass (ADG = 2.5). Steers that grazed forage of oat, wheat + rye, rye + ryegrass, and wheat + rye + ryegrass gained the same (ADG = 2.3) while those steers that grazed rye grew the slowest (ADG = 1.9). Temperatures during the fall and winter of 2001 – 2002 were relatively mild and adequate forage was available. A second set of steers grazed these forages from March through April.

Conclusions

Forage of all small grains or combinations of small grains tested were sufficient in production and quality for good growth of stocker steers. Oat forage is sensitive to cold temperatures and may freeze. Rye forage is more tolerant to cold temperatures but does not provide as good steer growth if winters are normal. Wheat and wheat + ryegrass appear to support steer growth best during a normal winter (Table 5). However all forages were sufficient for cattle to average 2.0 lb gain or better per day over the three-year study.

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Table 1. Average daily gain (ADG), total gain (TG), and gain per acre (G/A) of steers that grazed small grain forage during 1999 – 2001.

Treatment	ADG, lb	TG, lb	G/A, lb/acre
Wheat	2.75 + 0.14	309 + 15.2	463
Rye	2.77 + 0.14	311 + 15.2	466
Oats	2.94 + 0.14	331 + 15.2	496
Ryegrass	2.59 + 0.14	290 + 15.2	434
Wheat + rye	2.90 + 0.14	325 + 15.2	487
Wheat + ryegrass	3.07 + 0.15	344 + 16.3	458
Rye + ryegrass	2.99 + 0.14	334 + 15.2	502
Wheat + rye + ryegrass	2.93 + 0.14	328 + 15.2	493
Average	2.87 + 0.14	321 + 15.2	475
SE			27

* No significant treatment effects were found (P>0.05)

Table 2. ADG, TG, and G/A of steers that grazed small grain pastures during 2000 – 2001.

Variety	10/23 to 12/20	12/21 to 1/24	1/25 to 3/20	Overall
		ADG, lb[1]		
Oats	2.82	0.59	--	--
Rye + ryegrass	2.74	1.11	1.41[a]	1.88[a]
Rye	2.54	0.77	1.90[a]	1.88[a]
Ryegrass	2.43	0.88	0.54[b]	.36[b]
Wheat + rye	2.74	0.50	1.71[a]	1.83[a]
Wheat + ryegrass	2.72	0.65	0.58[b]	1.44[b]
Wheat + rye + ryegrass	2.93	0.51	1.55[a]	1.85[a]
Wheat	2.92	0.54	0.62[b]	1.51[b]
SE	0.20	0.20	0.22	0.09
		TG/steer, lb[1]		
Oats	163	21	--	--
Rye + ryegrass	159	39	78[a]	276[a]
Rye	147	27	104[a]	279[a]
Ryegrass	141	31	30[b]	201[b]
Wheat + rye	159	17	94[a]	270[a]
Wheat + ryegrass	158	23	32[b]	213[b]
Wheat + rye + ryegrass	170	18	85[a]	273[a]
Wheat	169	19	34[b]	223[b]
SE	12	7	12	13
		G/A, lb[1]		
Oats	245	31	--	--
Rye + ryegrass	238	57	112[a]	407[a]
Rye	221	40	157[a]	418[a]
Ryegrass	211	46	45[b]	302[b]
Wheat + rye	238	26	141[a]	405[a]
Wheat + ryegrass	237	34	48[b]	389[b]
Wheat + rye + ryegrass	255	27	128[a]	410[a]
Wheat	254	29	52[b]	334[b]
SE	17	10	18	19

Means in a column within trait with different letters differ (P<0.05)

Table 3. Daily high and low temperatures for December 19, 2000 to January 24, 2001.

Date	High	Low
	-F-	
December		
19		
31		
10		
20	31	10
21	33	24
22	31	6
23	37	12
24	35	19
25	33	17
26	29	21
27	33	28
28	35	21
29	36	31
30	31	16
31	28	12
January		
1	27	16
2	32	7
3	27	10
4	50	24
5	55	35
6	61	27
7	53	34
8	49	33
9	43	24
10	49	19
11	42	32
12	42	33
13	43	36
14	54	40
15	53	29
16	50	29
17	43	31
18	39	33
19	39	31
20	39	19
21	44	17
22	55	23
23	52	29
24	51	33
Average	41.2	23.4

Table 4. ADG, TG, and G/A of steers that grazed small grain forage from October 30, 2001 to February 22, 2002.

Forage	ADG, lb	TG, lb	G/A, lb/acre
Wheat	2.6	297	446
Rye	1.9	218	327
Oat	2.3	257	386
Ryegrass	2.5	281	422
Wheat + rye	2.3	260	390
Wheat + ryegrass	3.0	336	504
Rye + ryegrass	2.3	258	387
Wheat+rye+ryegrass	2.3	260	390

Table 5. Summary of ADG and G/A of steers that grazed small grain forage from 1999 through 2002.

Forage	ADG			G/A		
	1999 to 2001	2000 to 2001	2001 to 2002	1999 to 2000	2000 to 2001	2001 to 2002
Wheat	2.75	1.51	2.6	463	334	446
Rye	2.77	1.88	1.9	466	418	327
Oats	2.95	-	2.3	496	-	386
Ryegrass	2.59	1.36	2.5	434	302	422
Wheat + rye	2.90	1.83	2.3	487	405	390
Wheat + ryegrass	3.07	1.44	3.0	458	319	564
Rye + ryegrass	3.07	1.86	2.3	502	407	327
Wheat + rye + ryegrass	2.93	1.85	2.3	493	410	390

Evaluation of Cultivars of Soft Red Winter Wheat for Stocker Cattle

Introduction

Over one million acres of soft red winter wheat are planted each year in Arkansas for grain production. A large percentage of this wheat is grown on soil that is suitable for cattle production. Hard red winter wheat forage has been used to background stocker cattle in Oklahoma and the Southern Plains for years (Horn, 1994). Recent studies by Daniels et al. (1999) have shown that the use of soft red winter wheat forage for stocker cattle production is a unique and economical renewable resource in Arkansas and positions the state at a greater advantage in the production of beef over Oklahoma and the Southern Plains. Arkansas produces more forage per acre and can stock cattle at a rate two to three times greater than in Oklahoma. Income is derived from both grain and the increased values as weight gain that are added to growing cattle that graze winter wheat forage (Daniels et al., 1999). However, most of the cultivars of soft red winter wheat used in Arkansas for grain production have not been evaluated for forage production and growth of cattle. Horn et al. (1994) reported differences in average daily gain (ADG) of steers that grazed various cultivars of hard red winter wheat forage. Similar differences in ADG of steers that grazed different cultivars of hard red winter wheat forage have been reported by Gribble and Krenzer (1994). Therefore, it was the objective of this three-year study to evaluate growth performance of stocker cattle while grazing forage of popular cultivars of soft red winter wheat planted in Arkansas for grain production.

Materials and Methods

Forage of eleven cultivars of soft red winter wheat was grazed by stocker cattle during 1998 through 2001 to evaluate cultivar difference in the production of forage and its utilization by stocker cattle.

1998-1999

Eight cultivars of soft red winter wheat were seeded at a rate of 120 lb/acre on September 18 and 19, 1998 in prepared seedbeds. The wheat was seeded in 2-acre pastures with each cultivar replicated. Cultivars planted were Delta King 9027, Pioneer 2580, Agri Pro Shiloh, Agri Pro Foster, Agri Pro Elkheart, Jaypee, Coker 9543, and Coker 9663. All pastures were fertilized according to soil tests analysis. Forty-eight Angus steers, averaging 459± 4.1 lb body weight, were assigned randomly to pastures at a stocking density of 1.5 steers (689 lb beef/acre) per acre on November 11, 1998 and grazed until March 3, 1999. All steers were born and raised at the Livestock and Forestry Branch Research Station near Batesville. Steers were preconditioned for 30 days after weaning prior to grazing of wheat forage. Steers were implanted with Ralgro® and were fed two pounds of corn containing 20 mg Rumensin® per pound for each animal per day. A commercial trace mineral and vitamin supplement was fed ad libitum. Steers were weighed, using a 12-h shrunk weight, initially and at 28-d intervals. The data were analyzed using GLM procedures of SAS (SAS Inst. Inc., Cary, NC).

1999-2000

Eight cultivars of soft red winter wheat were seeded at a rate of 120 lb/acre on September 27 or 28, 1999 in prepared seedbeds. The wheat was seeded in 2-acre pastures, and each cultivar was replicated. Cultivars planted were Delta King 9027, Pioneer 2580, Agri Pro Shiloh, Agri Pro Foster, Agri Pro Elkheart, Jaypee, Coker 9543, and Coker 9663. All pastures were fertilized according to soil analyses. Thirty-two Angus steers averaging 503 lb body weight were assigned randomly to pastures at a stocking density of one steer (503 lb) per acre on November 17, 1999, and they grazed until April 26, 2000. All steers were born and raised at the Livestock and Forestry Branch Research Station and were weaned and preconditioned 30 d prior to grazing. Steers were implanted with Ralgro® and were fed 2 lb of corn containing 70 mg Rumensin®/lb for each animal per day. A commercial trace mineralized salt and vitamin mixture was fed ad libitum. Steers were weighed, using a 12-h shrunk weight, initially and at 28-d intervals. The data were analyzed using GLM procedures pf SAS (SAS Inst. Inc., Cary, NC).

2000-2001

Eight cultivars of soft red winter wheat were seeded at a rate of 120 lb/acre on September 13 and 14, 2000 in prepared seedbeds. The wheat was seeded in 2-acre pastures, and each cultivar was replicated. Cultivars planted were the most common ones planted for grain production in Arkansas. They were Coker 9704, Coker 9663, Coker 9543, Agri Pro Shiloh, Patton, Roane, Pioneer 2580, and Delta King 9027. All pastures were fertilized according to soil analyses. Forty-eight Angus x Gelbvieh steers, averaging 524 lb body weight, were assigned randomly to pastures at a stocking density of 1 1/2 steers per acre (786 lb/beef/acre) on November 9, 2000, and they grazed until March 20, 2001. Steers were fed bermudagrass hay from December 23, 2000 until January 24, 2000 due to the pastures being covered with ice and snow. All steers were born and raised on the Livestock and Forestry Branch Station and were weaned and preconditioned 30 d prior to

grazing. Steers were implanted with Ralgro® and were fed 2 lb of corn containing 70 mg Rumensin®/lb for each animal per day. A commercial trace mineralized salt and vitamin mixture was fed ad libitum. Steers were weighed using a 12-h shrunk weight, initially and at 28-d intervals. The data were analyzed as a one-way analysis of variance with pasture as the experimental unit using GLM procedures of SAS (SAS Institute, Inc., Cary, NC).

Results and Discussion

1998-1999

ADG, total gain (TG), and gain per acre (GA) of steers that grazed forage of different cultivars of soft red winter wheat from November 11, 1998 to March 3, 1999 are given in Table 1. There was a tendency for differences in ADG, TG, and G/A. Steers that grazed forage of Agri Pro Elkheart, Coker 9543, and Pioneer 2580 had higher (P=0.10) ADG, TG, and G/A than those that grazed Agri Pro Shiloh and Coker 9663 but were not different from Agri Pro Foster, Delta King 5627, or Jaypee. These data support those of Horn et al (1994) and Gribble and Krenzer (1994) who reported differences in ADG and TG of steers that grazed forage of different cultivars of hard red winter wheat.

1999-2000

The ADG and TG of steers that grazed forage of various cultivars of soft red winter wheat for 144 d and 162 d are given in Table 2. There were no differences in ADG or TG of steers that grazed for 144 d; however, when these steers had grazed for 161 d, differences approached significance (P<0.10). The ADG and TG of steers were lower during the last 17 d of grazing. The reduced gains were most likely due to a shortage of forage and a lower quality of forage because of the maturity of the wheat plants. Also the steers were more mature. These data differ from those reported by Horn et al. (1994) and Gribble and Krenzer (1994), who observed differences in ADG and TG of steers that grazed forage of different cultivars of hard red winter wheat.

ADG and TG were highest for steers that grazed Delta King 9027 (3.87; 3.71 lb), followed by Coker 9543 (3.76; 3.65 lb) and Jaypee (3.59; 3.54 lb) for 144 and 161 d of grazing, respectively. However, ADG and TG of steers that grazed forage of all soft red winter wheat cultivars were exceptionally high, averaging 3.54 and 3.43 lb at 144 and 161 d of grazing, respectively. These gains were higher than those reported by Daniels et al. (1999) for steers that grazed soft red winter wheat forage of Hickory or Jaypee cultivars and by Horn (1994) for steers that grazed hard red winter wheat. Daniels et al. (2000) observed that steers that grazed forage of the same eight cultivars of soft red winter wheat from November 1, 1998 through February 28, 1999 had lower ADGs and TGs than in the present study during 1999-2000. During the 1998-99 study, steers had the following ADGs: Pioneer 2580 (2.7 lb), Agri Pro Elkheart (2.6 lb), Agri Pro Foster (2.5 lb), Coker 9543 (2.4 lb), Delta King 9027 (2.4 lb), Jaypee (2.3 lb), Coker 9663 (2.2 lb), and Agri Pro Shiloh (2.1 lb).

2000-2001

The ADG, TG, and G/A of steers that grazed forage of the various cultivars from November 9 to March 20 are given by periods in Table 3. There were no differences in ADG, TG, or G/A due to cultivars from November 9, 2000 until December 28, 2000 or from December 23, 2000 until January 24, 2001 when pastures were covered with ice and berumudagrass hay was fed. These data differ from those reported by Horn et al. (1994) and Gribble and Krenzer (1994), who observed differences in ADG and TG of steers that grazed forage of different cultivars of hard red winter wheat, but agree with Daniels et al. (2000), who observed no difference in ADG or TG of steers that grazed forage of various cultivars of soft red winter wheat. Even though differences were small, Patton, Pioneer 2580, and Delta King 9025 tended to produce higher ADG, TG, and G/A than other cultivars tested (from January 24, 2001 until March 20, 2000 and overall November 9, 2000 until March 20, 2001 [P=0.10 and 0.08, respectively]). ADGs were 2.00 and 1.64 lb/day for Patton; 1.59 and 1.53 lb/d for Delta King 9027; 1.55 and 1.89 lb/d for Pioneer 2580; 1.72 and 1.48 lb/d for Agri Pro Shiloh; 1.43 and 1.29 lb/d for Coker 9543; 0.81 and 1.27 lb/d for Roane; 0.89 and 1.19 lb/d for Coker 9704; and 0.53 and 0.97 lb/d for Coker 9663 for periods from January 25, 2001 to March 20, 2001 (and overall November 9, 2000 to March 20, 2001), respectively. These data suggest that some cultivars were more sensitive to cold and ice cover than others and were slower to recover during the spring.

Conclusions

All cultivars of soft red winter wheat evaluated (Table 4) produced sufficient quantity and quality of forage to support rapid growth (over 2 lb per head per day) of stocker cattle. However, forage of some cultivars (Delta King 9027, Pioneer 2580, Agri Pro Shiloh, Coker 9543, Agri Pro Elkheart, and Agri Pro Foster) tended to produce greater ADG. Pioneer 2580, Delta King 9027, Agri Pro Shiloh, and Patton exhibited more tolerance to a cold, ice-covered environment. Therefore, even though all cultivars of soft red winter wheat evaluated produced ample high-quality forage to support good growth in stocker cattle, our recommendation would be to plant Delta King 9027, Pioneer 2580, Agri Pro Shiloh, or possibly Patton due to greater cold tolerance. Patton has only been evaluated for one year and more data are needed before making a firm recommendation.

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Table 1. Average daily gain (ADG), Total gain (TG), and Gain per acre of steers that grazed forage of different cultivars of soft red winter wheat from November 11, 1998 to March 3, 1999.

Cultivar	ADG	TG	G/A
		----------lb----------	
Agri Pro Elkheart	2.61[a]	292.5[a]	438.7[a]
Agri Pro Foster	2.47[ab]	276.7[ab]	416.0[ab]
Agri Pro Shiloh	2.11[c]	236.8[c]	355.2[c]
Coker 9543	2.63[a]	294.2[a]	441.2[a]
Coker 9663	2.19[bc]	245.0[bc]	368.2[bc]
Delta King 9027	2.33[abc]	260.7[abc]	391.0[abc]
Jaypee	2.20[ab]	246.5[ab]	369.7[ab]
Pioneer 2580	2.59[a]	289.7[a]	434.0[a]
SE	.13	14.5	21.07

Tendency for a difference (P=.10) for all traits
Means in a column with no letter in common differ (P<0.10)

Table 2. Evaluation of eight cultivars of soft red winter wheat forage on ADG and TG of grazing stocker steers at 144 and 161 d of grazing during 1999 and 2000.

Cultivar	ADG, lb		TG, lb	
	144 d	161 d	144 d	161 d
Delta King 9027	3.87	3.71	557	598
Coker 9543	3.76	3.65	541	588
Jaypee	3.59	3.54	517	571
Agri Pro Elkheart	3.50	3.32	504	534
Pioneer 2580	3.49	3.23	503	520
Agri Pro Shiloh	3.49	3.37	503	542
Coker 9663	3.42	3.29	493	530
Agri Pro Foster	3.23	3.31	465	533
SE	0.18	0.11	0.25	0.17
P value	0.38	0.10	0.38	0.10

Table 3. ADG, TG, and G/A of stocker cattle that grazed various cultivars of soft red winter wheat forage from November 9, 2000 until March 20, 2001.

Variety	11/9 to 12/22	12/23 to 1/24	1/25 to 3/20	Overall
		ADG (lb)[1]		
Coker 9543	1.83	0.36	1.43	1.29
Coker 9663	1.79	0.63	0.53	0.97
Coker 9704	2.13	0.45	0.89	1.19
Delta King 9027	2.04	0.76	1.59	1.53
Patton	2.03	0.54	2.00	1.64
Roane	2.35	0.65	0.81	1.27
Agri Pro Shiloh	1.78	0.67	1.72	1.48
SE	0.20	0.17	0.32	0.13
		TG/steer[1]		
Coker 9543	78.50	11.83	78.67	169.00
Coker 9663	77.17	20.67	29.33	127.17
Coker 9704	91.67	15.00	49.00	155.67
Delta King 9027	87.67	25.17	87.33	100.17
Patton	87.17	17.67	110.00	
Roane	101.00	21.50	44.33	166.83
Agri Pro Shiloh	76.67	22.17	94.50	193.33
SE	8.58	5.45	17.34	17.35
		G/A[1]		
Coker 9543	117.75	17.75	118.00	253.50
Coker 9663	115.75	31.00	44.00	190.75
Coker 9704	137.50	22.50	75.50	233.50
Delta King 9027	131.50	37.75	131.00	300.25
Patton	130.75	26.50	165.00	322.25
Roane	151.50	32.25	66.50	250.25
Agri Pro Shiloh	115.00	33.25	141.75	290.00
SE	12.87	8.17	26.00	26.03

[1]No significant differences among varieties at any time (P>0.10) although period 3 and overall approached significance (P=0.10 and P=0.10, respectively).

Table 4. Summary of ADG of steers that grazed small grain forage from 1998-2001.

	ADG			
Cultivars	1998 to 1999	1999 to 2000	2000 to 2001	AVG
		-lb-		
Pioneer 2580	2.59	3.23	1.59	2.47
Coker 9663	2.19	3.29	0.97	2.15
Delta King 9027	2.33	3.71	1.53	2.52
Agri Pro Shiloh	2.11	3.37	1.48	2.32
Coker 9543	2.63	3.65	1.29	2.52
Agri Pro Foster	2.47	3.31	-	2.89
Agri Pro Elkheart	2.61	3.32	-	2.96
Jaypee	2.20	3.54	-	2.87
Coker 9704	-	-	1.19	1.19
Patton	-	-	1.64	1.64
Roane	-	-	1.27	1.27

METRIC TO ENGLISH CONVERSION

Metric	English
Kilogram (kg)	2.2 lb
Meter	3.28 feet
Metric Ton (1000 kg)	2,204.62 lb
27.273 kg	Bushel of wheat (60 lb)
Hectare	2.471 acres
Kg/ha	2.2 lb x 2.471 acres


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