Small Grain Winter Forage Variety Testing, 2006-2007
NMSU Agricultural Science Center at Clovis

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Investigators

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Objective

To evaluate ensilage and hay production potential through dry matter harvests and nutritive value of cool-season, small grain varieties submitted for testing at the Agricultural Science Center at Clovis.

Materials and Methods

This variety trial was planted on October 25, 2006 (Table 1). All 21 entries were planted in 67 $ft.^2$ plots under center pivot irrigation. Soil type is an Olton clay loam and elevation is 4,435 ft. Individual plots consisted of 11 rows, 6.25 inches apart and 10 feet long. Plots were planted at a rate of 100 lb/acre with a plot drill.

The planting area contained 78 lb N/ac and 88 lb P_2O5/ac as carryover. Plots were fertilized with 30 lbs/acre of nitrogen on March 18, 2007. Additional N (30, 15 lb.) applications were made on March 29 and April 5. All fertilizer applications were based on soil test results and recommendations. On October 26, 2006, Buccaneer and Clarity herbicides were applied for weed control. Lo-Vol 6 (2,4-D) and Clarity herbicides were applied on March 14.

Total irrigation for the growing season was 7.20 inches, with the majority of water applied in April. Precipitation during the test was excellent, particularly during March, and 9.00 inches were received from late October to mid-May.

These small grains were managed for a one-cut, silage/hay oriented harvest in spring of 2007 (Table 1). Harvests began on April 30, 2007 with the earliest maturing species (barley) and continued through May 15. Plants were harvested at boot stage (Feekes scale: 10.0-10.3; Zadoks scale: 45-53) for maximum forage quality. Although yield is maximized at later growth stages, cutting earlier at boot to early head stages allows for a balance of good yields and optimum nutritive value. Considering the high nutritional needs of dairy cattle in the region and the common practice of double cropping with corn or sorghum, an early

cutting of forages was deemed most appropriate for the area. All plots were harvested with a sickle bar mower set at a height of 2 inches, and total plot weights were obtained to estimate yield on both a green forage and dry matter basis.

Statistical Analysis

Species/varieties were assigned randomly to plots in a completely randomized block design with 3 replications. Data were subjected to SAS® procedures for test of significance for differences ($P < 0.05$) among entries and mean separation procedures (protected least significant difference) were used to determine where differences occurred.

Results and Discussion

Yield and forage quality data for 2006-2007 are presented in Tables 2 and 3. Final results from 2007 harvests will be presented in the annual report for 2007 and in other periodic reports and presentations from the Agricultural Science Center at Clovis. Large amounts of precipitation likely affected overall yields of the small grains as mean dry forage was 3.8 tons/ac for the trial. Wet yields averaged 18.4 tons/ac. Dry forage produced ranged from 1.8 to 5.2 tons/ac. Forage nutritive value declined with increased yield. The general trend was that as dry matter yield increased, crude protein and NE_l were reduced and fiber proportions increased. Although all varieties were harvested at the same maturity stage, often times greater yields result in proportionately less protein and increased fiber (NDF, ADF). Nitrogen removed from the soil in 2006-2007 averaged about 197 lb N/acre and ranged from 109 to 259 lb N/acre.

Table 1. Winter Annual Small Grain Forages, 2006-2007, Agricultural Science Center at Clovis

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Test Description

Location:

County/Area:	Curry
Longitude:	-103.22
Latitude:	34.60
Elevation:	4435 ft.
Soil Name:	Olton
Soil Texture:	clay loam
Soil Depth:	>60 in.

Test Design:

Replications	3
Plot Length:	10 ft.
Plot Width:	6.73 ft.
Rows per Plot:	11
Drill Row Spacing:	6.25 in.

Seeding Rate:

All Entries:	100 lb/a

Management Practices:

Previous Crop: fallow

Planting Date: 25-Oct

Forage Harvest - Single harvest per plot

Harvest Dates: 30-April to 15-May

(Mechanically harvested all of each plot based on stage of maturity. Clipping height was 1 to 2 in.)

Production Inputs	Rate		Date
Fertilizer:			
Nitrogen	78	lb/ac	Carryover
Nitrogen	30	lb/ac	18-Mar
Nitrogen	30	lb/ac	29-Mar
Nitrogen	15	lb/ac	5-Apr
P_2O_5	88	lb/ac	Carryover
Herbicides:			
Buccaneer	24.0	oz/ac	26-Oct
Clarity	4.0	oz/ac	26-Oct
Clarity	4.0	oz/ac	14-Mar
Lo-Vol 6	0.5	pt/ac	14-Mar
Instecticides:			

Growing Conditions:

	Average Temp. ^{o}F	Precip. in.	Irrigation in.
October	55.0	1.78	0.35
November	47.0	0.06	1.35
December	36.0	1.20	0.00
January	29.5	0.62	0.00
February	40.0	0.19	0.00
March	49.0	3.70	1.00
April	51.0	0.18	3.50
May†	59.5	1.27	1.00

†May 1-15

Seasonal Precipitation	9.00	in.
Total Irrigation	7.20	in.

Table 2. Forage Harvest - Winter Annual Small Grain Forages - 2006-2007 Various Dates - NMSU Agricultural Science Center at Clovis

Company Name	Variety Name	Species †	Harvest Date	Green Forage	Dry Forage	Moisture at Harvest	Milk/ Ton	Milk/ Acre	RFQ	N removal
				T/ac	T/ac	%	lb/ton	lb/ac		lb N/ac
Seed Resource	Winter Master II	T	15-May	24.4 *	5.2 ***	78.8	2993	15498 *	142	259 ***
Curtis & Curtis, Inc.	X3-Exp.	T	14-May	24.5 *	5.1 *	79.3	2972	15037 *	136	241 *
Watley Seed Co.	SlickTrit	T	14-May	23.6 *	5.1 *	78.5	3104	15671 ***	148	256 *
Warner Seed	Triplecale	T	11-May	25.6 ***	4.7 *	81.8 ***	3013	14029 *	142	232 *
Scott Seed Co.	Champion I	W/B	11-May	19.6	4.3	78.2	2923	12519	138	204
Warner Seed	Pounds Plus B	T/W/O	15-May	21.1	4.2	79.9 *	3121	13256 *	152	220
Curtis & Curtis, Inc.	Maximizer A	W/T	11-May	21.9 *	4.0	81.6 *	3276	13145 *	164	230 *
Scott Seed Co.	Champion II	W	11-May	17.7	3.9	77.7	2814	11078	129	182
Curtis & Curtis, Inc.	X1-Exp.	T	15-May	20.9	3.8	81.7 *	2916	11141	134	186
Curtis & Curtis, Inc.	Maximizer B	W/T	14-May	17.5	3.8	78.4	3248	12264	158	201
Curtis & Curtis, Inc.	X2-Exp.	T	11-May	19.6	3.7	81.2 *	3330	12188	173	199
Agri-Pro	Tamcale 5019	T	7-May	18.3	3.5	80.7 *	3392	11886	179	207
Agri-Pro	Dumas	W	7-May	16.0	3.5	78.1	3381	11805	178	193
Agri-Pro	Longhorn	W	11-May	16.2	3.5	78.4	3134	10916	151	176
Agri-Pro	TAM 111	W	7-May	15.2	3.3	78.2	3296	10972	173	180
Paramount Seed Farms	Tambar 501	B	30-Apr	16.8	3.3	80.3 *	3608 *	11940	194 *	188
Agri-Pro	Cutter	W	7-May	14.7	3.3	77.9	3237	10526	173	172
Agri-Pro	Jagalene	W	7-May	13.7	3.0	77.9	3467	10405	195 *	169
Curtis & Curtis, Inc.	Smooth Grazer	W/T	7-May	14.6	3.0	79.9 *	3416	10054	182	175
Paramount Seed Farms	P-919	B	30-Apr	15.2	2.9	81.0 *	3678 ***	10523	208 ***	166
Paramount Seed Farms	Kanbar 04	B	7-May	9.5	1.8	80.6 *	3441	6315	189 *	109
			Trial Mean	18.4	3.8	79.5	3227	11960	164	197
			LSD (0.05)	3.9	0.85	2.3	192	2643	20	38
			CV	12.9	13.8	1.8	3.6	13.4	7.3	11.5
			F Test	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

†O=oat; R=rye; T=triticale; W=wheat; B=barley

All plots were harvested at Feekes stage 10.0-10.3; 10.0=sheath of flag leaf completely grown out, ear not visible; 10.3= half of heading process complete.

*** Highest numerical value in the column.

* Not significantly different from the highest numerical value in the column based on the 5% LSD.

Table 3. Forage Harvest - Winter Annual Small Grain Forages - 2006-2007 Various Dates - NMSU Agricultural Science Center at Clovis

Company Name	Variety Name	Species †	Harvest Date	CP	ADF	NDF	dNDF Dig. 48h	Non-Fiber Carb.	TDN	NE_l
				% of DM	% of DM	% of DM	% of NDF	% of DM	% of DM	Mcals/lb
Seed Resource	Winter Master II	T	15-May	15.7	32.7 *	51.7 *	59.7	23.8	63.6	0.65
Curtis & Curtis, Inc.	X3-Exp.	T	14-May	14.9	33.7 *	53.1 *	58.5	23.8	63.4	0.65
Watley Seed Co.	SlickTrit	T	14-May	15.9	31.6	50.7 *	60.8	24.8	65.0	0.67
Warner Seed	Triplecale	T	11-May	15.6	32.9 *	52.1 *	60.5	23.1	63.8	0.65
Scott Seed Co.	Champion I	W/B	11-May	15.0	32.5 *	51.3 *	58.4	24.3	62.8	0.64
Warner Seed	Pounds Plus B	T/W/O	15-May	16.2	31.2	50.0	61.2	25.1	65.2	0.67
Curtis & Curtis, Inc.	Maximizer A	W/T	11-May	17.9 *	30.2	48.3	63.7	24.6	67.1	0.69
Scott Seed Co.	Champion II	W	11-May	14.5	33.7 *	53.4 *	56.9	23.2	61.4	0.63
Curtis & Curtis, Inc.	X1-Exp.	T	15-May	15.2	34.7 ***	53.9 ***	59.6	21.7	62.5	0.64
Curtis & Curtis, Inc.	Maximizer B	W/T	14-May	16.7 *	30.0	49.3	62.4	25.8	66.8	0.69
Curtis & Curtis, Inc.	X2-Exp.	T	11-May	17.2 *	29.0	46.6	64.8	26.8	67.7	0.70
Agri-Pro	Tamcale 5019	T	7-May	18.6 *	27.7	45.5	65.9	26.5	68.5	0.70
Agri-Pro	Dumas	W	7-May	17.4 *	27.3	46.0	66.6	26.9	68.2	0.70
Agri-Pro	Longhorn	W	11-May	15.8	31.2	50.7 *	62.0	24.6	65.3	0.67
Agri-Pro	TAM 111	W	7-May	17.0 *	27.0	45.5	63.6	27.9	67.4	0.69
Paramount Seed Farms	Tambar 501	B	30-Apr	17.8 *	25.3	44.3	68.6 *	30.4 ***	71.2 *	0.74 *
Agri-Pro	Cutter	W	7-May	16.6 *	26.8	45.3	64.9	26.8	66.4	0.68
Agri-Pro	Jagalene	W	7-May	18.1 *	25.1	42.5	67.7	28.9 *	69.3	0.72 *
Curtis & Curtis, Inc.	Smooth Grazer	W/T	7-May	18.7 ***	26.9	45.0	66.3	26.8	68.7	0.71
Paramount Seed Farms	P-919	B	30-Apr	18.2 *	24.0	42.6	71.5 ***	30.3 *	71.8 ***	0.74 ***
Paramount Seed Farms	Kanbar 04	B	7-May	18.6 *	25.8	43.4	66.5	28.7 *	69.1	0.72 *
			Trial Mean	16.7	29.5	48.1	63.3	25.9	66.4	0.68
			LSD (0.05)	2.1	2.8	3.4	3.1	2.2	2.4	0.03
			CV	7.5	5.7	4.2	2.9	5.1	2.2	2.3
			F Test	0.0004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

†O=oat; R=rye; T=triticale; W=wheat; B=barley

All plots were harvested at Feekes stage 10.0-10.3; 10.0=sheath of flag leaf completely grown out, ear not visible; 10.3=half of heading process complete.

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