

## 2012 Forage Screening Demonstration

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Annual forages are a significant source of feed for cattle. Previous research at the Dickinson Research Extension Center has shown that perennial and annual forages can be used for early weaning, backgrounding, and in yearling extended grazing programs. One of the primary challenges with forages for grazing is to not only have an adequate supply, but that the forage be of good quality into the fall and early winter, when native range forage quality is declining. This is a challenge, because all forages naturally mature and weather with advancing season.

Summer annual warm season crops can provide an abundance of forage with very desirable forage quality, but some varieties have noticeably higher dry matter forage yield and quality than others. At the Center, 84-90 day maturity corns have been planted in various experiments for unharvested corn grazing. There are a large number of corn, sorghum, sudangrass, millet, and hybrid combinations as well as those with the brown midrib gene; however, we wondered how representative forage types would yield and what their nutrient quality might be under the growing conditions of western North Dakota.

Twenty warm season forage varieties were planted in mid-May that were sampled for dry matter (DM) forage, grain yield and nutrient quality on September 10, and the residue was sampled on October 20, 2012. The plant population of 19,000 plants/acre (p/a) that has been the standard corn plant population used in the Center's integrated crop and livestock research experiments. For interest, a few of the varieties were planted at 24,000 p/a to see how yield would be impacted. Since there was only a limited amount of seed available for some varieties, only a few varieties were seeded at the standard and high population rate.

Some winter pea varieties were also planted to evaluate cold tolerance for use in late grazed cover crop mixes; however, the rows were completely eaten by grasshoppers.

### *Summary*

The varieties grown, whole plant yield (DM, T/Ac) and grain yield (DM, Bu/Ac) are shown in Table 1, and forage nutrient quality on September 10, and late October 20 are shown in Tables 2 and 3. We had a limited amount of seed for some of the varieties, eliminating some of the varieties from the October sampling. A Pioneer variety 37K84 was grown for the Center's experiments and was included in the variety screening as a check variety.

### *Forage and Grain Yield*

Dry matter forage yield in September ranged from a low of 0.63 to a high of 4.39 T/A. Most of the varieties grown yielded from 3.0 to 3.5 T/A, and MasterGraze, a tillering corn variety, yielded 4.39 T/A. Brown Mid-Rib (BMR) Sorghum Sudan was the highest yielding sorghum/sudan hybrid (3.35 T/A) and cow pea and Siberian millet yielded less than a ton/acre.

In October, residue measured for the majority of the varieties yielded from 1.0 – 2.0 T/A. Aztec White (2.0 T/A) and MasterGraze-N (1.85 T/A) had the highest amount of residue measured in October.

Grain yield (DM) in September was highest for the Pioneer variety 37K84 at both the high and normal plant populations (e.g. 37.6 (H) and 41.2 bu/a (N), respectively). Wachichu Flint was the next highest grain yielding variety (35.3 bu/a) followed closely by 08K12 at 34.6 bu/a. All of the other varieties produced no grain or very little grain/ac.

### Nutrient Quality

Forage varieties with the highest nutrient quality based on percent of total digestible nutrients (TDN) were Wachichu Flint, BMR 84, cow pea, MasterGraze, and Pioneer 37K84. TDN values for the remaining varieties were lower, but the quality was still very good. Comparing the September TDN values with the October TDN values, there was an average 22.3% decline. Morado, Aztec White, Wapsie Valley and MasterGraze had the highest TDN values in October. **MasterGraze, Pioneer 37K84, BMR Sorghum Sudan and Wapsie Valley were varieties with the highest September forage yield and nutrient quality, and in October, the varieties with the highest residual forage and nutrient quality (TDN) were Aztec White and MasterGraze.**

Forage unsaturated fat content was high among a few varieties. Those with the highest fat content ranged from 10.2-14.0%. Varieties with the highest fat and yield on September 10 were Aztec White, MasterGraze, and BMR Sorghum Sudan. Combining yield, TDN, and high unsaturated fat content, MasterGraze and BMR Sorghum-Sudan were the top performing varieties. When measured in October, MasterGraze had the least crop residue shrink resulting in the highest yield retention as well as the highest residual fat content and nutrient quality (TDN).

Varieties planted in 2013 are listed in Table 4.

**Table 1. Forage Varieties** <sup>a, c</sup>

Forage	Tons/Ac (DM)	Tons/Ac (DM)	Grain/Ac (DM)	
Sample Date	Sept. 10	Oct. 20	Sept. 10	
Corn				
Morado	2.25	1.51	-	
Aztec White	3.14	2.0	-	
AR 16021-B73	3.11	1.04	7.78	
Wapsie Valley	3.39	0.95	21.39	
08K12	3.42	1.16	34.36	
08K12 (Late Planted)	1.17	-	-	
Pioneer 37K84 (H) <sup>b</sup>	3.40	1.14	37.60	
Pioneer 37K84 (N) <sup>b</sup>	3.36	1.13	41.16	
MasterGraze (H) <sup>b</sup>	2.45	1.39	13.94	
MasterGraze (N) <sup>b</sup>	4.39	1.85	12.64	
Wachichu Flint	0.95	1.54	35.33	
Gehu	2.04	1.04	8.10	
Motto/Syzidecka (N) <sup>b</sup>	1.58	0.74	4.86	
BMR 84 (N) <sup>b</sup>	0.63	-	-	
<b>Sorghum/Sudan</b>				
Piper Sorghum Sudan	1.55	-	-	
BMR Sorghum Sudan	3.35	-	-	
Red Kaoliang Sorghum	2.08	-	-	
Sugar Sweet Sorghum Sudan	2.54	-	-	
<b>Other</b>				
Cow Pea – Iron & Clay	0.95		-	
Siberian Millet	0.91			

<sup>a</sup>Sampled Sept. 10, 2012

<sup>b</sup>Plant population: H -22,000; N – 19,000 plants/acre

<sup>c</sup>Row spacing: 30”

**Table 2. Corn, Sorghum, Cow Pea, Millet - Whole Plant Nutrient Quality (September 10, 2012, DM)**

<b>Forage</b>	<b>Protein, %</b>	<b>ADF, %</b>	<b>NDF, %</b>	<b>Fat, %</b>	<b>IVOMD, %</b>	<b>IVDMD, %</b>	<b>Calcium, %</b>	<b>Phos, %</b>	<b>TDN, %</b>
<b>Corn</b>									
Morado	12.3	58.0	32.7	5.10	65.0	62.0	0.74	0.21	65.0
Aztec White	9.3	55.3	32.9	13.9	69.7	67.5	0.78	0.13	64.8
AR 16021-B73	7.5	57.3	29.3	9.7	72.1	71.1	0.59	0.13	67.4
Wapsie Valley	8.0	56.4	28.1	8.6	65.9	65.2	0.51	0.15	68.2
08K12	8.8	56.9	29.3	4.7	69.9	68.9	0.26	0.16	67.3
08K12 (Late Planted)	11.0	56.9	30.1	11.8	73.0	71.9	0.45	0.16	66.7
Pioneer 37K84(H)	7.6	53.8	28.2	7.3	69.8	68.8	0.35	0.12	68.1
Pioneer 37K84 (N)	6.4	51.8	25.7	6.8	72.3	71.9	0.30	0.14	69.8
MasterGraze (H)	6.9	53.5	26.5	10.2	77.7	77.3	0.43	0.14	69.3
MasterGraze (N)	7.8	52.3	25.4	13.2	80.5	80.3	0.51	0.14	70.1
Wachichu Flint	8.1	22.9	23.7	7.7	71.4	70.7	0.30	0.18	71.8
Gehu (H)	6.92	63.3	32.9	7.1	67.1	67.0	0.53	0.11	64.8
Motto/Syzidecka (N)	7.5	52.9	26.9	7.7	69.1	68.4	0.44	0.16	69.1
BMR 84 (N)	12.9	50.7	24.2	14.0	81.9	81.0	0.51	0.21	70.9
<b>Sorghum/Sudan</b>									
Piper Sorghum Sudan	9.1	59.1	33.2	8.5	62.7	61.1	0.53	0.16	64.6
BMR Sorghum Sudan	11.2	59.2	27.9	9.24	77.1	76.2	0.49	0.17	68.3
Red Kaoliang Sorghum	8.3	63.1	33.0	7.35	58.0	56.4	0.41	0.15	64.8
Sugar Sweet Sorghum Sudan	9.9	58.9	28.2	10.6	67.5	66.3	0.39	0.15	68.1
<b>Other</b>									
Cow Pea – Iron & Clay	23.8	35.9	25.4	4.8	72.4	68.8	3.2	0.28	70.1
Siberian Millet	12.0	54.2	27.6	5.8	65.8	64.5	0.34	0.15	68.5

**Table 3. Corn - Whole Plant Nutrient Quality (October 20, 2012, DM)**

Variety	Protein, %	ADF, %	NDF, %	Fat, %	IVOMD, %	IVDMD, %	Calcium, %	Phos, %	TDN, %
<b>Corn</b>									
Morado	9.2	38.3	65.8	3.5	55.9	58.6	0.35	0.16	57.4
Aztec White	9.5	38.0	66.7	5.9	65.8	67.4	0.64	0.17	57.8
AR 16021-B73	5.7	40.2	71.7	5.2	58.1	59.6	0.41	0.11	54.5
Wapsie Valley	5.9	35.3	66.7	5.9	63.1	64.0	0.44	0.08	58.7
08K12	5.0	41.6	71.1	7.1	50.6	52.0	0.35	0.8	53.2
Pioneer 37K84(H)	6.0	43.0	72.0	6.2	52.7	53.9	0.42	0.09	52.3
Pioneer 37K84 (N)	4.7	45.8	74.6	6.8	48.1	49.5	0.36	0.06	49.6
MasterGraze (H)	5.1	33.7	64.3	11.2	72.0	72.2	0.43	0.08	59.7
MasterGraze (N)	4.7	34.0	64.6	13.9	70.9	70.8	0.36	0.10	59.3
Wachichu Flint	6.0	39.4	67.5	8.4	57.9	58.8	0.26	0.10	55.3
Gehu (H)	7.1	43.1	75.7	3.0	63.0	64.2	0.62	0.08	52.7
Motto/Syzidecka (N)	7.2	39.5	69.1	6.0	55.4	56.0	0.45	0.15	55.7

**Table 4. 2013 Corn and Sorghum-Sudan Varieties**

Variety	Type	Supplier
<b>Corn</b>		
P0125R	Hybrid - Guard Strip	DuPont Pioneer
F2F343	Hybrid	Mycogen
Wapsie Valley	Open Pollinated	Green Haven Farm, Avoca, NY
Wachichu Flint	Open Pollinated	Prairie Road Organic Seed, Fullerton, ND
Dublin	Open Pollinated	Green Haven Farm, Avoca, NY
MN 13	Open Pollinated	Green Haven Farm, Avoca, NY
P0125R	Hybrid	DuPont Pioneer
Mastergraze	BMR Corn	Masters Choice, Anna, IL
P9690R	Hybrid	Pioneer Seeds
P9690R	Hybrid – Guard Strip	Pioneer Seeds
<b>Sorghum-Sudan</b>		
Sweetthing	BMR Sorghum/Sudan	Agassiz Seed & Supply, West Fargo, ND
Buffalo Grazex3	BMR Sorghum/Sudan	Chesak Seeds, Bismarck, ND
Piper	Sorghum/Sudan	Chesak Seeds, Bismarck, ND
AS 6402	BMR Sorghum/Sudan	Byron Seeds LLC, Albany, MN