

**GRAZING ANNUAL FORAGES  
- Preliminary Observations -**

(Presented at the NDSU Cow/Calf Conference in Bismarck, December 5, 1998)

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*Research has demonstrated that barley, oat, pea and Siberian millet can be used to provide productive annual pastures when grazed singularly or in sequence during the summer in the Northern Great Plains.*

## **Research summary**

Beef cattle have grazed annual forages at the Dickinson Research Extension Center for 5 yr (4 yr with cow/calf pairs; 1 yr with bred heifers). Stocking rate (animal unit/mo; AUM) and animal performance varied from year to year and crop to crop. Seasonal stocking rate averaged .8 AUM/ac; individual animal performance averaged 2.5 lb/d for suckling calves and 2.0 lb/d for bred heifers; and live weight gain averaged 66 lb/ac. Although the potential for grazing cattle on annual forages is quite promising, further research is needed to identify promising forage species for grazing and establish potential forage sequences and optimal seeding dates, initial grazing dates, stocking rates, and grazing management appropriate for annual forage pastures.

## **Introduction**

Prices received for agricultural commodities are often low compared to the relatively high costs of production. This results in relatively low net returns per acre for the amount of capital invested. At the same time, a reduction in

government control of agricultural production has given producers greater flexibility in developing their own farming plans. As these producers contemplate new cropping decisions, crop rotations involving annual forages are gaining in popularity. Annual forages have potential for increasing net returns to crop acres by providing feed for livestock production. Forages can be harvested and fed or grazed in the field. Studies have been initiated to evaluate the potential of using traditional crop land for cattle production by growing sequences of annual forage and grazing beef cattle during the summer.

## Materials and Methods

In each of 4 yr, crossbred cow/calf pairs (animal unit [AU]=cow/calf pair) grazed on sequences of annual forages. Eight paddocks (8.3 ac/paddock) were arranged into two, 4-pasture blocks. Within each block, annual forages were randomly seeded ([Table 1](#)) into individual paddocks and grazed sequentially with a constant stocking rate (2.05, 1.45, 1.2 and 1.2 AU/ac in 1993, 1994, 1995 and 1996, respectively). Annual forages selected for grazing evaluation included: winter rye, cereal/pea intercrop, and millets (Siberian and Pearl). Use of Pearl millet was discontinued in 1994 due to agronomic difficulties and replaced by barley in 1995 and 1996. Within each year, the desired grazing management involved grazing rye in May, cereal/pea in June, Pearl millet or barley in July and Siberian millet in August. Calves were weighed at the initiation and termination of grazing in each pasture. Average daily gain, gain per acre and accumulated grazing days (AUM/ac) were used to evaluate the grazing potential of each forage type. A complete description of grazing evaluations between 1993-1994 and 1995-1996 is given in Manske and Nelson (1996) and Poland et al. (1996), respectively.

In 1998, 12 paddocks (2.5 ac/paddock) were blocked into two, 6-paddock groups (2 paddocks/forage type). One group was seeded to pea, oat or oat-pea intercrop, while the other group was seeded to lentil, barley or barley-lentil intercrop. Paddocks were grazed by bred beef heifers (.75 AU/heifer) at a constant stocking rate of .9 AU/ac. Paddocks seeded ([Table 1](#)) to oat, pea and oat/pea combinations were grazed first (mid June to mid July), followed by paddocks seeded to the barley, lentil and barley/lentil combinations (mid July to mid August). Grazing potential of each forage type was evaluated as in earlier experiments. This seeding/grazing sequence will be repeated in a second set of paddocks in 1999. A more detailed description of the 1998 grazing evaluation is given in Poland et al. (1998).

## Results and Discussion

Seeding and grazing dates and accumulated grazing days per acre are presented in [Table 1](#). With the exception of 1993, all paddocks were grazed between 15 May and 31 August. Under the grazing management imposed, sequences of annual forages accumulated an average of .82 AUM/ac. A hypothetical, 640-ac pasture seeded to an appropriate sequence of annual forages would be expected to support 150 animal units for 3.5 mo (approximately 15 May - 31 August).

Suckling calf performance (4 years; 1993 - 1996) is summarized in [Table 2](#). Although there was considerable variation within forage types both among and between years, annual performance averaged 2.48 lb/head/d and 66.0 lb/ac. The 150-cow herd in the previous example would be expected to add 260 to 280 lb per calf over the summer period (3.5 mo). A calf with a 65 lb birth weight that had gained 120 lb (60 days of age gaining at 2.0 lb/d) prior to moving to annual forage pastures would weigh approximately 455 lb (65+120+270) by the end of August.

Bred heifer performance (1 year; 1998) is also presented in [Table 2](#). Heifers averaged 2.0 lb/d from mid June to mid August. Heifer live weight gain per acre (67.2 lb/ac) was comparable to average suckling calf performance reported in previous years.

## Conclusions

Five years of research demonstrates that beef cattle can successfully graze annual forages in the Northern Great Plains during the summer. Seasonal stocking rates have averaged .8 AUM/ac, while live weight gain per acre has averaged 66 lb. Individual daily gain has averaged 2.5 lb for suckling calves and 2.0 lb for bred heifers. Data from specific forage types suggests that seasonal production parameters can be improved. New research is needed to support the development of optimally matched annual forage production and grazing strategies.

## Literature Cited

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<b>Table 1. Seeding and grazing dates and stocking rates for beef cattle grazing annual forages at Dickinson Research Extension Center.</b>				
<b>Year/Forage Type</b>	<b>Seeding date</b>	<b>Grazing dates</b>	<b>Days</b>	<b>AUM<sup>a</sup>/acre</b>
<b><u>1993<sup>b</sup></u></b>		<b>01June - 30September</b>	<b>57</b>	<b>.96</b>
OP intercrop <sup>c</sup>	24April	13July - 27July	14	.94
Pearl millet	Early May	not grazed	--	--
Siberian millet	Early June	01September - 15September 08October - 14October	20	1.34
Pearl millet	Mid July	15September - 08October	23	1.54
<b><u>1994</u></b>		<b>01June - 30September</b>	<b>67</b>	<b>.79</b>
Winter rye	August, 1993	15June - 13July	27	.64
OP intercrop	07May	14July - 08August	26	1.23
Pearl millet <sup>d</sup>	not seeded	--	--	--

Siberian millet	Early June	23August - 06September	14	.66
<b>1995</b>		<b>15May - 31August</b>	<b>77</b>	<b>.76</b>
Winter rye	August, 1993	15May - 30May	15	.59
CP intercrop <sup>c</sup>	03May	29June - 26July	27	1.07
Barley <sup>d</sup>	01June	27July - 11August	16	.62
Siberian Millet	12June	12August - 30August	19	.75
<b>1996</b>		<b>15May - 31August</b>	<b>68</b>	<b>.67</b>
Winter rye	May, 1995	28May - 10June	13	.52
CP intercrop	20April	14June - 01July	17	.68
Barley	24May	16July - 06August	21	.83
Siberian Millet	29June	07August - 23August	17	.68
<b>1998</b>		<b>15June - 15August</b>	<b>61</b>	<b>.92</b>
Oat and Pea	27April	15June - 20July	35	1.05
Barley and Lentil	04June	22July - 17August	26	.78

<sup>a</sup> Animal unit month or the equivalent of one cow-calf pair grazing for one month. Bred heifer were considered to be .75 animal unit.

<sup>b</sup> Stocking rates were 2.05, 1.45, 1.2, 1.2 and .9 animal units per acre in 1993, 1994, 1995, 1996 and 1998, respectively.

<sup>c</sup> OP and CP refer to oat-pea and oat-pea-winter rye intercrops, respectively.

<sup>d</sup> Use of Pearl millet discontinued in 1994 and was replaced by barley in 1995 and 1996.

**Table 2. Cattle performance while grazing annual forages at Dickinson Research Extension Center.**

Year/Forage Type	Average daily gain lb/d	SE <sup>a</sup>	Gain per acre lb/ac	SE
	<b>Suckling calf performance</b>			
<b>1993<sup>b</sup></b>	<b>2.46</b>	<b>..<sup>c</sup></b>	<b>91.0</b>	<b>--</b>
OP intercrop <sup>d</sup>	3.01	--	86.3	--
Pearl millet <sup>e</sup>	1.29	--	61.0	--
Siberian millet	3.07	--	125.6	--
<b>1994</b>	<b>2.16</b>		<b>57.8</b>	
Winter rye	1.20	--	23.4	--
OP intercrop	2.48	--	93.1	--
Siberian millet	2.81	--	56.9	--
<b>1995</b>	<b>2.50</b>	<b>.002</b>	<b>58.0</b>	<b>.0005</b>
Winter rye	2.22	.071	40.2	1.27
CP intercrop	2.02	.060	65.6	1.98
Barley <sup>e</sup>	3.61	.442	69.5	8.49
Siberian Millet	2.48	.335	56.8	7.71
<b>1996</b>	<b>2.79</b>	<b>.179</b>	<b>57.2</b>	<b>3.68</b>
Winter rye	2.22	.240	34.7	3.75

CP intercrop	2.53	.046	51.9	.92
Barley	3.18	.202	80.4	5.16
Siberian Millet	3.03	.329	62.0	6.72
<b>Overall for forage type<sup>f</sup></b>				
Winter rye	1.88	--	32.7	--
OP/CP intercrop	2.51	--	74.2	--
Siberian millet	2.85	--	75.3	--
Pearl millet	--	--	--	--
Barley	3.40	--	75.0	--
	<b>Bred heifer performance</b>			
<b>1998</b>	<b>2.02</b>	<b>--</b>	<b>67.2</b>	<b>--</b>
Oat and Pea	1.45	.18 <sup>g</sup>	61.4	5.8 <sup>g</sup>
Barley and Lentil	2.62	.18 <sup>g</sup>	73.0	5.8 <sup>g</sup>

<sup>a</sup> Standard error of mean.

<sup>b</sup> Stocking rates were 2.05, 1.45, 1.2, 1.2 and .9 animal units per acre in 1993, 1994, 1995, 1996 and 1998, respectively. One animal unit equating to a cow-calf pair or 1.2 bred heifers.

<sup>c</sup> Not applicable or not reported.

<sup>d</sup> OP, CP and BL refer to oat-pea, oat-pea-winter rye and barley-lentil intercrops, respectively.

<sup>e</sup> Use of Pearl millet was discontinued in 1994 and replaced by barley in 1995 and 1996.

<sup>f</sup> Means are averaged across years (winter rye, n=3; OP/CP intercrop and Siberian millet, n=4; Pearl millet, n=1; barley, n=2).

<sup>g</sup> Standard error is average for all forage types within year.

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