# Diet and Performance Of Steers Grazing Eastern Oregon Native Flood Meadows

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*SUMMARY: This experiment compared strip (SG) and continuous grazing (CG) effects on livestock diet quality and performance. Biweekly diet samples and fecal collections showed that over the grazing season, crude protein in CG diets tended to be higher than SG (P=0.14), at 13.9 and 10.9 percent, respectively. Crude protein declined significantly between May and September. Digestibility of diets varied between treatments (P=0.07), at 64.6 and 60.7 percent on CG and SG, respectively. Meadows foxtail was the most common grass on the meadows, and was more frequent in SG diet samples (P=0.05). Forage intake was similar (P=0.42) for both treatments, at about 2.1 percent of body weight per day. Steers were weighted biweekly. Steer average daily gain (May to Sept.) was greater under CG (P=.09) (2.5 lbs/day) than SG (1.7 lbs/day). Growing cattle performed very well on native meadows containing meadows foxtail. Grazing is a viable option that may provide increased economic returns to livestock producers.*

Native flood meadows (NFM) are used to produce hay and are irrigated by stream flow. In the Harney Basin, control of water is minimal, resulting in an uncontrolled flooding system that often prevents haying until forage has become mature. Traditional management involves haying in summer, with grazing of aftermath and regrowth in the fall, prior to winter hay feeding. Meadows are often fertilized with nitrogen in early spring, with hay yields of about 3,500 lb/ac. Regrowth potential after haying is low because soils are dry, and native species present do not provide adequate regrowth. Recent changes in meadow composition have changed this picture however. Introduced grasses are better able to regrow after clipping in early summer.

Meadows in this area were historically dominated by rushes (*Juncus*) and sedges (*Carex*), but have recently shifted to stands dominated by an introduced species, meadow foxtail (*Alopecurus pratensis*). Meadow foxtail grows early in spring and produces high yields, however it often reaches maturity in mid-to late June. Inability to control timing and duration of surface flooding usually prevents cutting for hay until early to mid-July, resulting in a lower quality hay.

Grazing of meadows containing meadow foxtail appears to be a viable alternative to harvesting for hay only. Objectives of this research were to determine diet quality, diet botanical composition, forage, intake and animal performance of steers grazing meadows with either strip (SG) or continuous (CG) grazing management.

## MATERIALS & METHODS

*Study Area.* The Eastern Oregon Agricultural Research Center is 5 miles south of Burns, Oregon. The dominant grasses are meadow foxtail, saltgrass (*Distichlis stricta*), reed canarygrass (*Phalaris arundinacea*), quackgrass (*Agropyron repens*), and Nevada bluegrass (*Poa nevadensis*). Sedges and rushes are also important components. Common forbs include hesperochiron (*Hesperochiron pumulus*) and common dandelion (*Taraxacum officinale*), with arrowgrass (*Triglochin maritima*) scattered in small quantities throughout the pasture.

*Treatments.* In April, the meadow was fenced into four equal pastures of about 14 acres. Continuous (CG) and Strip (SG) grazing treatments were applied. Steers on

CG had access to the entire pasture at all times, while animals on SG treatments were restricted to strips by portable electric fencing.

*Animals.* Eighty yearling steers (556 lb) were stratified by weight into four groups, with each group randomly assigned to treatments. Weight change was determined for each group by weighing 15 steers after overnight restriction from feed and water. At weaning the previous fall, steers had received clostridials, infectious bovine rhinotracheitis, and bovine viral diarrhea vaccinations. Prior to placing animals on treatment all steers received zeranol, and were revaccinated for clostridials.

*Sampling.* Diet sampling was conducted approximately biweekly, to coincide with the second day of grazing in each strip. Collections were made in each pasture on two consecutive days. Nitrogen percentage of diets was determined by macro-kjeldahl digestion and reported as crude protein (CP=N x 6.25). Digestible dry matter (IVDDM) was determined by 48-hour *in vitro* digestion. Total fecal collections began the day following diet collections. Fecal bags were placed on the animals by 7 a.m. and remained in place for 24 hours. Upon removal fecal bags were weighed and the quantity of feces determined.

## RESULTS AND DISCUSSION

*Diet Quality.* Dietary CP and IVDDM both declined significantly ($P<.05$) over the summer (Table 1), which is a typical result of advancing plant maturity. Between CG and SG treatments, seasonal means for CP tended to differ ($P=0.14$), at 13.9 and 10.9 percent, respectively. Likewise, digestible DM was higher ($P=.07$) in CG steer diets than SG ($P=.07$), at 64.6 percent vs 60.7 percent, respectively.

Diet quality of steers on SG was significantly lower than for CG steers from June 26 to August 7, because regrowth from strips grazed in May and early June had matured. Soil water was still adequate to allow plant growth, and probably enhanced diet quality for steers on CG pastures. Diet quality did not differ between treatments in late August. At that time SG steers were grazing forage that had been previously grazed in late June. That forage had not reached maturity because decreased soil water had limited growth during July.

*Botanical Composition of Steer Diets.* Strip grazing increased ($P=.06$) grass percentage in steer diets (Table 2), which is consistent with other reports of floristic changes in animal diets under intensive grazing management.

The rush and sedge component of steer diets tended to be greater for CG animals (63%) than for SG (49.0%) ($P=.14$). Forbs represented only minor amounts in steer diets (<1%), and no differences were detected in forb consumption between treatments. Meadow foxtail was significantly greater ($P=.05$) in SG (43.9%) than in CG (27.1%) diets. Regrowth potential of native sedges and rushes is low but meadow foxtail has been shown to produce regrowth. Therefore, strip grazing may have increased the standing crop of meadow foxtail relative to sedges and rushes, and influenced percentages of grass in steer diets.

*Intake and Performance.* Daily DM intake was analyzed as lb DM/d on a percentage of body weight (BW) basis. There was no difference between treatment means (Table 3) for daily DM intake ($P=.42$), at 2.0 and 2.1 percent of BW for SG and CG steers, respectively. Intake (lb DM/d) increased between May and September as a result of increased body mass and rumen capacity. Mean ADG was 2.4 lb for continuous, and 1.8 lb under strip grazing. Increased performance exhibited by CG steers is likely a result of the higher plane of nutrition noted previously. In our study, superior individual steer performance under CG was offset by the smaller pasture area grazed under SG management (14 vs 10 acres, respectively). Gain per acre did not differ between treatments when compared on a total production basis ($P=.17$), at 25 and 20 lb/ac for CG and SG, respectively.

## CONCLUSIONS

Strip-grazing management tended to increase grass consumption and contributed to a 39 percent relative increase of meadow foxtail in steer diets compared to CG management. Individual animal performance tended to be greater for CG steers, which is consistent with the observed plane of nutrition. However, total animal gain per hectare was similar between management systems because pasture area utilized by SG steers during the study was less than for the CG treatment. Increases in diet quality were noted in late August when SG animals were grazing areas that did not have high levels of regrowth, and had remained vegetative. This might indicate that if animal demand had been increased to shorten rotation interval, diet quality might have improved for SG animals in July. This study demonstrated that native flood meadow vegetation containing meadow foxtail can produce excellent animal performance, and that strip grazing will provide similar animal gain/ha while reducing the total land area required. Further research is needed at several stocking rates to determine the effect of increased stock density on performance of steers grazing wet meadows in spring.

**Table 1. Crude protein (CP) and in vitro digestible dry matter (IVDDM) of steer diets on continuous or strip grazing systems.**

| | Continuous | | Strip | |
|---|---|---|---|---|
| Date | CP | IVDDM | CP | IVDDM |
| May 15 | 18.7 | 76 | 17.2 | 74 |
| May 29 | 16.4 | 70 | 13.7 | 69 |
| June 12 | 15.3 | 68 | 12.8 | 66 |
| June 26 | 13.9** | 66** | 9.4 | 57 |
| July 10 | 13.7* | 65* | 9.6 | 60 |
| July 24 | 12.8** | 62** | 8.6 | 53 |
| Aug 7 | 12.2** | 60** | 7.5 | 52 |
| Aug 21 | 8.5 | 54 | 7.1 | 55 |
| Sept 4 | 13.8 | 59 | 12.5 | 60 |

Asterisks (* or **) indicate grazing treatments differ at P=0.05 or 0.01, respectively.

**Table 2. Major components of steer diets while grazing native meadows under either strip (s) or continous (c) grazing management.**

| | Foxtail | | Grasses | | Rush/Sedge | |
|---|---|---|---|---|---|---|
| Date | C | S | C | S | C | S |
| 5/15 | 13 | 23 | 3 | 1 | 81 | 75 |
| 5/29 | 29* | 46 | 4 | 1 | 32 | 48* |
| 6/12 | 32* | 56 | 2 | 0 | 34 | 36 |
| 6/26 | 33 | 44 | 3 | 4 | 36 | 47 |
| 7/10 | 23 | 13 | 4 | 6 | 27 | 79* |
| 7/24 | 23 | 14 | 9 | 9 | 32 | 74* |
| 8/7 | 43 | 51 | 5 | 6 | 48 | 42 |
| 8/21 | 23* | 82 | 28* | 2 | 51 | 16* |
| 9/4 | 23* | 68 | 12 | 8 | 35 | 24 |

* Means within a forage category and ate differ at $P<0.05$.

**TABLE 3. Dry matter (DM) intake (percent of body weight), average daily gain (ADG) and total gain per acre of steers under strip or continuous grazing of native flood meadows May 1 - Sept 4, 1989.**

| Item | Treatment | | |
|---|---|---|---|
| | Continuous | Strip | SEM[c] |
| DM Intake | 2.1% | 2.0% | |
| ADG (lbs) | 2.6[a] | 1.8[b] | 0.4 |
| Total gain[d] | 23.3[a] | 19.7[a] | 0.4 |

[a,b] Means within rows differ ($P<.10$) when followed by different letters.

[c] Standard error of the mean calculated from treatment by block (error a) and treatment by block period within period (error b: n=16.

[d] Based on total seasonal grazed areas of 13 and 6.5 acres for continuous or strip treatments, respectively.