



Healthy Food, Diverse Farms, Vibrant Communities

Cooperators

Bruce and Derek Carney, Maxwell

Project Timeline

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Web Link

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Comparison of Stocker Gains from Grazing Different Forages

Abstract

Thirty-nine stocker cattle were weighed before and after three different grazing periods from July 18, 2009 to October 17, 2009, to compare the rate of gain on the different forages being grazed. Three different forages were compared: 1. green-leaf corn; 2. red clover and grass mix, sorghum sudangrass and soybeans; and 3. alfalfa-grass mix. There were significant differences between the animals' average daily gains between treatments, in the following order: corn (2.6 lbs./day) > alfalfa-grass (2.2 lbs./day) > mixed forages (0.83 lbs./day).

Background

Raising beef cattle on pasture without feeding additional grain or other stored feeds can be challenging. It requires cattle genetics that have been selected for high performance in a grass-based system. It also requires high-quality forages to maintain animal performance. At some times of the year, well-managed perennial pastures work well for this, but sometimes additional forages must be grown to supplement these pastures, especially during the hottest and driest time of summer when pasture growth is slow and forage quality is poor. One option for supplemental forages is to plant annuals such as corn or sorghum sudangrass. Another option is to graze other forages that would normally be harvested for stored forage such as hay. In this trial, one or both of these methods were used during the three different grazing periods.

Materials and Methods

Animals -- A total of 59 stocker cattle were used for this study. For purposes of consistent data reporting, we will only report the weight gain data from the 39 stockers that were weighed

not included in the average daily gain calculations.

Forages -- The cattle were strip-grazed during all grazing periods and moved a minimum of once a day. Paddock size



Bruce Carney

each of the four measurement events. The average initial animal weight was 499 lbs., ranging from 344 lbs. to 700 lbs. On August 24, 32 heifers (average weight of 700 lbs.) and a bull (1200 lbs.) were added to the group, but



Derek Carney

for a day was determined based on the amount of forage available.

From July 18 to August 8, they grazed green-leaf corn (grazing period 1, GP1), half of which was planted on

May 4 and half planted on May 18. From August 8 until September 13, the cattle grazed a red clover and grass mix for the first three weeks, then primarily sorghum sudangrass (planted on August 19) overseeded with soybeans (grazing period 2, GP2). From September 13 until October 17, they grazed alfalfa-grass mix (grazing period 3, GP3). The three alfalfa fields grazed during this period were established in 2005, 2006 and 2009.

The soybeans in GP2 were planted into the sorghum sudangrass to make up for the lack of growth in the sorghum sudangrass (which could have been due to the allelopathic effect from the preceding rye cover crop). Low temperatures may also have led to poor sorghum sudangrass growth.

Forage production was calculated as animal days per acre (ADA, formula 1) and dry matter production per acre, assuming 26 lbs. of dry matter consumption per 1000-pound animal unit (live weight basis)(formula 2).

Formula 1: $ADA = (\text{lbs. animal live weight}/1000 * \text{days in grazing period})/\text{acres grazed}$

Formula 2: $\text{Pounds dry matter production/acre} = ADA * 26$

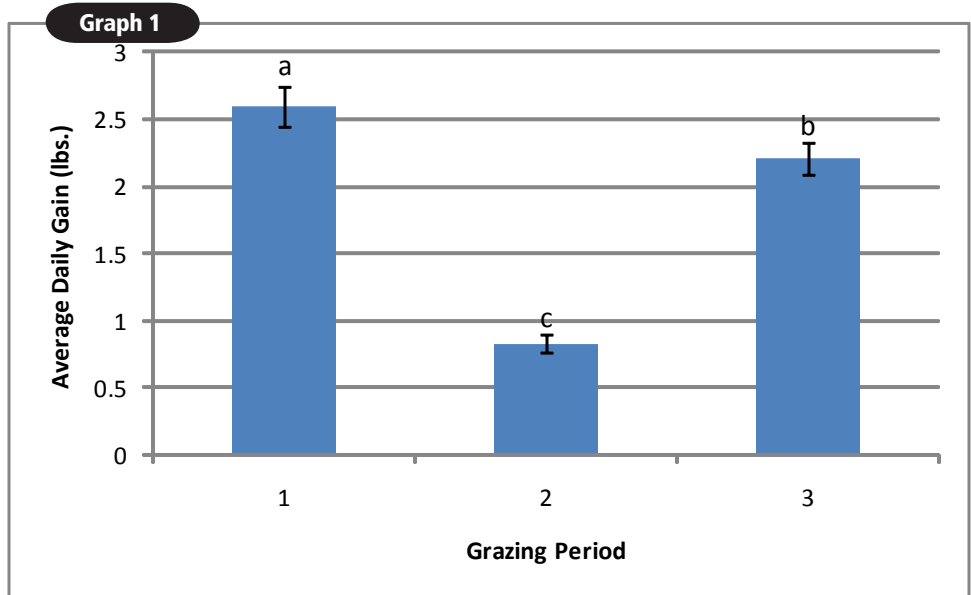
Climate -- Precipitation and temperature data used were obtained from the Iowa Environmental Mesonet. These data were recorded at the ISU Agronomy Farm near Ames (approximately 30 miles from the trial site).

Measurements -- The cattle were weighed individually before and after

each grazing period. They were not weighed in the middle of GP2, between the red clover/grass mix and the sorghum sudangrass/soybean mix, so these two different forage mixes were treated as one grazing period.

Statistics -- The data were analyzed using student's paired t-test in JMP8.

and annuals. The past few years their cow herd has grazed at the Chichaqua Bottoms Greenbelt for three months during the summer, resulting in a 90-day rest period for their home pastures. They would have 25-45 days of rest without this extra pasture. They utilize that rest to build up a stockpile of forage to graze during the winter.



Average daily gain on corn (1), red clover/grass and sorghum sudangrass/soybeans (2) and alfalfa. Different letters over the bars indicate significant differences ($p < 0.01$).

Cooperators

The Carneys rotationally graze their 125 cow-calf herd. They grow corn, alfalfa, rye, sorghum sudangrass and oats. They sell their animals through a local locker. Bruce has been farming since 1996. He began rotationally grazing in 1997 and has been managing his pastures more intensively every year since. In 2009, he began grazing with high density, whereby the cattle are moved a minimum of once a day. Derek has been highly active on the farm since 2004 and has been raising meat chickens for the last five years.

The Carneys' grazing system involves a combination of perennial pastures

Stockers and finishing animals remain on the home farm during this summer period but are mostly grazed on annual forages. They like to use these forages to help get them through the summer slump with high quality forages in order to leave a greater rest period between grazings on perennial pastures and to transition crop ground to pasture.

Results

Average Daily Gain — Over the 91-day trial period, the animals gained an average of 162 lbs. with an average daily gain (ADG) of 1.75 lbs. During GP1 (corn), the ADG was 2.6 lbs., with average total gains of 56 lbs.

During GP2 (clover/grass, sorghum sudangrass/soybeans), they gained an average of 30 lbs., with an ADG of 0.83 lbs. In GP3, when the animals grazed alfalfa-grass mix, they gained 162 lbs. on average, with an ADG of 2.2 lbs.

The stockers had significantly ($p < 0.01$) greater ADG in GP1 than in GP3. The ADG in GP1 and GP3 were both significantly greater than in GP2 ($p < 0.0001$).

Pasture Productivity -- During GP1, GP2, and GP3, respectively, dry matter (DM) harvested per acre was 1894, 1603, and 1699 lbs./acre. The average stock density on these same pastures was 72,900; 51,700; and 65,353 lbs. live animal weight per acre.

significantly greater than the mix of forages that made up the second grazing period. Since cattle weights were not recorded between the red clover/grass mix and the sorghum sudangrass/soybean mix, we cannot conclude whether animal

performance was better on one forage mix than on the other during GP2. Normally sorghum sudangrass would be expected to perform well, so poor growth resulting possibly from nutrient tie-up, low moisture or allelopathy from the preceding rye cover crop. The stress from adding a new group of animals to the herd could also have contributed to low animal performance.

highest average air temperatures, and precipitation was similar during all grazing periods. However, other environmental factors such as day length could also have affected forage quality.

Table 1

Grazing Period	Forages	Animal Days/Acre	Dry Matter Harvested/Acre (lbs.)	Average Stock Density (lbs. live animal weight)
1	Green leaf corn	72.9	1894	72,900
2	Red clover/grass mix and sorghum sudangrass/soybeans mix	61.6	1603	51,700
3	Alfalfa/grass mix	65.4	1699	65,400

Grazing periods, forages available and production from those forages.

Climate --The average air temperature for GP1, GP2, and GP3, respectively, was 69°F, 67°F, and 54°F. The average weekly precipitation for GP1, GP2, and GP3, respectively, was 0.01 inches, 0.03 inches, and 0.02 inches.

Dry matter production during this period was not much lower than in the alfalfa, so per acre production was still not poor. Statistical comparisons of forage production could not be made due to lack of replication.

Conclusions

In this trial, grazing green-leaf corn resulted in the highest stocker gains, with alfalfa-grass resulting in slightly lower gains. These gains were

Air temperature and precipitation do not appear to have been contributing factors in animal performance, as the two grazing periods that had the best performance had the lowest and