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Intensive Rotational Grazing of Steers on Highly Erodible Land at the Adams County CRP Project

Abstract

Grazing yearling steers is one way to utilize the forages required for participation in the Conservation Reserve Program (CRP) after CRP contracts expire. In 1995, a stocker-steer intensive-rotational grazing study was conducted at the CRP Research and Demonstration Project near Corning, Iowa. A similar study was carried out in 1994. Seventy-five yearling crossbred steers grazed a 65-acre pasture that had been divided into 27 paddocks using electric fencing from May 4, 1995 to September 14, 1995. During this period, the 65-acre pasture system produced 9,975 animal-days of grazing and 11,403 pounds of gain. On a per-acre basis, this translates to 153.5 animal-days of grazing and 175.4 pounds of gain. The stocking rate was constant for the entire 133-day grazing season at 1.15 steers per acre. On May 4, 1995, the beginning of the grazing season, the average weight of the steers was 495.7 pounds. By the end of the grazing trial on September 14, 1995, the average weight of the steers had increased to 647.7 pounds. The average gain per steer during the 133-day grazing period was 152 pounds, and the average daily gain per steer was 1.14 pounds. The average bodyweight of the steers during the entire grazing season was 571.7 pounds.

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Intensive Rotational Grazing of Steers on Highly Erodible Land at the Adams County CRP Project

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Summary

Grazing yearling steers is one way to utilize the forages required for participation in the Conservation Reserve Program (CRP) after CRP contracts expire. In 1995, a stocker-steer intensive-rotational grazing study was conducted at the CRP Research and Demonstration Project near Corning, Iowa. A similar study was carried out in 1994.

Seventy-five yearling crossbred steers grazed a 65-acre pasture that had been divided into 27 paddocks using electric fencing from May 4, 1995 to September 14, 1995. During this period, the 65-acre pasture system produced 9,975 animal-days of grazing and 11,403 pounds of gain. On a per-acre basis, this translates to 153.5 animal-days of grazing and 175.4 pounds of gain.

The stocking rate was constant for the entire 133-day grazing season at 1.15 steers per acre. On May 4, 1995, the beginning of the grazing season, the average weight of the steers was 495.7 pounds. By the end of the grazing trial on September 14, 1995, the average weight of the steers had increased to 647.7 pounds. The average gain per steer during the 133-day grazing period was 152 pounds, and the average daily gain per steer was 1.14 pounds. The average bodyweight of the steers during the entire grazing season was 571.7 pounds.

Introduction

The Adams County CRP Research and Demonstration Project was established to study alternatives to row-crop production on highly erodible land. Beef cow-calf and yearling steer grazing are enterprises farmers often choose to earn a return from this kind of land.

Beef cow-calf demonstrations have been conducted at the CRP Research and Demonstration Project near Corning, Iowa in 1991, 1992, 1993, 1994 and 1995 (refer to Beef and Sheep Research Report Leaflets R-903, R-1036, R-1037, R-1156, R-1157, and R-1248). A yearling steer grazing program was carried out for the first time in 1994 and repeated in 1995.

Materials and Methods

The yearling steer grazing demonstration was conducted at the Adams County CRP Research and Demonstration Project farm located in Section 14 of Quincy Township in Adams County, Iowa. The predominant soil type of the 65 acres used for the grazing project is Adair-Shelby complex, 9% to 14% slope, and severely eroded. This tract is believed to be representative of much of the CRP land in Adams County.

The area used for pasture is divided into 27 paddocks using a single-wire, 12.5 gauge, high-tensile electric fence energized by a high-voltage, low-impedance power unit. The 65-acre pasture system was first used for grazing trials in 1992. At that time, the entire area was divided into 18 paddocks. The 18-paddock system was grazed by cow-calf pairs in 1992 and 1993, and by stocker steers in 1994. Before the 1995 stocker steer grazing trial began, nine of the original 18 paddocks were split into two paddocks each to make 27 paddocks available for grazing in the 1995 season.

Smooth brome grass, tall fescue, orchardgrass, and Kentucky bluegrass are the predominant forages in the pasture. Some paddocks have been interseeded or frost-seeded with red clover, birdsfoot trefoil, creeping alfalfa and Korean lespedeza, but even in those paddocks, the grass species predominate. Four paddocks were seeded in 1992 to a mixture of warm-season native grasses (big and little bluestem, eastern gamagrass, switchgrass, and Indian grass) and legumes (alfalfa and birdsfoot trefoil). Birdsfoot trefoil appears to be the predominant species in the mixture at this time.

Soil samples were taken from all paddocks in March, 1995. Fertilizer was applied based on recommendations made by the Iowa State University Soil Testing Laboratory for a grass-legume pasture crop. All paddocks received a fertilizer application of 40 pounds of actual nitrogen per acre. Five paddocks, comprising 18.9 acres, received 40 pounds of P₂O₅ equivalent in addition to the 40 pounds of nitrogen per acre. Phosphorus was applied only where soil test levels were medium or below. The fertilizer applications were made on March 31 and April 1, 1995.

Grazing management in most paddocks throughout the summer was based on two principles: 1) graze no more than half the standing forage in each paddock, and 2) let each paddock rest approximately 30 days between grazings. Exceptions to these guidelines were allowed in paddocks which contained mixtures of warm-season native grasses and legumes.

Forage-height measurements were taken with a yardstick as steers were turned in to a paddock and again as they

were taken out. These measurements were used as guides to determine when to move cattle. Individual paddocks were grazed from two to five times during the season.

Rainfall data were collected at both the Adams County CRP farm and the Corning Mercy Hospital weather station about three miles from the farm (Table 1). Temperature records were kept only at the hospital.

The steers used in the grazing demonstration were crossbred calves with variable breeding and frame size. Judging by their eartags, it appeared that the steers had been comingled from at least three different sources. Although a few calves showed evidence of dairy breeding, beef breeding predominated, especially Angus and Limousin. The steers were purchased by Iowa State University and had been fed a growing ration designed to produce daily gains of approximately 1.5 pounds per head per day prior to the time they were delivered to the farm on May 2, 1995.

Upon delivery to the demonstration site, the steers were held in drylot two days and fed mixed hay and a commercial concentrate mix formulated to combat stress. The steers were poured, weighed and implanted with Ralgro® on May 4, 1995. They had been vaccinated in March 1995, before delivery to the CRP project, to immunize them to clostridial diseases (7-way), IBR, BVD, PI₃, and BRSV, and they were not revaccinated before going to pasture. Except for a free-choice mineral supplement which contained 720 mg. of Bovatec® per pound, the steers received no supplementary feed until they were fed one bale of mixed hay on August 21 and another bale of mixed hay on August 28. No other supplementary feed was fed.

The steers were weighed at approximately monthly intervals until the demonstration ended on September 14, 1995. Each time the steers were weighed, they were given any necessary treatments for pinkeye and other ailments. Pinkeye treatments were also administered anytime the need arose between weighings. The steers were poured with insecticide twice.

The cattle were watered with untreated pond water in stock tanks which were located so they could be accessed from several paddocks. The water was pumped to the tanks from ponds using both buried and above-ground lines.

Results

Seventy-five yearling crossbred steers rotationally grazed a 65-acre pasture divided into 27 paddocks from May 4, 1995 through September 14, 1995. A total of 11,403 pounds of liveweight gain were produced from 9,975 animal-days of grazing. The average gain per animal-day was 1.14 pounds, and the average animal gain per acre was 175.4 pounds.

The steers began the 133-day grazing period weighing an average of 495.7 pounds and gained an average of 152 pounds per head to weigh 647.7 pounds at the end. The stocking rate was constant at 1.15 steers per acre throughout

the season.

Table 2 summarizes the performance of the steers in 1995. As was true in 1994, animal performance was best early in the growing season. The steers actually lost weight during the last two weeks of the grazing season.

Animal performance was considerably below that obtained in 1994 with similar management. Table 3 contains comparisons between the two years.

Gains were depressed during July when extreme heat and humidity persisted for about a two-week period. Whether or not the weather conditions were responsible for the poor animal performance is not known. Animal performance was lowest during the same month in 1994.

Eleven bales of hay were harvested from one paddock. Each bale was estimated to contain 1,200 pounds of dry matter.

Discussion

The total gain produced on the 65-acre pasture system in 1995 was less than two-thirds what the same area produced in 1994 with similar management. The number of animal-days of grazing was about the same both years—9,977 animal days in 1995 and 9,912 in 1994—but the distribution of grazing days differed. Although the stocking rate at the beginning of the grazing period was the essentially same both years, 40 of the heaviest steers were sold after only 88 days of grazing in 1994, which reduced the stocking rate to only 34 steers on 65 acres. In 1995, 75 steers grazed the entire season from May 4 to September 14. The grazing season was 55 days longer in 1994. It does not appear that extending the grazing season later in 1995 would have been beneficial, however, because the cattle were actually losing weight the last two weeks of the grazing period, and rainfall was below normal in August, September, and October.

Although grazing management was similar both years, more paddocks were used in 1995. Nine of the original 18 paddocks were subdivided before grazing began in 1995 to make 27 paddocks available for grazing in 1995. This change was expected to have a positive effect on the amount of gain per acre, but this effect was not evident.

After the cattle went to pasture, two bulls were discovered in the group that was believed to be all steers. Those two were castrated during the trial.

Rainfall was greater in 1995 than in 1994. From April through September of 1995, 25.91 inches of rain fell at the Corning hospital weather station, and 25.47 inches fell at the CRP project farm, but August and September were dryer than normal. During the corresponding period in 1994, the weather station reported 20.04 inches of rainfall, and 21.11 inches fell at the farm. In 1995, July and August were hot and humid, and animal performance was poor during that period, particularly in July.

Approximately 40% of the total gain for the entire 1995

grazing season was achieved by June 1. During the month of May, gains were actually higher in 1995 than in 1994, but for the remainder of the grazing season, performance was better in 1994.

Nothing is known about the inheritance of the cattle in the project in either 1994 or 1995. Both years the cattle had been comingled from several sources. Improvement in gain is possible if cattle can be obtained from sources with superior genetics for growth.

The gains of the calves in the cow-calf trials conducted at the farm in 1995 were virtually the same as those obtained in 1994. Since many of the same cows were in the trials both years, one could speculate that the genetic ability of the calves to grow was similar both years and that this contributed to the similar performance both years. However, the gains of the stocker steers were quite different the same two years, and one has to wonder if genetics might have been responsible for much of the difference.

The 65-acre, 18-paddock system was first grazed in 1992. During 1992 and 1993, cow-calf production was evaluated in this pasture system. The calf gain per acre, averaged over those two years, was 158 pounds. The cows themselves produced an additional 21 pounds of gain per acre during those two years. The average stocking rate over the two years was 0.48 pairs per acre, or 2.08 acres per pair. Grazing yearling steers produced liveweight gains of 277 pounds per acre in 1994 and 175 pounds per acre in 1995. Averaged over the two years, grazing yearling steers has produced a modest improvement over the liveweight gains per acre obtained from cows and calves in previous years.

The results reported in this paper represent production at the farm only. They do not include any shrink loss from purchase weight to on-test weight or from final on-farm weight to sale payweight.

Implications

The results obtained this year show that animal gains on pasture can vary widely from year to year, even when pasture management remains constant. This makes the financial outcome of the stocker grazing enterprise difficult to predict.

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Table 1. Weather records, Corning, Iowa, 1995.

Month	Normal rainfall	Rainfall at hospital	Rainfall at farm	Ave. temperature at hospital, °F	
				High	Low
April	3.15	5.71	5.79	57.27	34.73
May	4.06	6.50	5.76	64.61	45.74
June	4.55	4.57	4.64	78.53	59.37
July	4.09	4.51	6.28	85.58	63.87
August	4.90	1.73	0.62	87.61	67.39
September	4.28	2.89	3.26	73.37	49.47
Totals and averages	25.03	25.91	26.34	74.57	53.52

Table 2. Yearling steer grazing performance by weighing period, 1995

Period	Days	Animal days	Wt. at start of period (lb)	Gain (lb)	ADG	Average bodyweight (lb)
May 4 - June 2	29	2,175	7,176	4,729	2.17	527.21
June 2 - July 3	31	2,325	41,905	3,214	1.38	580.16
July 3 - Aug 1	29	2,175	45,119	1,210	0.56	609.65
Aug 1 - Aug 31	30	2,250	46,329	3,221	1.43	639.19
Aug 31 - Sept 14	14	1,050	49,550	-971	-0.92	654.19
Totals and averages	133	9,975	37,176	11,403	1.14	571.67

Table 3. Performance comparisons between 1994 and 1995.

Item	1994	1995
Date Grazing Started	April 29, 1994	May 4, 1995
Date Grazing Ended	November 3, 1994	September 14, 1995
Number of Days Grazed	188	133
Animal Days of Grazing	9912	9975
Animal Days of Grazing per Acre	152.5	153.5
Stocking Rate, Steers per Acre	0.81	1.15
Average Beginning Weight	488.2	495.7
Average Ending Weight	731.5	647.7
Total Gain	18003	11403
Average Daily Gain per Head	1.82	1.14
Pounds of Gain per Acre	277	175