

Drylot vs. pasture beef cow/calf production: Three-year progress report

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This study compares drylot feeding of lactating beef cows and calves with conventional pasture-based beef cow-calf production. This is a three-year interim report of a planned six-year study. Beef cows and calves can be fed in a pen during the summer, but gains were lower for drylot calves and feed costs were higher, depending on pasture costs. Animal health was satisfactory in both treatment groups and conception was similar. Feed cost for the cows' required nutrients at critical production stages is an important factor in the economic competitiveness of drylot production.

Summary

Drylot and pasture beef cow-calf production systems were compared for three years. Different weaning dates and cow management practices were used for the two groups to integrate drylot beef cows with crop production. Beef cows kept in drylot during the normal grazing season require more feed and labor than pasture cows and their calves. Pasture calves were 40 pounds heavier at the same age in the fall. Good facility and nutritional management is required to support optimal growth and reproduction of the drylot cows. Feed, yardage and creep feed costs were \$1.72 per day for drylot cows and calves and \$1 per day for pasture pairs, which included trips to pasture, fencing materials, labor and creep feed. The higher costs for drylot pairs in this study resulted in a partial budget cost of \$1.02 per pound of weaning weight for drylot production compared with 79 cents for the pasture system.

Introduction

Pasture and rangeland for grazing beef cattle are diminishing in some parts of the country due to a variety of decisions and external factors, including cropland competition for grain farming, drought, alternative uses such as urbanization and recreation, and environmental regulations.

Drylot beef cow-calf production has been used for various research trials at the NDSU Carrington Research Extension Center since 1972, with a focus on nutrition and management. Feedstuffs used in various research studies include multiple crop residues, several different coproducts, deliberately grown forages and low-quality grain products.

A study comparing the performance of lactating beef cows and their calves fed in a pen during the normal grazing season (drylot) with conventionally pastured cow-calf pairs was initiated in 2009. This article was developed after three years of the six-year study to provide an interim report on animal performance and the economics of drylot vs. pasture cow-calf production through weaning. Additional data

will be reported on the postweaning performance of steers and heifers raised under the two management systems.

Experimental Procedures

Mature, crossbred, spring-calving Red Angus x Simmental beef cows (n = 80) and their calves were randomly allotted by birth date to one of two treatments — 1) drylot production or 2) pasture production — at the initiation of this system study in late May 2009. Cows assigned to respective treatments in year one stayed in that group in subsequent years.

Pasture cows and calves were hauled to native grassland 20 miles away for the approximate six-month grazing season. Pasture grasses were primarily bluegrass and a variety of native warm-season grasses. Pastures were stocked at one pair per six acres. Water was provided by a flowing stream through the pasture.

Drylot cows and calves were housed in south-sloping dirt pens with approximately 1,200 square feet of space per pair and 2 feet of fence-line bunk per cow. Automatic waters provided fresh water to cows and calves.

Drylot cow diets were formulated with a variety of feeds based on availability, nutrient content and price. Formulations varied for each year, with the primary ingredients being crop residues (wheat straw, pea straw or corn stover) and coproducts (distillers grains, wheat middlings, barley hulls and various grain screenings), plus corn silage and grass hay. Feeds were tested and diets formulated to meet or exceed NRC (National Research

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Council, 1996) nutrient requirements for mature lactating beef cows of average milking ability.

Creep feed was offered to both group of spring-born calves beginning on the same date each year. Creep feeds were formulated to 16 percent crude protein and included coproducts and rolled grains with grass hay offered to drylot calves. Salt and minerals were supplemented free choice to the pasture cows and included in the mixed ration for drylot cows.

Cows were exposed to natural-service sires during a 45-day breeding season, with two sires used in each group of cows. Sires were semen tested and passed a breeding soundness exam prior to use. Cows were culled for infertility or unsoundness and replacements were added prior to turnout in subsequent years to maintain numbers in respective treatment groups.

Drylot calves were weaned in late September and placed on a growing ration (47 megacalories of net energy for gain per pound, or Mcal NEg/lb) in the feedlot. Weaning occurred at different times for the two production systems to better accommodate the use of feed resources. After weaning, drylot cows grazed on crop aftermath and regrowth as it became available. Pasture calves were weaned in late October and placed in the feedlot for growing and finishing. Pasture cows remained in the same pasture until late November, when winter weather conditions dictated cows be returned to a pen environment at the Research Extension Center.

Midgestation and late-gestation rations were similar for each treatment group. Cows and calves were weighed individually at the initiation of grazing, at the end of breeding during the summer, at drylot weaning in September and at pasture weaning in late October.

Considerable variation occurred

in temperature and rainfall during the three years of this progress report. As a result, dates of turnout and weaning varied by up to 10 days, so the timing of events is given in general terms (Table 2), with some variation in days of lactation, etc., from year to year.

Feed costs used in this report reflect actual costs for purchased feeds and production costs for farm-raised feeds as reported by the North Dakota Farm Business Management program participants across North Dakota (Metzger and Hanson, 2012). The production costs are a close approximation of typical market prices for crop residues and farm-sourced

feeds.

Yardage was billed at 35 cents per head per day for cows in drylot during the summer. Pasture rent was \$20 per acre in years one and two and \$25 per acre in year three. Expenses for hauling cattle to and from pasture, fencing materials, labor and mileage for checking cows biweekly were included in the pasture cost calculations.

This project was approved by the NDSU Animal Care and Use Committee.

Results and Discussion

Cow weight change varied by production stage (Table 1), with an

Table 1. Beef cow/calf performance from drylot or pasture production systems.

Item	Drylot (DL)	Pasture (PSTR)	Difference
Cow weight, lb.			
Turnout (TO), late May	1,516	1,508	
End breeding (EB), late July	1,411	1,454	
Change, TO to EB	-105	-54	51
DL weaning, late September	1,424	1,461	
Change, EB to DL weaning	13	7	-4
PSTR weaning, late October	1,489	1,488	
Change, DL wn to PSTR wn	65	27	-38
Winter pen (WP), early December	1,445	1,475	
Change, PSTR wn to WP	-44	-13	31
Change, TO to WP	-69	-29	40
Conception, % (45 d nat svc)	84.2	85.2	
Calf data			
Birth date	April 1	March 30	
Sex ratio, 1 = H, 2 = B	1.45	1.58	
Percent assisted	14.0	5.3	
Calf weight, lb.			
Birth	95.5	94.1	
TO in late May (initiation of drylot comparison)	222	228	
EB in late July	371	410	
Gain, TO to EB	149	182	33
DL weaning in late September		571	617
Gain, EB to DL weaning	200	207	7
PSTR weaning in late October	667	707	
Gain, DL wn to PSTR wn	96**	90	-6
Gain, TO to DL weaning	348	388	40
Gain, birth to PSTR wn	572	613	41

* Difference is advantage of pasture management.

** Drylot calves were weaned and in the feedlot during this time.

average advantage of 40 pounds for pasture cows vs. drylot cows from turnout in late May to winter penning in early December. Several factors may affect weight difference, including the nutrient density of the diet offered to drylot cows or the quality of aftermath grazing for drylot cows compared with the quality of fall pastures for grazing cows.

Even though drylot cows lost 105 pounds from late May to the end of breeding season, compared with 54 pounds for pasture cows, conception rates were similar at 84.2 and 85.2 percent, respectively. Little difference in weight change was observed for cows from the end of the breeding season until drylot calves were weaned in late September. Drylot cows gained more weight (65 pounds) after calves were weaned than pasture cows still being nursed (27 pounds).

The average calf birth date was two days later for drylot calves after three years in the drylot treatment. Fourteen percent of drylot cows were assisted during parturition, compared with 5.3 percent for pasture cows.

Pasture calves gained more weight from turnout in late May to late September (388 pounds) than drylot calves (348 pounds) (Table 1). Drylot calves consumed 653 pounds of creep feed per head, with pasture calves nursing longer consuming 806 pounds of creep feed. Drylot calves placed in the feedlot from weaning in late September until late October, when pasture calves were weaned, gained 96 pounds vs. 90 pounds for pasture calves still nursing and consuming creep feed.

Feed costs (Table 2) were higher for drylot cows during lactation (\$1.72/head/day), compared with pasture (\$1/head/day). If pasture rental rate was \$43/acre, the cost per head per day for drylot and pasture cows would be equal. Midgestation feed costs were lower when drylot

cows grazed crop aftermath.

A partial budget (Table 3) indicates annual feed costs were higher for drylot cows (\$518.91/cow) than pasture cows (\$456.98/cow) in this study, with more creep feed consumed by pasture calves (\$100.51/calf) vs. drylot calves (\$84.19/calf). The total feed cost for drylot pairs was \$600.13/pair, while the feed expense for pasture pairs was \$557.49/pair.

Drylot cows were charged 35 cents/head/day for yardage, which includes feed delivery, pen depreciation and water. Manure produced by drylot cows is credited as fertilizer for the crops based on prices for nitrogen (N), phosphorus (P) and potassium (K) (Table 3).

The net cost/pair/year totaled \$580.13 for drylot pairs and \$557.49 for pasture pairs. The cost per pound of weaned calf was 23 cents lower for pasture cows in this study. The difference in weaning time (late

September vs. late October) and weaning weight (571 pounds for drylot vs. 707 pounds for pasture) may affect market price, with an advantage to lighter calves, reducing the net difference in the two management systems.

Feed costs, including grazing, are major economic factors in beef production. All farm-raised feeds and forages were valued at real production costs as published in the North Dakota Farm Business Management reports (Metzger and Hanson, 2012). This study was conducted with drylot cows managed in a conventional feedlot setting with calves offered creep feed in a small pen with slotted gates.

Several management variations not incorporated into the drylot production system in this study potentially can improve the performance and economics of drylot beef cows. Practices evaluated prior to this study that can lower feed costs for

Table 2. Daily feed costs for drylot vs. pasture beef cows by stage of production.

	Drylot	Pasture
	Feed cost/head/day, \$	
Lactation	1.72	1.00
Midgestation/winter	1.25*	1.36
Late-gestation/calving	1.63	1.59

*Includes aftermath grazing in two of three years (avg 20 days/year)

Table 3. Partial budget for drylot vs. pasture beef cow-calf production.

	Drylot	Pasture
Annual cost/cow, \$ *	518.91	456.98
Creep feed, cost/calf, \$	84.19	100.51
Subtotal, cost/pair/year, \$	600.13	557.49
Summer drylot yardage @ 35 cents/head/day	40.02	–
Manure (NPK) value, \$/drylot cow per summer	67.13	–
Net cost/pair/year	580.13	557.49
Cost/lb. calf weaned, \$ **	1.02	0.79

*Includes aftermath grazing in two of three years (avg 20 days/year) for drylot cows and all feed and other costs for grazing pairs.

**Drylot calves weaned late September, pasture calves weaned late October.

drylot production systems include creep grazing for nursing calves and extensive aftermath grazing for midgestation cows in the fall.

Creep-grazing calves gained 12 percent more per day and consumed 6 percent less creep feed (Anderson, 1981) than drylot calves offered only creep feed. The cost of aftermath grazing can be less than the pasture cost, but that depends on a variety of factors, including fencing, labor needs, trucking, and land or forage charges. Maximizing crop-aftermath grazing will lower feed and labor costs and utilize cow manure for fertilizer. Weaning prior to aftermath grazing is recommended because milk production may be affected and calves can grow faster in a feedlot pen setting.

Additional research is needed to compare calf growth and production costs during the residue-grazing period. Severe weather can occur any time after early October in northern areas, with negative effects on calf health and weight gains. Delivering

the mixed ration to lactating drylot cows on alternate days can lower labor and machine costs, and did not affect performance in prior trials.

More research is needed on reducing feed costs, supplementing residues and cost-saving management practices for drylot cows. Understanding that the successful performance of the lactating beef cow and calf in drylot is dependent on the manager feeding a balanced diet to meet the cows' needs is critical. The economic success of a drylot production system is based on optimum care of the animals and competitively priced feeds.

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