



Creep Feeding Beef Calves



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Introduction

Creep feeding is the practice of providing supplemental feed (grain or forage) to nursing calves. This is usually done with the use of a creep gate, which is large enough for calves to enter the feeding area but too small to allow cows to pass. A lactating beef cow can supply only 50 percent of the nutrients a three- to four-month-old calf needs to maximize growth. Depending on availability and quality, forage may not be able to supply the other 50 percent of nutrients the calf needs. Nutrient deficiency is more pronounced when calves graze late summer or drought stricken pastures, and during the winter when no grazing is available.

Creep feeding can be implemented in various forms or systems regardless of method chosen. Creep feeding systems vary from grain-based energy supplements to limit-fed protein supplements to creep grazing. Each system generally produces increased growth, which may or may not be profitable. Creep feeding, like any other supplementation practice, must be analyzed based on estimates of expected increases in performance and income compared to the costs of these improvements. This publication discusses the advantages and disadvantages of creep feeding.

Cost of Added Gain

The first factor to consider is the cost of the added gain. It is futile to spend more than the market price to produce additional weight gain. The conversion of feed to gain can

vary from 3 to 12 pounds of feed for each pound of gain above non-creep-fed calves. In a creep grazing system the increase in calf weights would have to be evaluated against the cost per acre of creep forage, the number of calves carried per acre and the amount of extra weight produced per acre of creep grazing.

Producers generally assume that creep feeding is more valuable when calf prices are high. However, the higher the calf prices, the greater the discounts as calves increase in weight. Creep feeding grain for 100 days should add approximately 60 pounds of weaning weight to a calf. When calf prices are high, a non-creep-fed steer weighing 550 pounds may be worth \$1.10 per pound while the creep fed steer would be worth \$1.05. The non-creep-fed steer would generate \$605 (550 x \$1.10/pound) and the creep fed steer would generate \$641 (610 x \$1.05). The additional 60 pounds of gain would generate \$36 or \$0.60 per pound of added gain.

When calf prices are low, the 550-pound steer may be worth \$0.75 per pound and the creep fed steer may only be discounted \$0.03 instead of \$0.05. In this situation, the 550-pound steer would generate \$413 (550 x \$0.75) and the creep-fed calf would generate \$439 (610 x \$0.73). The additional 60 pounds of gain would generate \$33 or \$0.55 per pound of added gain. Over a wide range of prices, added gain is worth about \$0.50 to \$0.60 per pound. Therefore, in most years, it must cost less than \$0.50 to \$0.60 to add 1 pound of gain.

Feed Efficiency and Feed Cost

The relationship between feed conversion and feed cost determines the cost of gain (Table 1). Cost of gain is calculated by dividing total feed costs per calf by added gain per calf. For practical purposes, use a conversion of 9 pounds of feed per pound of added gain when determining how much can be paid for creep feed. Remember, feed costs per pound of gain should be in the range of \$0.50 to \$0.60 to make creep feeding profitable. If feed conversion is 9 pounds of feed per pound of added gain, a feed price of \$120 per ton would equal \$0.54 per pound of added gain, which is about breakeven. Therefore, if creep costs more than \$120 per ton, it may not be profitable.

One factor that greatly affects creep feed consumption and efficiency is the quantity and quality of available forage. If high quality forage is available, forage intake will be reduced and the benefits in animal performance over the no-creep system will diminish. Creep feeding has been most effective in drought situations or whenever quantity or quality of pastures does not meet the growth requirements of the calf. Daily intake of creep feed can affect feed efficiency. Protein-based creep feeds are often fed in limited amounts by including salt in the feed. Reported feed efficiencies (feed/gain) have been lower when using these supplements compared to high energy, low protein grains and by-product feeds. An Illinois study compared limited or unlimited intake of corn or soybean hulls (Faulkner et al., 1994). There was no difference in feed efficiency between the supplements or intake level, which were 2.2 (limited) or 5.0 (unlimited) pounds per calf per day.

Forage Quality and Availability

The response to creep feeding will be less when abundant high quality forage is available until weaning. Growth rates will be less restricted in non-creep-fed calves when high quality forage is substituted for grain in creep-fed calves. A more fibrous creep feed such as soybean hulls will not decrease forage intake and forage digestion as much as a high starch feed such as corn. One trial showed that calves fed about 7 pounds of creep feed per day consumed about 50 percent less forage when fed corn and 40 percent less forage when fed soybean hulls. In the same study, forage intake was decreased by 12 percent when creep feed was limited to 1.5 pounds per day. During a drought, calf gains are limited by poor quality forages and a lack of forage availability, so creep feeding should be most beneficial in drought years.

Selection for Milk Production

Creep feeding can mask the poor milking performance of cows. Calves of poor milking cows may consume more feed to make up for receiving less milk from the cow. If culling and selection are based on weaning weight, weigh calves prior to the creep feeding period to obtain an estimate of

the cow's performance.

Stockering Program

Another point to consider is whether or not the calves will be marketed following a stockering program. If calves are heavily fed and fat at weaning, creep feeding could decrease performance during the stockering period. In this situation, use a creep grazing or limited protein supplement. This should decrease creep feeding gains but allow for normal growth rates in case of a drought or poor forage quality.

Creep feeding is more beneficial if calves are marketed following or through slaughter. Creep feeding familiarizes calves with grain and results in greater intakes of grain and reduced stress at and after weaning. Calves that were creep fed have been shown to have fewer respiratory diseases during the preconditioning period compared with calves that were not creep fed. Creep feeding will benefit calves retained through slaughter by increasing marbling and avoiding the price discounts that may be applied to heavier, fleshier calves when sold at weaning.

Carcass Traits

Creep feeding has been shown to increase marbling scores in many research trials. Some have estimated that marbling scores increase approximately 0.01 point for every day the calf is creep fed. Therefore, creep feeding a calf for 100 days could increase the final quality grade by one score (for example, low choice to average choice). Other studies have shown lower increases in marbling scores (Table 2), but the bottom line is that creep feeding a grain-based diet will enhance carcass marbling provided calves are fed at least 80 days (Tarr et al., 1994). To retain the benefits of increased marbling, calves should continue being fed a grain-based diet immediately after weaning and adjusted to a feedlot finishing diet within 28 days after weaning.

Replacement Heifers

In most situations, creep feeding future replacement heifers is not recommended. Research shows that high-energy supplementation and subsequent high daily gains of heifers, prior to weaning, decrease mammary development and subsequent milk production. Creep feeding will reduce milk production by approximately 25 percent. Milk production should not decrease unless heifers are gaining at least 2 pounds per day. Creep feeding heifer calves can decrease milk production in their first lactation and result in a lower weaning weight of their calves.

Replacement heifers generally need to gain only 1 to 1.5 pounds per day from weaning to breeding to achieve 65 percent of mature weight at breeding. At such low growth rates, much of the added weight gained from creep feeding will be lost. Separate potential replacement heifers from the calves that are creep-fed. Creep feeding heifers has been shown to decrease the age at puberty. If weaning weights

are severely restricted by poor forage, then creep feeding can allow heifers to obtain normal growth and reach puberty to calve at 2 years of age.

Grain-based Creep Feeds

Supplementation with concentrate feeds is the most widely used creep system. Under most circumstances, this system produces the most additional gain. Creep feeding can be accomplished using a self feeder with a creep gate attached, or by using a creep gate to divide off a separate creep area and placing a trough inside. Locating feeders around loafing areas and spreading hay in creep areas helps the calves find the feed. The efficiency of a grain creep system usually varies from 5:1 to 10:1. In other cases, feed efficiency has ranged up to 20:1, clearly an uneconomical level. A good average to use is 9:1 (9 pounds of feed for each additional pound of gain), which is a safe assumption for calculating the amount one can pay for creep feed. Success with this creep system fluctuates with cattle and grain prices, available forage, type of cattle and management system.

With the high grain creep system, many ration combinations can be used to achieve satisfactory results. Example rations are shown in Table 3. Ingredients and ingredient amounts can vary according to feed cost. Mix the ration thoroughly to prevent the calf from sorting feed particles. Whole or rolled grains make a simple, satisfactory creep feed and are more palatable than finely-ground grains. In addition, larger feed particle sizes reduce dust and may decrease waste. Adding 3 to 5 percent molasses can reduce dust, reduce separation of feedstuffs and improve palatability.

Creep feed intake is important when evaluating the efficiency of an unlimited grain-based creep feed. Monitor intake closely so ration adjustments can be made to control intake. If intake begins to exceed 1.5 percent of body weight, then it may need to be controlled with the addition of salt.

In a study conducted in Georgia, Hereford calves were creep fed for 91 days prior to weaning at seven months of age (Rossi et. al., 2004). The study followed the calves through the finishing phase and addresses several of the factors affecting creep feeding listed above. The creep feed was a 50:50 mix of ground corn and corn gluten feed. Cow weight was not affected by creep feeding status, so producers should not depend on creep feeding to increase body condition of thin cows. Calf weight gain was an additional 0.68 pounds per day for calves that were creep fed versus those not creep fed (Table 4).

Efficiency of gain was 8.78 pounds of creep feed per pound of additional gain. This is consistent with a summary of 31 trials that showed a creep feed efficiency of 9.0 pounds of feed to 1 pound of gain (Lusby). Average daily gains during the feedlot phase were not affected by creep feeding, which indicates that increased pre-weaning gains due to creep feeding will not depress feedlot daily gains. Final feedlot weight was greater for calves that were creep

fed than not creep fed, and carcass weight was 43 pounds greater for creep-fed calves. Carcass marbling score was greater in calves that were creep fed versus not creep fed. This agrees with the study of Faulkner et al. (1994) that showed an increase in marbling scores when calves were creep fed. Carcass price was essentially the same for calves that were creep fed versus not creep fed. This is important because creep-fed calves are usually discounted when sold at weaning compared to their non-creep-fed counterparts. This study shows that creep feeding will increase carcass marbling, carcass weights and yield grade. Non-creep-fed counterparts would require more days on feed to achieve equal carcass weights. The economic benefits of creep feeding will be much greater if ownership of calves is maintained throughout the finishing phase.

Protein Level

A wide variety of grain mixes can yield satisfactory results. However, high protein (> 20 percent protein) creep feeds have resulted in the most added gain and higher feed efficiency when fed in either limited or unlimited amounts. Creep feeds with protein levels of 10, 20 and 30 percent using corn and soybean meal in varying amounts are shown in Table 5. Performance is shown in Table 6. Daily gain of creep-fed calves averaged 0.94 pounds per day greater than non-creep-fed calves. Daily gains increased as protein level in the diet increased. Although soybean meal is more expensive than corn, in this study, even if soybean meal is twice as expensive as corn, it would still be more economical to feed the 30 percent protein feed versus the 10 percent protein feed (Table 7).

Limit-fed High Protein Creep Feeds

Research shows that soybean or cottonseed meal, limit-fed with salt, can stimulate an efficient increase in weaning weight. The major action of high protein creep feed is to increase forage digestibility and forage intake. This option would be more beneficial when protein prices are low or when there is abundant low quality forage and a protein supplement is needed to maximize performance.

Supplementing warm season grasses such as bermudagrass and bahiagrass with high protein creep feeds will increase calf performance. When compared to unlimited creep feed, limited creep intake with salt will result in lower daily gains but improved feed efficiency. The system has been tested under conditions where adequate forage is available but lacking in protein content. In these situations, the conversion of creep feed to added gain has ranged from 2.25 to 2.80, with the calves consuming about 1 pound per day of cottonseed meal. Between 10 and 15 percent salt has been effective in limiting daily intake to about 1 pound of soybean or cottonseed meal. Intake should be limited to this level because more of the favorable effects on forage digestibility and intake are achieved more efficiently with the first

pound of protein creep.

Beyond the 1-pound level, additional protein creep will likely be used for energy, and the conversion of creep to added gain will become less efficient. Limiting intake of high protein creep feeds will not yield as much added gain as allowing unlimited intake of creep feed. Expect about one-third to one-half as much added gain when using the limited intake system as compared to allowing creep feed to be consumed in unlimited amounts. This option is more suited for selling calves at weaning, as the creep-fed calves should not receive a discount for being too fat compared to non-creep-fed calves.

Points to consider when using a salt-limited creep system include:

- 1) It normally takes two to three weeks for calves to start consuming creep.
- 2) Start with 0 to 5 percent salt in feed and adjust the salt level as necessary to keep consumption around 1 pound per day.
- 3) Initially, hay spread in the creep area attracts calves to creep feed.
- 4) Salt is corrosive to metal creep feeders, but rubber pans or wood troughs work quite well.

Creep Grazing

All creep feed does not have to be grain or grain by-products. Creep grazing programs can produce additional calf gains using forage rather than the traditional grain-based creep diets. There are many ways to adapt this system to each individual situation, but the bottom line is that it must be profitable.

Most forages can be used for successful creep grazing as long as they are high in nutrient quality and readily available. Time of year will affect which forage is used for creep grazing. During the warm season months, most producers will use legumes, pearl millet, or sorghum-sudan grass. During the cool season months, annual grasses like rye, oats, wheat or ryegrass will be used. Using summer annuals such as pearl millet, calves can be stocked at six to 10 head per acre of creep forage. Two different methods have been used to allow calves access to creep forage while keeping cows out. One method is to build a typical creep gate with entrance slots 18 inches wide and place the creep gate in the fence line or at the gate separating the creep grazing area from the main pasture. Another method is to use one strand of electric wire to allow calves to graze while keeping cows out. Placing this single strand of wire 36 to 42 inches above the ground will allow calves to pass under while keeping the cows out.

Similar to grain creep feeds, the added weight gain from creep grazing depends on pasture quality. Regardless of forage quality, if forage quantity is a problem, creep grazing should have a positive effect on calf performance and possibly cow performance as well. Daily gains tend to be less than the full fed energy creep systems. Daily gains

are usually increased by 10 to 20 percent with creep grazing. However, improvements in daily gains of 0 to 50 percent have been reported. This underscores the effects that pasture quality and quantity exert on gains of creep-grazed calves.

If both the cow and calf are grazing a high quality grass-legume forage, the expected benefits of creep grazing would be minimal. A North Carolina study compared weaning weights of calves either not creep grazed or allowed to creep graze either Tifleaf Pearl Millet or a red clover/bluegrass mixture. The base pasture for the cows was a white clover and Kentucky Bluegrass mixture. Weaning weights were not increased for calves that creep grazed compared to calves not creep grazed. If calves are grazing fungus-infected fescue or any other poor quality forage, then creep grazing would be beneficial. A trial in northern Alabama used Tifleaf 1 Pearl millet as a creep forage, and cows grazed only endophyte-infected tall fescue. This trial showed that calf average daily gain was increased from 1.38 to 2.1 pounds per day from late June to September (Table 8). As a result, calves that creep grazed weighed 75 pounds more at weaning. In addition, cows of the calves that were creep grazed gained weight during the study, whereas cows of calves not creep grazed lost weight.

Research in Louisiana (Bagley et al., 1987) has demonstrated a 10 percent increase in weaning weights when fall- and winter-born calves creep grazed winter annuals and millet prior to weaning in the summer. Trials conducted at the University of Georgia have demonstrated that *Aeschynomene* can improve calf gains of fall-weaned calves (Table 9). *Aeschynomene* (also known as American joint vetch) is a high quality tropical legume that can be grown in the lower one-fourth of Georgia. Calf average daily gain was increased when cows grazed either Coastal or Tifton 85 bermudagrass. In addition, cow gain was greater for cows that had creep-grazed calves compared with cows that had calves not creep-grazed. Additional research in Florida (Table 10) showed that a variety of warm season legumes and millet can improve daily gains of calves when the cows are grazing Bahiagrass pastures.

Creep grazing has a few other indirect benefits. One is that calves do not get as fat as when they are fed a grain-based creep feed and may not receive price discounts often applied to calves fed an unlimited high energy creep feed. Replacement heifers may get too fat if fed a grain-based creep feed and have reduced milk production. This problem is less likely to occur when using forage as a creep feed.

Summary

Creep feeding is best used when cows are poor milking, when pasture quality and quantity will not support optimal gains, and when ownership of calves will be retained through slaughter. A variety of options (unlimited grain, salt-limited grains and forage) are available to improve the growth rates of nursing calves.

If creep-fed calves are retained after weaning, it is important to get the calves adapted to a high grain diet shortly after weaning and finished out as calf-fed. If calves are retained in a stockering program, the creep-fed calves will gain weight more slowly than non-creep-fed calves and much of the weight advantage will be lost. However, this may not occur when calves are placed directly into the feedlot at weaning.

There is little benefit to creep feeding future replacement heifers unless grazing conditions limit their growth rate to less than 1 pound per day (or 1-1.25 pounds per day). Creep feeding can also reduce the incidence of sickness that often occurs shortly after weaning. To get the full benefits of creep feeding (added weight gains, reduced sickness at weaning and improved carcass marbling), you must retain ownership of calves through the feedlot phase.

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Tables 1-10

Table 1. Cost per pound of gain from creep feeding.

Feed Conversion lb of Feed/ lb of Extra Gain	Cost of feed per ton (\$)				
	100	120	140	160	180
	(cost cents/lb.)				
4	0.25	0.24	0.28	0.32	0.36
5	0.20	0.30	0.35	0.40	0.45
6	0.30	0.36	0.42	0.48	0.54
7	0.35	0.42	0.49	0.56	0.63
8	0.40	0.48	0.56	0.64	0.72
9	0.45	0.54	0.63	0.72	0.81
10	0.50	0.60	0.70	0.80	0.90
11	0.55	0.66	0.77	0.88	0.99
12	0.60	0.72	0.84	0.96	1.08

Table 2. Feedlot performance and carcass traits of creep-fed calves.

Item	Not creep-fed	Creep-fed
Final weight, pounds	1159	1219
Feedlot weight gain, pounds/day	3.08	3.08
Carcass weight, pounds	708	751
Marbling score ^a	318	348
Yield grade	2.6	2.9
Carcass price, \$/pound	122.5	122.4

^a200=select; 300=low choice; 400=average choice; and 500=high choice.

Table 3. Example Creep Rations.

Ingredient %	Ration					
	1	2	3	4	5	6
Corn	60 to 80	60	67	50	50	
Corn gluten feed					50	
Oats	—	30	33	—		
Soybean meal or cottonseed meal*	20 to 40	10	—	15		10
Soybean hulls	—	—	—	30		90
Molasses	—	—	—	5		

Molasses may be added to any ration at 2 to 5% to reduce fines, limit separation of feedstuffs and increase palatability.

*Only use cottonseed meal when creep feeding calves over four months of age.

Table 4. Calf and cow performance during the creep feeding period.

Item	Not creep-fed	Creep-fed
Calf weight gain, pounds/day	2.11	2.79
Creep feed intake, pounds/day	—	5.99
Feed efficiency, pounds feed/pound added gain	—	8.78
Cow weight gain, pounds/day	0.17	0.14

Table 5. Composition of creep feed, %.

Ingredient	% protein of diet		
	10%	20%	30%
Cracked corn	97	72	47
Soybean meal	—	25	50
Molasses	3	3	3

% CP	9.1	18.8	28.5
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Table 6. Performance of creep-fed calves.

Item	Creep Feed, %CP			
	No-creep	10	20	30
Initial weight, pounds	312	315	324	322
Final weight, pounds	366	403	436	438
Summer gain, pounds/day	0.88	1.45	1.84	2.17
Creep intake, pounds/day	0.0	5.2	5.7	5.7

Table 7. Performance of control (non-creep-fed) and creep-fed calves.

Item	Treatments	
	Control	Creep
Number of calves	43	20
Initial weight, pounds	309	307
Final weight, pounds	509	530
Weight gain, 101 days, pounds	200	223
Pounds creep/calf	—	61
Pounds creep/pound of added gain	—	2.65
Cost of added gain ¹ , \$	—	6.10
Value of added gain ² , \$	—	13.80
Profit, \$/calf		7.70

¹ Cottonseed meal costing 0.08/pound, including labor.

² Added gain valued at 0.60/pound.

Table 8. Effect of allowing calves to creep graze Pearl millet from June to September (104 days) in North Alabama on tall fescue-based pasture systems.

Item	Control (no creep)	Creep-grazed
Calf gain, pounds	144	219
Calf daily gain, pounds	1.38	2.10
Cow weight change, pounds	-60	+27

Table 9. Performance of calves creep grazing *Aeschynomene*.

Item	Creep Feed, %CP	
	Not creep grazing	Creep-grazed
Calf Age, days	118	120
Initial weight, pounds	353	348
Weaning weight, pounds	521	537

Gain, pounds/day	1.82	1.99
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Table 10. Effect of creep grazing treatments on average daily gain of calves while grazing Bahiagrass pastures (Ocumpaugh, 1985)

Creep Forage	Calf daily gain, pounds/day
Aeschynomene	1.98
Tifleaf 1 millet	1.80
Hairy Indigo	1.80
Alyceclover	1.70
Grain-based feed	1.86
Control (no creep)	1.50