

Heifer Nutrition and Development

8

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Adequate heifer development is critical to the long-term sustainability of a productive cow herd. Replacement heifers are the foundation on which your herd is built. Whether heifers are purchased or self-raised, they represent your long-term herd productivity.

The improved profitability resulting from calving heifers for the first time as 2-year-olds rather than as 3-year-olds has been long proven. Also, research indicates that well-developed heifers that calve early in their first calving season continue to calve early in subsequent calving seasons. Consequently, they wean heavier calves throughout their lifetimes, compared to heifers that calve later in their first calving season.

Although aspects such as breed characteristics and genetics are important, meeting animals' nutritional requirements is a key part of developing productive heifers. The nutritional program for developing heifers should not require expensive purchased feeds. Target gains often can be met with little energy and protein supplementation.

Divide the heifer nutritional program into stages: weaning, weaning to breeding, breeding to first calving, first calving to second breeding, and the second postcalving period. Each stage is discussed below.

Weaning

Weaning is a time of stress, and it is a time when heifer calves' development can be retarded. A good weaning program typically lasts 4 weeks and should overcome the weight loss and nutritional stress of the weaning process. Prior to weaning, contact your veterinarian to set up a vaccination and preconditioning schedule.

A practice that is proving to be effective is fence line weaning. In a recent study, researchers weaned 248 calves and placed them in two feed yard pens. The dams of the calves in one pen were allowed to stay in the area just outside the pen. The other dams were removed from the area. After 10 days, there was no significant difference in weight gain, immune function, or physiological indicators of stress. But there was much less fence walking and bawling in calves weaned next to their dams. Fence-line weaning seemed to be a calmer process.



When weaning, get the calves started on high-quality hay and a palatable grain mix, and provide the recommended level of trace minerals (see Chapter 4, Table 4.2). The grain mix should contain a protein supplement (soybean meal, cottonseed meal, etc.) and some molasses to increase palatability.

It is important to provide a palatable, high-quality grain mix because dry matter intake normally is depressed during weaning and, consequently, nutrient intake is decreased. The grain mix should allow the heifers to obtain a significant amount of their required nutrients from a small amount of supplement.

You can get calves to the feed bunk quickly by feeding a familiar ingredient (such as high-quality hay or alfalfa). You might begin by providing high-quality hay in the feed troughs, in addition to about 1 pound/head/day of ground barley or corn oats barley (COB) and 1 pound/head/day of soybean meal.

Once the animals have gotten used to the grain mix (usually 5 to 7 days), you can increase the quantity to 2 pounds/head/day grain and 2 pounds/head/day soybean meal. After about 4 weeks (to monitor for health disorders and allow adequate time for adaptation to life without “mom”), you can turn the calves out on high-quality pasture and initiate the growing program.

Postweaning

The postweaning period lasts from the end of the weaning phase to the time the heifers are bred. The growth rate during this phase should allow heifers to reach their target weight for breeding, or approximately 60 to 65 percent of mature weight. At this weight, most heifers reach puberty before the breeding season. Since the pubertal estrus is less fertile than later cycles, it is wise to plan for heifers to reach their target weight at least 21 days prior to the breeding season.

If the target weight is not reached, breeding will be delayed. Conversely, with excessive growth and condition, the developing udder fills with fat, retarding mammary development and resulting in poor milking ability.

The daily gain of heifers typically needs to be about 1.25 pounds during this stage. You can accelerate the growth rate so that heifers lagging in development can catch up, but the gain should not exceed 2 pounds/day.

Adequate growth often can be achieved with high-quality pasture alone. During wintering in western Oregon, grazing on small grain, ryegrass, or fescue pastures can result in adequate gain.

Average-quality hay or pasture rations require supplementation, as determined by a forage analysis. The supplement may need to provide protein, energy, or both. A mineral mix containing an ionophore can stimulate performance if forage quality is marginal compared to the heifer’s requirements. Chapter 1 discusses the protein, energy, and mineral requirements of heifers at different stages of development.

Worksheet 8.1 (at the end of this chapter) will help you calculate required heifer gains.

Breeding to calving

It is recommended that first-calf heifers weigh 75 to 85 percent of their mature weight at first calving. Heifers need to gain approximately 1 pound/day from the time they are bred until calving. In western Oregon, this gain usually is achieved on pasture alone.

While it might seem easy to achieve this performance goal, do not turn heifers out to pasture and ignore them before calving. Take steps to assure adequate body condition of heifers precalving, and pay extra attention to mineral and vitamin requirements during the last trimester.

Heifers should have a body condition score of at least 6 (see Chapter 7) entering the calving season. If heifers are in poor condition, place them on a higher level of nutrition. It is difficult to improve their condition as they approach calving, and it is especially difficult after calving. Improving heifer body condition score will increase the quantity and quality of colostrum, decrease the time from calving to estrus, decrease death loss in calves, and increase calf vigor.



Calving to rebreeding

If a heifer that calves in good body condition loses condition rapidly after calving, her reproductive rate may be reduced. Heavy-milking heifers are especially prone to rapid weight loss, resulting in delayed cycling.

Plan to provide the lactating first-calf heifer the highest quality hay or pasture available, and be prepared to provide a grain supplement sufficient to maintain body condition above 5. Provide a good, palatable mineral supplement balanced specifically for early lactation (see Chapter 4).

It is important to understand a cow's order, or hierarchy, of nutrient allocation. Nutrients are utilized in the following order: (1) maintenance, (2) lactation, (3) growth, and (4) reproduction (see Chapter 7). It is easy to see that a cow in a negative energy and protein state will experience decreased reproduction and conception. Reproduction is a luxury (not a necessity) for the heifer; however, it is essential for producer profitability.

Second calving

Second-calf cows often are the most difficult to get bred; many producers notice the highest rate of open cows in this age bracket. When the young cow is preparing for her second calf, she should be about 90 percent of her mature body weight. She should maintain a body condition of 5 or better after calving.

This cow is still growing, especially in the case of later maturing breeds, so she needs a slightly higher level of nutrition than do mature cows. In general, however, if milk production is moderate and forage

quality is high, 3-year-old cows can be managed with mature cows. Some producers find it easier to group 3-year-olds with 2-year-olds, but in either case it is difficult to target nutrition specifically to this group.

Summary

The development program for heifers is divided into stages. Providing heifers with nutrition to meet the target gains and weights indicated will result in a high level of fertility and calf health. Providing heifers with a good start also improves the overall profitability of the beef operation.

Many producers develop their own heifers. It is important to examine the possibility of purchasing 2-year-old replacement heifers from a producer who specializes in developing quality heifers. Worksheet 8.2 will help you compare the cost of raising versus purchasing replacement heifers.

Worksheet 8.1 Calculating Required Heifer Gains

	Example	Your herd	Notes
Mature cow size	1,100 lb		
Target weight at breeding (65% of mature weight)	715 lb		$1,100 \times 0.65 = 715$
Current weight	450 lb		
Total gain needed	265 lb		$715 - 450 = 265$
Current date	October 15		
Start of breeding season	June 1		
Length of feeding period	225 days		

Worksheet 8.2—Sample Change in Net Income if Replacement Heifer Is Purchased

Positive effects \$ per head

Added returns

1. Net returns from sale of raised heifer calf (535 lb x \$0.80/lb)	\$428.00
2. Interest on net returns from heifer calf sale \$428 [line 1] x 0.11 (interest rate) x 15 months ^a ÷ 12	\$58.85
3. Total added returns [line 1 + line 2]	\$486.85

Reduced cost^b

4. Value of hay fed to raised heifer calf (1.82 tons x \$75/ton)	\$136.50
5. Value of pasture grazed by raised heifer calf	\$55.14
6. Value of salt and minerals for raised heifer calf	\$15.97
7. Other feed costs for raised heifer calf	\$11.59
8. Veterinary and medicine expenses for raised heifer calf	\$5.00
9. Value of labor and management for raised heifer calf (8 hours x \$10/hr)	\$80.00
10. Raised heifer calf's share of bull cost \$840 (annual bull cost) ÷ 25 females per bull x 15 months ^a ÷ 12	\$42.00
11. Other nonfeed costs for raising heifer calf ^c	\$50.00
12. Interest on feed and nonfeed costs for raised heifer calf 396.20 [sum of lines 4–11] ÷ 2 x 0.11 (interest rate) x 15 months ^a ÷ 12	\$27.24
13. Total reduced cost [sum of lines 4–12]	\$423.44
14. Total positive effects [line 3 + line 13]	\$910.29

Negative effects

Added cost

15. Cost of purchased replacement heifer	\$750.00
16. Other costs for purchased replacement heifer ^b	\$0
17. Total added cost [line 15 + line 16]	\$750.00

Reduced returns

18. Reduction in returns experienced if replacement heifer is purchased ^b	\$0
19. Total negative effects [line 17 + line 18]	\$750.00

Financial analysis

20. Change in net income per heifer replacement [line 14 – line 19]	\$160.29
21. Change in annual net income for herd \$160.29 [line 20] x 20 (number of heifer replacements required per year) x (12 ÷ 15 months ^a)	\$2,564.64
22. Average annual rate of return \$160.29 [line 20] ÷ \$750.00 [line 15] x (12 ÷ 15 months ^a) x 100	17.1%

^aThe numerator (lines 2, 10, 12) and denominator (lines 21, 22) should equal the number of months between the sale of the heifer calf and the purchase of the replacement heifers.

^bEnter only the effects occurring during the period between the sale of the heifer calf and the purchase of the replacement heifer.

^cMay include repairs, utilities, fuel, insurance, etc.

Source: Nelson, D.D. and G.S. Willett. 1992. *Analyzing the Economics of Raising versus Buying Beef Replacement Heifers*. EB17. Washington State University Cooperative Extension.

Worksheet 8.2—Blank

Change in Net Income if Replacement Heifer Is Purchased

Positive effects \$ per head

Added returns

1. Net returns from sale of raised heifer calf (_____ lb x \$ _____ /lb)\$ _____
2. Interest on net returns from heifer calf sale
 \$ _____ [line 1] x _____ (interest rate) x _____ months^a ÷ 12\$ _____
3. Total added returns [line 1 + line 2]\$ _____

Reduced cost^b

4. Value of hay fed to raised heifer calf (_____ tons x \$ _____ /ton)\$ _____
5. Value of pasture grazed by raised heifer calf\$ _____
6. Value of salt and minerals for raised heifer calf\$ _____
7. Other feed costs for raised heifer calf\$ _____
8. Veterinary and medicine expenses for raised heifer calf.....\$ _____
9. Value of labor and management for raised heifer calf (_____ hours x \$ _____ /hr)\$ _____
10. Raised heifer calf's share of bull cost
 \$ _____ (annual bull cost) ÷ _____ females per bull x _____ months^a ÷ 12\$ _____
11. Other nonfeed costs for raising heifer calf^c\$ _____
12. Interest on feed and nonfeed costs for raised heifer calf
 _____ [sum of lines 4–11] ÷ 2 x _____ (interest rate) x _____ months^a ÷ 12\$ _____
13. Total reduced cost [sum of lines 4–12].....\$ _____
14. Total positive effects [line 3 + line 13].....\$ _____

Negative effects

Added cost

15. Cost of purchased replacement heifer\$ _____
16. Other costs for purchased replacement heifer^p\$ _____
17. Total added cost [line 15 + line 16].....\$ _____

Reduced returns

18. Reduction in returns experienced if replacement heifer is purchased^b\$ _____
19. Total negative effects [line 17 + line 18]\$ _____

Financial analysis

20. Change in net income per heifer replacement (line 14 – line 19).....\$ _____
21. Change in annual net income for herd
 \$ _____ [line 20] x _____ (number of heifer replacements required per year)
 x (12 ÷ _____ months^a)\$ _____
22. Average annual rate of return
 \$ _____ [line 20] ÷ \$ _____ [line 15] x (12 ÷ _____ months^a) x 100 _____ %

^aThe numerator (lines 2, 10, 12) and denominator (lines 21, 22) should equal the number of months between the sale of the heifer calf and the purchase of the replacement heifers.

^bEnter only the effects occurring during the period between the sale of the heifer calf and the purchase of the replacement heifer.

^cMay include repairs, utilities, fuel, insurance, etc.

Source: Nelson, D.D. and G.S. Willett. 1992. *Analyzing the Economics of Raising versus Buying Beef Replacement Heifers*. EB17. Washington State University Cooperative Extension, Pullman, WA.

