

Nutritional Management of Beef Replacement Heifers

► Purchasing or raising replacement heifers is a systematic part of maintaining a beef cow-calf operation. Replacement heifers should ultimately grow into a productive, fertile female that produces a calf annually as part of the herd.

Many management decisions must be considered when selecting and raising replacement heifers. Heifers must complete several milestones before entry into the herd: selection at weaning, development from weaning to breeding, establishment and maintenance of a pregnancy, success during the first calving season, and establishment of successful rebreeding. After selection at weaning, the nutrition program provides the foundation for growth and advancement of maturity in preparation for the breeding phase.

Producers who plan to wean and retain ownership of replacement heifers through the development phase should consider the following nutritional checkpoints to reach the breeding season:

- Collect weights of replacement heifers at weaning. At weaning, heifers should be between 7 and 8 months of age and generally weigh 500 pounds or greater.
- Determine the frame score of replacement females (table 1). Estimate anticipated body weight as a mature cow. Frame scores are a measurement that can be used to monitor body size and to predict mature weight. Hip heights are measured in inches and then adjusted for age and sex of the animal to a numerical frame score of 1 to 9, with 1 being a small-framed animal and 9 being a large-framed animal. A frame score between 4 and 6 is recommended for replacement heifers at weaning. Heifers above or below this range may be too large or too small for efficient production.



Table 1. Hip Height, Frame Score, and Anticipated Mature Weight for Heifers

Age Months	Frame Score (Hip Height, Inches)				
	3	4	5	6	7
6	38.2	40.3	42.3	44.4	46.5
7	39.2	41.2	43.3	45.3	47.4
8	40.1	42.1	44.1	46.2	48.2
9	40.9	42.9	44.9	47.0	49.0
Estimated Mature Weight	900 lb	1,000 lb	1,100 lb	1,200 lb	1,300 lb

Table 2. Weights Needed to Reach Puberty Based on Breed Composition

Breed or Breed Type	Weight (lb)
Angus	650
Brangus	700
Charolais	775
Hereford	700
Charolais × British	775
Simmental Cross	700
Limousin Cross	700
Gelbvieh Cross	650
Brahman × British	750

- Understand the influence of breed type. Table 2 highlights the projected weights needed to reach puberty as influenced by breed composition.
- Develop heifers to achieve 65 percent of their mature body weight at first breeding and to reach puberty by 12 to 14 months of age. Breed heifers with the goal of them having their first calf at the age of 2.
- Monitor body condition scores (BCS) as heifers are developed. Heifers need to be maintained at a BCS of 5 to 6. Body condition scores reflect the relative body fat and energy stores of a beef animal. A score from 1 to 9 is assigned to an animal, with 1 representing emaciated (extremely thin) and 9 representing obese.
- Use forages and supplemental feed resources as needed to provide a steady plane of growth to achieve this target. A target of 1.0 to 1.5 pounds per day gain from weaning to breeding is needed for growing heifers to reach 65 percent of mature body weight.
- Target the breeding of replacement heifers at 20 to 30 days before the cow herd. This provides an early projected calving date, allowing for more time and labor efforts to be given to heifers during this period.



Nutritional Requirements of Growing Heifers

The nutritional program for developing replacement females depends on anticipated mature animal body weight, weaning weight, and the growth rate needed to achieve puberty in the desired time frame (i.e., average daily gain). Tables 3 through 5 provide information on the daily dry matter intake and diet nutrient density required to achieve various levels of average daily gain.

Post-Weaning Nutrition Systems

This phase occurs from the time of weaning until breeding. In general, a growth rate of 1.0 to 1.5 pounds per day from weaning to breeding is needed for growing heifers to reach 65 percent of mature body weight. A more specific growth rate can be estimated by (1) evaluating the amount of gain needed between the time of weaning and breeding, and (2) estimating the number of days remaining until the breeding period.

In the Southeast, warm-season perennial grass pastures, such as bermudagrass, bahiagrass, or dallisgrass, may provide close to 1.0 pound per day average daily gain during peak growth. However, additional supplementation may be required to achieve greater gains or as forage becomes more mature and less productive late in the growing season.

Cool-season forages (annuals and perennials with or without legumes) generally provide high-quality forage growth during the winter and spring months and can support up to 2.0 pounds per day average daily gain. In the fall, stockpiled tall fescue may support gains of 1.5 pounds per day without supplementation. Stockpiled warm-season perennial grasses may also reduce hay needs, although supplementation with a high energy-protein supplemental feedstuff may be needed to meet gain goals.

Drylot development programs rely more on conserved forages, where animals are developed in nongrazing paddocks. These programs rely more heavily on conserved forages than on grazed pasture. The first step to develop a cost-effective supplementation program is therefore to conduct a forage analysis. This provides needed information on digestibility, crude protein, and fiber value of the forage to be used as part of the nutrition program.

As forage maturity increases, dry matter intake potential decreases. Good-quality hay (minimum of 11 percent crude protein, 55 percent total digestible nutrients) is needed to achieve adequate forage dry matter intake

Table 3. Diet Nutrient Densities for Growing Cattle—Anticipated Mature Weight of 1,100 Pounds

Weaning Weight (lb)	ADG (lb)	DMI (lb/d)	TDN (%)	CP (%)	Ca (%)	P (%)
500	1.0	11.3	60.5	9.9	0.33	0.19
	1.5	11.6	65.7	11.4	0.44	0.23
	2.0	11.5	71.9	13.1	0.55	0.27
600	1.0	13.0	60.6	9.2	0.31	0.18
	1.5	13.2	65.9	10.4	0.39	0.21
	2.0	13.2	72.1	11.7	0.47	0.22
700	1.0	14.6	60.4	8.7	0.29	0.17
	1.5	14.9	65.7	9.6	0.35	0.19
	2.0	14.8	71.8	10.7	0.42	0.22

Table 4. Diet Nutrient Densities for Growing Cattle—Anticipated Mature Weight of 1,200 Pounds

Weaning Weight (lb)	ADG (lb)	DMI (lb/d)	TDN (%)	CP (%)	Ca (%)	P (%)
500	1.0	11.3	59.9	9.9	0.30	0.19
	1.5	11.5	64.8	11.4	0.36	0.23
	2.0	11.5	70.4	13.1	0.43	0.27
600	1.0	13.0	60.0	9.2	0.32	0.18
	1.5	13.2	64.9	10.1	0.40	0.21
	2.0	13.2	70.5	11.8	0.48	0.24
700	1.0	14.5	59.9	8.8	0.30	0.17
	1.5	14.8	64.7	9.7	0.36	0.20
	2.0	14.8	70.3	10.8	0.43	0.22

Table 5. Diet Nutrient Densities for Growing Cattle—Anticipated Mature Weight of 1,400 Pounds

Weaning Weight (lb)	ADG (lb)	DMI (lb/d)	TDN (%)	CP (%)	Ca (%)	P (%)
500	1.0	11.2	59.0	10.0	0.37	0.20
	1.5	11.5	63.3	11.5	0.47	0.24
	2.0	11.6	68.1	13.1	0.58	0.28
600	1.0	12.9	59.1	9.4	0.33	0.18
	1.5	13.2	63.3	10.6	0.42	0.22
	2.0	13.3	68.2	11.9	0.51	0.25
650	1.0	14.4	59.0	8.9	0.31	0.18
	1.5	14.8	63.2	9.9	0.38	0.20
	2.0	14.9	68.0	10.9	0.45	0.23

to support gain and minimize the amount of additional feedstuffs required for purchase. High-quality baleage or silage may also be used as the forage base in a drylot program. This is a high-moisture, conserved forage product that can have good nutritional value.

Feedstuffs should be selected based on their ability to complement the forage component of the diet. For this reason, avoid feeding high-starch feeds such as corn or wheat middlings at greater than 0.5 percent of animal body weight per day.

Feed rations should be formulated to provide fiber-based digestible energy and protein to make up for forage deficiencies. Some examples of readily available fiber-based feedstuffs in Alabama include soybean hulls, corn gluten feed, dried distillers grains, whole cottonseed, cottonseed hulls, and meals such as cottonseed or soybean. Additional information on feeding recommendations for these by-products can be found in “By-Product Feeds for Alabama Beef Cattle” (Extension publication ANR-1237).

There are many commercially formulated products that also can be used as part of a supplementation program. Feedstuffs should be purchased based on quality and a cost-per-pound-of-nutrient basis.

The following are examples of supplementation strategies for beef replacement heifers using conserved forage and feed resources commonly found in the Southeast. The supplementation level is dependent on forage nutritional value and animal average daily gain goals:

- Tall fescue hay and 0.5–1 percent animal body weight per day of 50 percent soyhulls and 50 percent corn gluten feed fed daily
- Bermudagrass hay and 0.5–1 percent animal body weight per day dried distillers grains fed daily
- Bahiagrass hay and 0.5–0.75 percent animal body weight per day of whole cottonseed fed daily

Feeding Logistics

To achieve these development goals, replacement heifers should be fed separately from the cow herd. Replacement females have a different nutritional requirement than mature cows. Cow behavior may limit the accessibility of heifers to feed bunks, water troughs, etc., due to the social hierarchy.

Depending on the number of replacement females, additional separation into weight categories (i.e., light, medium, heavy) may further refine the nutrition program and help females achieve their growth potential by providing a more specific plane of nutrition. For example, a lighter-weight group of heifers may require a more energy-dense diet than a heavier group.

Summary

Several management decisions should determine if a beef heifer is suitable for entry into the herd as a replacement female. When considering selecting and developing beef replacement heifers on-farm, evaluate potential costs, estimate the growth rate needed to reach puberty, and determine how forage resources can be used to support these goals. Evaluate additional feed inputs on a basis of cost per pound of nutrient supplied to maximize efficiency.

Providing heifers with a good start nutritionally will improve viability of the beef operation. It also will help move animals toward the goal of becoming a productive member of the cow herd.



Kim Mullenix, *Extension Beef Systems Specialist*, Associate Professor, and **Michelle Elmore**, *Extension Beef Specialist*, Extension Assistant Professor, both in Animal Sciences and Forages, Auburn University

For more information, contact your county Extension office. Visit www.aces.edu/directory.

Trade and brand names are given for information purposes only. No guarantee, endorsement, or discrimination among comparable products is intended or implied by the Alabama Cooperative Extension System.

The Alabama Cooperative Extension System (Alabama A&M University and Auburn University) is an equal opportunity educator and employer. Everyone is welcome! Please let us know if you have accessibility needs.

New October 2019, ANR-2597

© 2019 by the Alabama Cooperative Extension System. All rights reserved.

www.aces.edu