UF IFAS Extension UNIVERSITY of FLORIDA

AN132

Improving the Productivity of Beef Heifers in Florida[1]

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Replacement heifers are an important part of the cow-calf operation and represent genetic improvement of the cow herd. Developing replacement heifers on the ranch can be expensive and require significant management inputs. However, purchasing replacement heifers is not always less expensive. *Bos indicus*-influenced cows are more productive in the Florida environment but they are slower to mature and more difficult to develop into successful brood cows. Selecting high-quality heifers with the ability to conceive early in the breeding season and deliver calves without difficulty is of utmost importance. Providing the correct nutrition that will allow the heifer to achieve these goals is very important.

Raised versus Purchased

Beef replacement heifers are a major cost that cow-calf producers typically incur every year. The decision to raise or to purchase beef replacement heifers is not a simple decision. Some producers will raise replacement heifers, while others will choose to purchase them. When it is time to make the decision to invest in the future, a case can be made both for buying and for raising replacements depending on the circumstances.

In order to make an informed decision about whether to raise or to purchase beef replacement heifers, an evaluation should be made of the operation to determine whether it makes economic sense to raise or to purchase quality replacement heifers. A question that producers need to ask themselves is "Can I purchase replacement heifers of equal or better genetics at equal or lower costs than the ones I raise?" If the answer is yes, selling your heifer calves and purchasing bred replacement heifers is a viable alternative. Purchasing beef replacement heifers for small- to medium-sized cow-calf operations often works very well, as producers typically do not have the additional resources needed to manage replacement heifers effectively. Additionally, it allows producers to allocate more resources for the brood cows that would be needed for developing replacement heifers. Larger cow-calf operations will find it more difficult to acquire the number of replacements needed that fit their calving season from a single source. Lastly, the decision to buy or to raise beef replacement heifers should be viewed as a long-run decision. It often is not easy or economical to raise beef replacement heifers one year and choose not to do so the next year, not only because producers would have to make adjustments to their stocking rate, inputs, machinery and equipment, and facilities, but also due to the additional length of time needed for developed replacement heifers to calve.

There is no one answer that fits all cattle producers. The decision to raise or to purchase replacement heifers will vary depending on the producer's level of management,

1. This document is AN132, one of a series of the Animal Sciences Department, UF/IFAS Extension. Original publication date November 2002. Revised March 2015. Visit the EDIS website at http://edis.ifas.ufl.edu.

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goals, input costs, and the circumstances of each individual situation. When comparing the cost of raising versus purchasing replacement heifers, serious consideration should be given to making the decision that is the most economically viable for the ranch in the long run.

The Cost of Raised Beef Replacement Heifers

The economic analysis presented in this section furthers the discussion of the cost of raising beef replacement heifers in *What Does It Cost to Develop a Replacement Heifer?* (http://www.edis.ifas.ufl.edu/an238). Calculating the cost of a raised beef replacement heifer seems simple. Most producers include the production costs of heifer development and the value of the weaned heifer calf. However, the situation is a little more complicated than it seems. There is an infinite number of replacement heifer development programs and levels of management which all have different associated costs and rates of success in getting a non-pregnant heifer pregnant. In addition, there are at least two adjustments that should be included in the analysis: 1) the gain or loss on replacement heifers that either die or do not become pregnant and 2) an adjustment for the reduced inventory of brood cows when raising beef replacement heifers, since this decision decreases the total number of brood cows that the ranch can support. It is important to include these two adjustments to correctly calculate the total cost of raising beef replacement heifers.

The costs associated with raising a replacement heifer can be large. The example in Table 1 provides an estimated cost of a raised beef replacement heifer in Florida during 2015. The estimates are expressed on a per-heifer basis and as the cost of raising 20 beef replacement heifers. The example presented in Table 1 represents only one of an infinite number of development strategies and levels of management to raise beef replacement heifers. The budget in Table 1 is based on developing and breeding 20 weaned heifer calves. It was assumed that 17 of the 20 heifers (85%) became pregnant, 2.8 animals (14%) were culled, and 0.2 heifers (1%) died. The variable and fixed costs for the beef replacement heifer program total $1,874.13 and $318.67 per heifer, respectively. The total variable and fixed costs were $2,193 per heifer assuming all heifers became pregnant and no death loss occurred. The loss for non-breeders was $122 per heifer and the adjustment for the reduced inventory of brood cows was –$133 per heifer. The resulting total cost of a raised beef replacement heifer in this budget was $2,448 per heifer.

Note that the cost to raise beef replacement heifers varies considerably between producers. Estimated costs for a given ranch may be higher or lower than those presented in the example budget because of location, resources, level of management, inputs, and conception rate. Whenever possible, producers should make adjustments and use their own production and financial information to determine their cost of raising replacement heifers. However, the example budget will provide a template to follow when estimating the cost of developing a raised beef replacement heifer.

Sensitivity of Total Cost of a Raised Beef Replacement Heifer

The total cost of a raised beef replacement heifer is very sensitive to the production cost level (variable and fixed costs per heifer) and the percentage of exposed heifers confirmed pregnant. Table 2 shows the estimated total cost of a raised replacement heifer based on various production cost levels and percentage of exposed heifers confirmed pregnant. The production cost levels in Table 2 range from $1,800 to $2,600 per heifer and the percentage of exposed heifers confirmed pregnant ranges from 60 to 90 percent. The estimated total cost of raising a pregnant replacement heifer ranged from $1,867 (associated with a production cost level of $1,800 and 90 percent of exposed heifers confirmed pregnant) to $3,122 (associated with a production cost level of $2,600 and 60 percent of exposed heifers confirmed pregnant).

In Table 2 a $100 increase in the production cost level increases the total cost of a raised replacement heifer between $111 per heifer (assumes 90 percent confirmed pregnant) and $145 per heifer (assumes 60 percent pregnant). A 5 percentage unit increase in the percentage of exposed heifers confirmed pregnant decreases the total cost of a raised replacement heifer between $17 (assumes a production cost level of $1,800 per heifer) and $61 per heifer (assumes a production cost level of $2,600 per heifer). Thus the greater the value of a weaned heifer, the greater the cost of open heifers.

Producers should use their own variable and fixed costs and their projected average conception rate when calculating their total cost of a raised pregnant replacement heifer. These two variables have a large impact on the total cost of a raised pregnant replacement heifer. Additional attention to management has been shown to improve the percentage of heifers confirmed pregnant and to lower production

costs, which can result in a significantly lower cost of a raised beef replacement heifer.

Equipment and Facility Considerations

Developing beef replacement heifers can be a difficult and expensive undertaking for the average producer. A major component of raising beef replacement heifers is having the necessary resources to consistently produce a successful set of beef replacement heifers. Raising beef replacement heifers may require additional resources such as management, labor, inputs, grazing land, bulls, cattle-handling facilities, feed, herd health, and other resources. A proper set of cattle-handling facilities allows for closer observation of replacement heifers and provides the ability to perform routine health and management procedures such as pelvic measurement, reproductive tract score, vaccinating, controlling parasites, pregnancy testing, and other veterinary medicine practices safely and efficiently.

There are an infinite number of feeding, breeding, and management alternatives for developing beef replacement heifers. These alternatives must be evaluated to determine which feedstuffs and management practices will consistently produce a successful set of beef replacement heifers. The nutritional needs of beef replacement heifers vary widely depending on their age, weight, and frame size as well as on length of the heifer development program. Thus as the nutritional needs of replacement heifers differ from other classes of cattle, they need to be grouped separately on grazing land. There usually are economies of scale in developing beef replacement heifers which typically favor larger operations because they generally have hired management and labor that can perform the necessary management practices on a timely basis, buy feedstuffs in bulk quantities at low prices, have a well-established relationship with an experienced veterinarian, and have adequate facilities to handle replacement heifers.

Selecting Heifers for Replacements

If you decide to raise replacement heifers, selecting the heifers from the herd to keep as replacements is a very important step in the process. Heifers should achieve 65 percent of mature body weight by the start of the breeding season to successfully conceive early in the breeding season. Larger, heavier heifers at weaning will more easily reach 65 percent of mature weight at the start of breeding, but these larger, heavier heifers also may develop into larger, heavier mature cows. Larger cows will decrease the carrying capacity on the ranch or increase the supplemental feed needs. It is important to have an accurate estimate of the expected mature weight of the heifer.

Knowing the age of the heifers can help estimate whether they will be heavy mature cows. For example, a heifer born late in the calving season that weighs 500 lb. at weaning will likely have a heavier mature weight than a heifer born early in the calving season that weighs 500 lb. The late-born heifer has greater weight per day of age, which typically leads to heavier mature weight. Additionally, age plays a role in achievement of puberty. It is important for heifers to achieve puberty at 13–14 months of age in order to conceive early in the breeding season at 15 months of age. For *Bos taurus* x *Bos indicus* cross heifers that are weaned at greater than 6 months of age, puberty will likely not be achieved before 13.7 months of age (412 days of age) regardless of the how fast the heifer gains weight post-weaning (see *Targeting ADG of Developing Replacement Heifers Using Age and Body Weight*, http://www.edis.ifas.ufl.edu/an305).

Hip height also can be used to estimate the mature weight of beef heifers, but day of age must be known. Hip height at a given age will allow calculation of frame size, and from frame size calculation of mature weight is possible. The following formulas can be used to calculate frame score and expected mature weight:

$$\text{Frame score} = -11.7086 + (0.4723 \times \text{Ht}) - (0.0239 \times \text{Age}) + (0.0000146 \times \text{Age}^2) + (0.0000759 \times \text{Ht} \times \text{Age}),$$

$$\text{Mature weight, lb} = (\text{frame score} \times 75) + 800,$$

where Age = age in days and Ht = hip height in inches. Hip height at various ages and frame scores is shown in Table 3.

Figure 1 shows the proper place to measure hip height on the heifer. Hip height should be measured in a squeeze

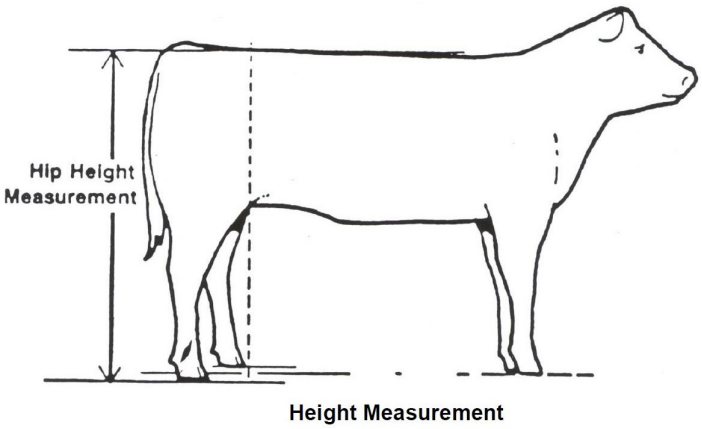

Figure 1. Illustration of proper hip height measurement.
Credits: Beef Improvement Federation (2010).

chute or alley way while the heifer is standing freely with good posture. Hip height can be measured using a hip height measuring stick that can be purchased at many veterinary supply companies or using a standard tape measure. If using a standard tape measure, hang the tape measure above the chute or alley and first measure the distance to the ground. Then measure the distance to the top of the heifer's hips and subtract this number from the distance to the ground to calculate the hip height.

Other important considerations for selecting replacement heifers are reproductive tract score and pelvic area. Visit with your veterinarian about collecting these measurements on replacement heifers. Reproductive tract score is a subjective estimate of sexual maturity based on ovarian development and palpable size and tone of the reproductive tract. Heifers are given a score of 1 (infantile) to 5 (cycling) at 12–13 months of age (Table 4). Previous research indicates that heifers with tract scores of 4 and 5 have pregnancy rates 20–30 percent greater than heifers with tract scores of 1 and 2. Additionally, heifers with tract scores of 4 and 5 conceive earlier in the breeding season and have 20–30 percent greater pregnancy rates as first-calf cows during their second breeding season. Thus it is recommended that heifers with tract scores less than 3 be culled before the breeding season. Reproductive tract score is moderately heritable ($h^2 = 0.32$), indicating that selecting heifers with high tract scores will increase reproductive performance of heifers in the future.

Pelvic area is the product of height and width of the inside of the pelvis, and has a strong relationship with calving difficulty in heifers. Figure 2 illustrates how to measure the height and width of the pelvis. Pelvic area should be measured in 12–13-month-old heifers and adjusted to a standard age of 365 days using the formula:

Adjusted 365-day pelvic area = actual pelvic area + [0.27 × (365 – actual age)],

where pelvic area is in cm^2 and age is in days.

Calf birth weight is the most important factor impacting calving difficulty in heifers. Therefore by using expected calf birth weight and pelvic area we can identify heifers with small pelvic area that would be expected to have calving difficulty (Table 5). For example, if the expected calf birth weight based on the bull is 70 lb, a threshold pelvic area can be calculated for 12–13-month-old heifers weighing 700 lb to use as culling criteria (70 x 2.2 = 154 cm^2 pelvic area). Therefore heifers with pelvic area less than 150 cm^2 should be culled. Pelvic area is highly heritable ($h^2 = 0.50$) such

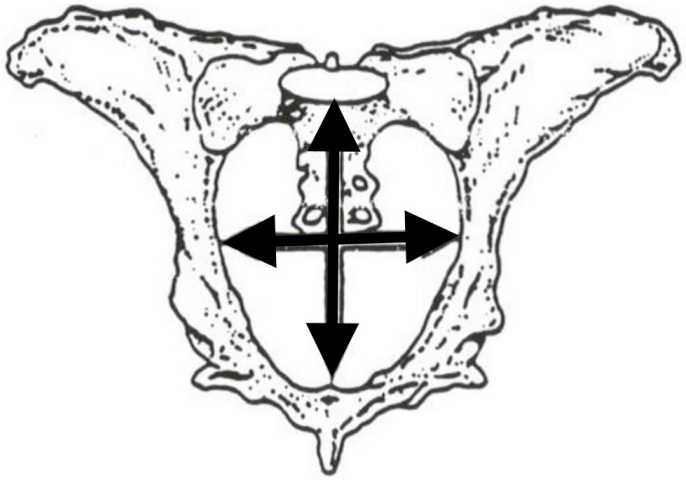

Figure 2. Illustration of measuring the height and width of the pelvis to calculate pelvic area.
Creits: Beef Improvement Federation (2010).

that selecting for larger pelvic area can result in less calving difficulty in replacement heifers in the future.

The process for selecting replacement heifers should begin before or at weaning. At weaning, selection should be based on age, current weight, and expected mature weight. Selecting older heifers that also weigh more at weaning will allow them to achieve puberty before the start of the breeding season. These heifers should have a moderate frame size and should not have expected mature weights greater than your cows. At 12 months of age, reproductive tract scores and pelvic area should be evaluated and the less-developed heifers culled from the group. This will reduce heifer development costs and reduce the bull power necessary to service the replacement heifers.

Nutritional Management

After the beef replacement heifers have been selected at weaning, providing proper nutrition is key to allow these heifers to develop and achieve puberty prior to the breeding season. The nutritional requirements of the heifers will depend upon current weight, expected mature weight, and rate of gain necessary to achieve 65 percent of mature weight by the start of the breeding season. The necessary rate of gain can be calculated by the formula:

Target rate of gain = (target weight – current weight) ÷ # days until breeding,

where rate of gain is lb/day and target weight is expected mature weight × 0.65. The nutrient requirements for a heifer with average feeding weight of 600 lb at various rates of gain and mature weights are presented in Table 6.

In general, achieving the desired rates of gain will require considerable amounts of supplemental feed and can be quite costly. Better management of forages, different feeding strategies, and use of feed additives can be used to reduce supplemental feed costs. Managing forage resources to provide more TDN (total digestible nutrients) from forage for developing heifers is a good practice. Stockpiling hermarthria in the fall in south Florida or overseeding annual forages in north Florida are good ways to provide high-quality forage that can reduce the need for supplemental feed. Also, harvesting forage for hay in the spring when forage TDN is highest can provide high-quality forage. It generally is a good practice to use the forage with the highest TDN value for the beef replacement heifers rather than for other classes of cattle.

Additionally, labor required to feed heifers can be costly. Feeding 3 times per week can reduce labor needs, but heifers need to have access to high-quality feed daily. Research at the UF/IFAS Range Cattle Research and Education Center demonstrated that feeding dry feed 3 times per week to growing beef replacement heifers reduced pregnancy rates compared with feeding liquid molasses slurry 3 times per week. The heifers fed the dry feed quickly consumed all the dry feed in 1 day, whereas the heifers fed the liquid molasses consumed it over a 2-day period. The heifers fed the dry feed had large fluctuations in blood glucose and insulin that caused them to achieve puberty later than the heifers fed the liquid molasses. When planning to provide supplemental feed 3 times per week, using liquid molasses slurry as part of the ration may be beneficial.

Another management practice that could reduce labor costs associated with feeding replacement heifers is the slow-rapid gain method. A constant gain method means that supplemental feed will be provided for the entire post-weaning period to produce a moderate rate of gain. The slow-rapid gain method means that heifers will be allowed to grow slowly on less expensive forage for some period but then provided supplemental feed for a short period before the start of the breeding season. The slow-rapid gain method can be used successfully to develop beef replacement heifers. See *Targeting ADG of Developing Replacement Heifers Using Age and Body Weight* (http://www.edis.ifas.ufl.edu/an305) for an in-depth discussion of different feeding strategies.

Feed additives such as monensin and lasalocid (trade names Rumensin® and Bovatec®) can reduce feed costs for developing beef replacement heifers. These feed additives increase the conversion of feed to weight gain and reduce the amount of feed needed to get heifers to the target weight. Additionally, the use of monensin or lasalocid in diets for developing heifers reduces age and weight at puberty.

After the breeding season, nutritional requirements of pregnant beef heifers decrease dramatically, but these heifers still need to grow. Heifers should achieve 80% of mature weight at time of first calving, and thus the rate of gain needed depends upon mature weight. Table 7 shows the target ADG and nutrient requirements of pregnant replacement heifers of various mature weights. Spring forage generally will meet the nutrient requirements of pregnant beef replacement heifers, but as nutrient requirements increase for heifers scheduled to calve in the fall or winter nutrient requirements of late gestation heifers often exceed nutritive value of forage. Thus supplementation of pregnant beef replacement heifers may be necessary in late summer and fall.

If at all possible, pregnant beef replacement heifers should be kept separate from the rest of the cow herd because their nutritional requirements are different than those of mature cows. For example, a 1200-lb mature cow in mid-lactation requires a diet with 55 percent TDN and 8.5 percent CP whereas a 1200-lb mature-weight pregnant replacement heifer in early gestation requires a diet with 50 percent TDN and 7.2 percent CP. The nutrient requirements are greater for the lactating mature cow than for the pregnant replacement heifer early in the production cycle. However, the late-gestation, dry mature cow requires a diet with 52 percent TDN and 7.7 percent CP whereas the late-gestation, pregnant heifer requires a diet with 56 percent TDN and 8.5 percent CP. Later in the production cycle the nutrient requirements of the late-gestation pregnant replacement heifer are greater than those of the late gestation mature cow because the replacement heifer is still growing. Therefore, if managed together the pregnant replacement heifer will be over- or under-fed as part of the feeding program for the mature cow herd.

Conclusion

Beef replacement heifers are a necessary but costly part of every cow-calf operation. A decision needs to be made to either purchase replacement heifers or raise them on the ranch. This is a long-term decision that will affect the ranch for many years through the genetics of the replacement heifers and through equipment and management inputs. The cost of raising a pregnant replacement heifer is highly influenced by pregnancy rate. Pregnancy rate is influenced by age, body weight, nutrition, and reproductive tract development. When making the decision to raise or to

purchase replacement heifers, an assessment of whether management capabilities are adequate to select potential replacement heifers at weaning, manage available feed resources to meet nutritional requirements of the growing replacement heifers, and cull less reproductively developed heifers prior to the start of the breeding season needs to be made. If a decision is made to raise replacements on the ranch, a management plan should be developed to attain high pregnancy rates (>80 percent) cost effectively.

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Table 1. Estimated costs of raised beef replacement heifers, Florida 2015

Item	Description	Unit	Quantity	#/Unit	$/Heifer	$/20 Heifers
Estimated Variable Costs						
Heifer Calf	Value of Weaned Heifer	*lbs*	525.00	$2.45	$1,286.25	$25,725.00
Land Rent	Imp. Perennial Pasture	*acre*	2.00	$25.00	$50.00	$1,000.00
Pasture Costs	Fertilizer, Misc. Costs	*acre*	2.00	$50.00	$100.00	$2,000.00
Mixed Hay	53% TDN, 7% CP	*tons*	0.90	$80.00	$72.00	$1,440.00
Energy Supplement	72% TDN, 16% CP	*tons*	0.26	$225.00	$59.06	$1,181.25
Protein Supplement	75% TDN, 46% CP	*tons*	0.11	$175.00	$19.69	$393.75
Mineral and Salt		*tons*	0.04	$650.00	$23.73	$474.50
Breeding Cost	Cost of Bull Service	*heifer*	1.00	$60.00	$60.00	$1,200.00
Mach. & Equip.	Fuel, Oil, Lube, etc.	*heifer*	1.00	$25.50	$25.50	$510.00
Vet. and Med.	Preg Check, Vac., Supplies	*heifer*	1.00	$23.50	$23.50	$470.00
Labor	(Wages & Fringe)	*hours*	3.00	$12.50	$37.50	$750.00
Misc. Expenses		*heifer*	1.00	$15.00	$15.00	$300.00
Interest on ½ of Operating Costs		*dollars*	$485.98	5.75%	$27.94	$558.87
Interest on Heifer Calf		*dollars*	$1,286.25	5.75%	$73.96	$1,479.19
Total Variable Costs					**$1,874.13**	**$37,482.56**
Estimated Fixed Costs						
General Overhead		*dollars*	$1,874.13	9%	$168.67	$3,373.43
Management Fee		*heifer*	1.00	$150.00	$150.00	$3,000.00
Total Fixed Costs					**$318.67**	**$6,373.43**
Total Variable and Fixed Costs					**$2,193**	**$43,856**
Gain/Loss Adjustment for Non-Breeders*					**($122)**	**($2,445)**
Adjustment for Reduced Brood Cow Inventory**					**($133)**	**($2,667)**
Total Cost of Raised Replacement Heifer					**$2,448**	**$48,967.83**

*The gain/loss adjustment for non-breeders is the market value of non-breeders minus their total variable and fixed costs.
**The adjustment for reduced brood cow inventory is the reduced profit resulting from a lower level of brood cow inventory associated with raising replacement heifers.

Table 2. Estimated total cost of a raised replacement heifer based on various cost levels and percentage of heifers confirmed pregnant

	Percentage of Exposed Heifers Confirmed Pregnant						
Variable and Fixed Costs of Raised Repl. Heifer*	90%	85%	80%	75%	70%	65%	60%
	(Estimated Total Cost of a Raised Replacement Heifer, $/hd.)						
$2,600	$2,756	$2,817	$2,878	$2,939	$3,000	$3,061	$3,122
$2,500	$2,644	$2,700	$2,756	$2,811	$2,867	$2,922	$2,978
$2,400	$2,533	$2,583	$2,633	$2,683	$2,733	$2,783	$2,833
$2,300	$2,422	$2,467	$2,511	$2,556	$2,600	$2,644	$2,689
$2,200	$2,311	$2,350	$2,389	$2,428	$2,467	$2,506	$2,544
$2,100	$2,200	$2,233	$2,267	$2,300	$2,333	$2,367	$2,400
$2,000	$2,089	$2,117	$2,144	$2,172	$2,200	$2,228	$2,256
$1,900	$1,978	$2,000	$2,022	$2,044	$2,067	$2,089	$2,111
$1,800	$1,867	$1,883	$1,900	$1,917	$1,933	$1,950	$1,967

*Assumes 1% death loss and a market value of $1,500 per heifer for culled open heifers

Table 3. Hip height at various frame scores for 5 to 21 month-old heifers.

	Frame Score								
Age, months	1	2	3	4	5	6	7	8	9
5	33.1	35.1	37.2	39.3	41.3	43.4	45.5	47.5	49.6
6	34.1	36.2	38.2	40.3	42.3	44.4	46.5	48.5	50.6
7	35.1	37.1	39.2	41.2	43.3	45.3	47.4	49.4	51.5
8	36.0	38.0	40.1	42.1	44.1	46.2	48.2	50.2	52.3
9	36.8	38.9	40.9	42.9	44.9	47.0	49.0	51.0	53.0
10	37.6	39.6	41.6	43.7	45.7	47.7	49.7	51.7	53.8
11	38.3	40.3	42.3	44.3	46.4	48.4	50.4	52.4	54.4
12	39.0	41.0	43.0	45.0	47.0	49.0	51.0	53.0	55.0
13	39.6	41.6	43.6	45.5	47.5	49.5	51.5	53.5	55.5
14	40.1	42.1	44.1	46.1	48.0	50.0	52.0	54.0	56.0
15	40.6	42.6	44.5	46.5	48.5	50.5	52.4	54.4	56.4
16	41.0	43.0	44.9	46.9	48.9	50.8	52.8	54.8	56.7
17	41.4	43.3	45.3	47.2	49.2	51.1	53.1	55.1	57.0
18	41.7	43.6	45.6	47.5	49.5	51.4	53.4	55.3	57.3
19	41.9	43.9	45.8	47.7	49.7	51.6	53.6	55.5	57.4
20	42.1	44.1	46.0	47.9	49.8	51.8	53.7	55.6	57.6
21	42.3	44.2	46.1	48.0	50.0	51.9	53.8	55.7	57.7

Frame Score = –11.7086 + (0.4723 × Ht) – (0.0239 × Age) + (0.0000146 × Age^2) + (0.0000759 × Ht × Age), where Age = age in days and Ht = hip height in inches.

Table 4. Criteria for reproductive tract scores in heifers

		Size and Characteristics of Ovaries			
Reproductive Tract Score	Uterine Horns	Length (mm)	Height (mm)	Width (mm)	Ovarian Structures
1	Immature <20 mm diameter, no tone	15	10	8	No palpable follicles
2	20–25 mm diameter, no tone	18	12	10	8 mm follicles
3	25–30 mm diameter, no tone	22	15	10	8–10 mm follicles
4	30 mm diameter, good tone	30	16	12	>10 mm follicles, corpus luteum possible
5	>30 mm diameter, good tone, erect	>32	20	15	>10 mm follicles, corpus luteum present

Table 5. Pelvic area to calf birth weight ratios for various heifer weights and ages to estimate deliverable calf birth weight

	Age, mo			
Weight, lb	8–9	12–13	18–19	22–23
500	1.7	2.0	-	-
600	1.8	2.1	-	-
700	1.9	2.2	2.6	-
800	-	2.3	2.7	3.1
900	-	2.4	2.8	3.2
1000	-	2.5	2.9	3.3
1100	-	-	-	3.4

Deliverable calf birth weight = pelvic area ÷ pelvic area to birth weight ratio for the age and weight of the heifer.
Threshold pelvic area = expected calf birth weight × pelvic area to birth weight ratio for the age and weight of the heifer.

Table 6. Nutrient requirements of replacement heifers with various rates of gain and mature weights at expected average feeding weight

	Target ADG, lb/day					
Item	0.50	0.75	1.00	1.25	1.50	1.75
1100 lb mature weight						
Dry FI, lb/day	15.7	16.2	16.6	16.9	17.0	17.1
TDN%	48.0	50.	52.0	54.0	56.0	58.0
CP%	6.94	7.46	7.98	8.52	9.15	9.09
1200 lb mature weight						
Dry FI, lb/day	16.7	17.0	17.5	17.8	18.0	18.1
TDN%	47.5	49.5	51.5	53.5	55.5	57.5
CP%	7.03	7.60	8.05	8.57	9.12	9.71
1300 lb mature weight						
Dry FI, lb/day	18.2	18.5	19.0	19.3	19.5	19.6
TDN%	47.5	49.3	51	52.8	54.8	56.5
CP%	6.74	7.29	7.72	8.22	8.74	9.30

FI = feed intake; TDN = total digestible nutrients; CP = crude protein.
Expected average feeding weight is 600, 650, and 725 lb for mature weights of 1100, 1200, and 1300 lb.

Table 7. Nutrient requirements of pregnant replacement heifers of various mature weights

	Months Since Conception								
Mature weight (Target ADG)	1	2	3	4	5	6	7	8	9
1100 lb (0.80 lb/day)									
Dry FI, lb/day	18.0	18.5	19.0	19.5	20.1	20.8	21.5	22.3	22.9
TDN%	50.3	50.4	50.5	50.8	51.3	52.3	53.9	56.5	60.6
CP%	7.20	7.17	7.17	7.21	7.32	7.54	7.93	8.63	9.80
1200 lb (0.88 lb/day)									
Dry FI, lb/day	19.3	19.8	20.3	20.9	21.5	22.2	23.0	23.7	24.4
TDN%	50.5	50.5	50.7	50.9	51.4	52.3	53.8	56.2	59.9
CP%	7.21	7.19	7.18	7.22	7.31	7.52	7.89	8.53	9.62
1300 lb (0.95 lb/day)									
Dry FI, lb/day	20.5	21.0	21.6	22.2	22.9	23.6	24.4	25.2	25.9
TDN%	50.6	50.7	50.8	51.0	51.5	52.4	53.7	56.0	59.5
CP%	7.23	7.20	7.20	7.22	7.31	7.50	7.85	8.45	9.46

FI = feed intake; TDN = total digestible nutrients; CP = crude protein.