



Benchmarking Heifer Growth

Introduction

The cost of raising replacement heifers is the second highest input cost on the dairy; the first is feed. Therefore, efficiencies in the replacement heifer area have significant impact on overall farm profitability. One of the primary influences in the cost of raising replacements is the average age at first calving (AFC). Multiple studies have indicated that an optimal goal for AFC should be 22-24 months.¹ The estimated cost is \$50-60 per heifer for every month after 24 months that a heifer is not milking. There appears to be no economic or biologic justification for calving heifers at ages greater than 24 months of age.² While 22 month calving may not be attainable for all dairy producers, the basic premise remains the same— know where you are so you can improve your metrics.

In order to average AFC at 22-24 months, growth rates must be achieved to reach optimal body size by that time period. If heifers do not reach optimal body size prior to calving, increased calving problems and decreased milk production will result.³ Table 1 shows ranges for optimal body size for Holstein heifers.¹ Ranges for optimal body size at various ages for colored breeds can be found at the following Penn State website: www.das.psu.edu/dcn/calfmgt/growth/

The ranges of body weight data in Table 1 are based on Holstein heifers in high producing herds. Farms with genetics that allow for much larger or smaller body type animals should create their own goals for heifer growth using a percentage of mature body weight. It is important to base nutrient requirements on mature body size for your herd, so rations are correctly balanced for nutrients like protein and energy.

Average weight at pregnancy:	55% of mature body weight⁴
Average weight at post-fresh:	85% of mature body weight⁴

How to Measure Heifer Growth

Obtaining heifer weight and body measurements during different phases of development will allow the grower to compare heifers to optimal body ranges (Table 1). This will help evaluate the success of heifer feeding and management programs throughout different phases of growth (i.e. pre-weaning, post-weaning/pre-puberty, breeding age, and calving age).

- Heifer weight can be obtained by use of a scale or body weight tape. Body weight tapes are generally accurate to within 5-7% of actual body weight.³
- Withers height can be obtained by using a measuring stick or by placing a piece of tape or a mark on a wall in the heifer pen at a given height. If you're using the wall mark technique, be sure you use an area that does not build up with manure (such as a scraped alley).

Body condition score (BCS) is obtained by using the dairy scale of 1 = thin to 5 = obese. Since BCS is a subjective measurement, accuracy is improved if the same person does the scoring each time. Most nutritionists and veterinarians are trained to BCS dairy animals.

When to Measure Heifer Growth

Obtaining heifer body measurements at key intervals allows the grower to achieve an optimum end point, which is defined in this situation as a pre-fresh heifer with body weight, withers height, and BCS



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in the ranges identified in Table 1. At the very minimum, growers should measure heifers at breeding age and again 1-2 weeks prior to the calving date. Larger farms and heifer growers often measure heifers at more frequent intervals.

Measuring heifers at breeding age allows the grower to breed based on size rather than age. Measuring heifers 1-2 weeks prior to calving allows the grower to make the appropriate adjustments to ensure future heifer groups are the proper size and BCS at calving time.

Achieving proper body weight, withers height, and BCS directly relates to improved health and performance in the first lactation.

Conclusion

As economic constraints continue to tighten on the dairy, increasing the efficiency of growing your heifers should be on your list of management goals. By measuring heifers at key growth phases and evaluating those measurements against the growth goals appropriate for the animals on your dairy, growers can efficiently produce heifers that are healthier and more profitable.

Age, Mo.	UPPER RANGE				LOWER RANGE			
	BW	ADG	WH	BCS	BW	ADG	WH	BCS
0	93	----	30	----	93	----	30	----
1	139	1.5	32	----	139	1.5	32	----
2	185	1.5	34	----	185	1.5	34	----
3	242	1.8	36	2.2	236	1.7	36	2.2
4	298	1.8	39	----	287	1.7	38	----
5	355	1.8	40	----	339	1.7	40	----
6	410	1.8	41	2.3	390	1.7	41	2.3
7	467	1.8	43	----	441	1.7	42	----
8	522	1.8	44	----	491	1.7	43	----
9	580	1.8	44	2.4	544	1.7	44	2.4
10	635	1.8	46	----	595	1.7	45	----
11	692	1.8	46	----	646	1.7	46	----
12	747	1.8	47	2.8	696	1.7	46	2.8
13	804	1.8	48	----	749	1.7	47	----
14	860	1.8	49	----	800	1.7	48	----
15	917	1.8	50	3.0	851	1.7	49	3.0
16	972	1.8	50	----	901	1.7	50	----
17	1029	1.8	51	----	952	1.7	50	----
18	1084	1.8	52	3.2	1005	1.7	51	3.2
19	1142	1.8	52	----	1056	1.7	52	----
20	1197	1.8	53	----	1106	1.7	52	----
21	1254	1.8	54	3.4	1157	1.7	53	3.4
22	1309	1.8	54	----	1210	1.7	53	----
23	1366	1.8	55	----	1261	1.7	54	----
24	1422	1.8	56	3.5	1311	1.7	54	3.5
7 days postpartum	1281				1181			
30 days postpartum	1192				1102			



References

- (1) Optimum Growth Rates for Holstein Replacement Heifers, Pat Hoffman, University of Wisconsin
- (2) Paradoxes Associated with Early Calving of Replacement Heifers, Pat Hoffman, University of Wisconsin
- (3) Monitoring Dairy Heifer Growth, Jud Heinrichs, Penn State University
- (4) Discussion at AABP 2005, Mike Van Amburgh, Cornell University