

# Heifer growing challenges and parameters: Maximize efficiency

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While there seems to be general agreement on the benefit of having heifers calve at 24 months of age, according to 2014 National Animal Health Monitoring System (NAHMS) data, it's not happening.

There has been some improvement in age at first calving from 1996 at 25.5 months to 25 months in 2014. However, there also are various reasons why average age at first calving may be greater on a given dairy: calvings being lower during summer months, managing or delaying first calvings to fill holes in the herd calving cycle and other events which show up in a given year but not other years.

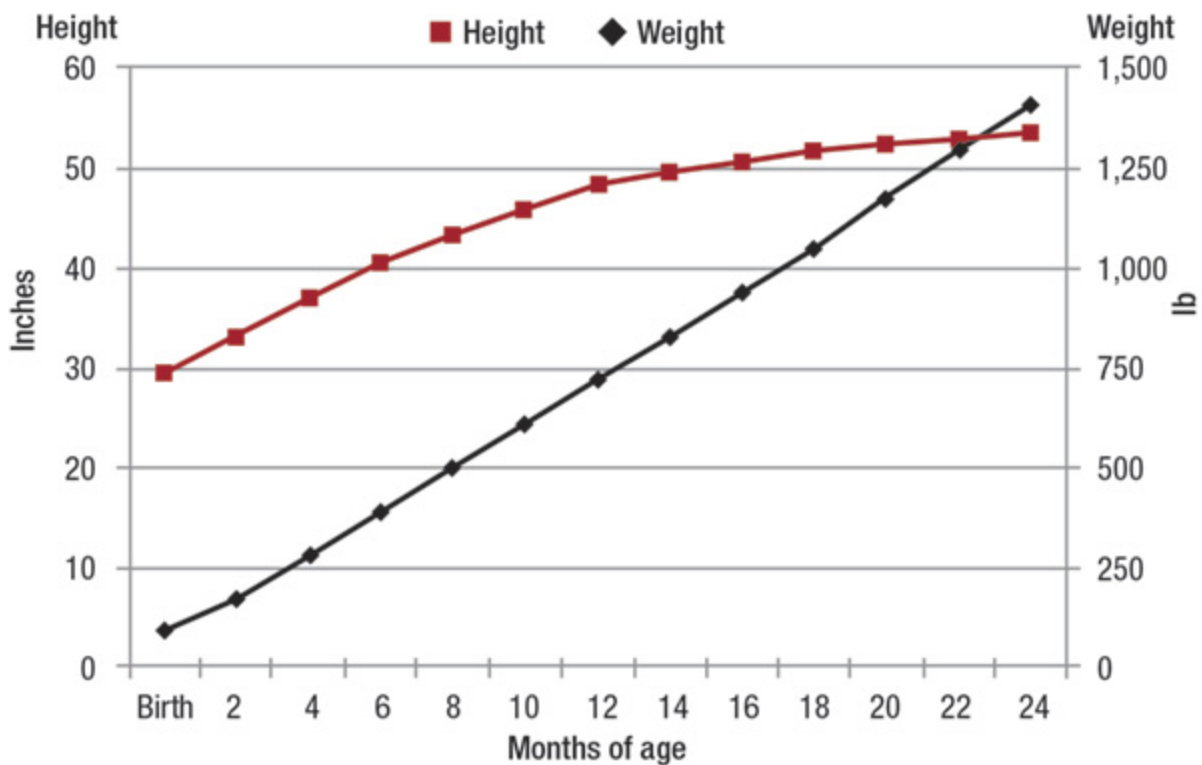
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## Heifers cannot make up for lost calf growth

Heifers have a distinct growth curve for weight and height. Of course, this will vary some with genetics in a herd and with individual animals. An example from a five-year database is shown in **Figure 1**. After weaning, weight increase should be about 1.8 to 2 pounds daily until first calving for Holsteins. Daily gains beyond one kilogram (2.2 pounds) can be problematic because that gain has been found to be the maximum rate of protein deposition. Gains greater than that are likely to lead to undue fattening. This increase in bodyweight is fairly linear. I have had calf/heifer growers tell me that while their calves may not do so well in the first two months, they can make that up later with daily gains of 2.5 to 3 pounds. But, any energy intake that allows for growth in excess of 2.2 pounds per day will end up as fat and is not encouraged because it usually is done to overcome a poor calf growth program.

**FIGURE 1** Standard growth curves



Relative efficiencies of wither height and bodyweight increase from birth until first calving in Holstein cattle.

Source: Kertz et al., 1998, J. Dairy Sci. 21:1479-1482

Pre- and post-calving bodyweights need to account for this irrespective of parity. Cows lose about 11% of their bodyweight at calving from the weight of the calf, placenta and other tissues and fluids.

But, height increase in heifers is not linear. About half of height increase occurs between birth and the end of six months of age. Only another 25% of height increase occurs in the next six months, and only 25% occurs over the last 12 months before first calving. This

pattern is quite different from weight gain and is critical to understand in feeding and managing dairy calves and heifers. This height increase is directly related to growth hormone secretion and is age dependent. And, as far as I know, there is no compensatory increase in height at a later period of growth.

## **Preweaned calf growth is the most efficient**

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Now, let's backtrack a moment to further establish some key elements of the growth and development process. It is most efficient during the first six months of life. Some fattening needs to occur from birth as normal growth and development. Adipose (fat) cells first increase by hyperplasia – an increased number of fat cells at an early age. Fattening later occurs by hypertrophy – an increase in size of fat cells. If there are more fat cells established in early life, increased propensity to fatten later occurs more easily because there are more fat cells to increase in size. An average daily gain of 1.5 to 1.7 pounds during the first two months doubles bodyweight by the end of two months of age. After that, an average daily gain of 1.8 to 2.0 pounds during the subsequent 22 months results in a 1,400-pound precalving bodyweight at 22-24 months of age.

Major feeding variables include dry matter intake (DMI), which can be quite variable, more so than for cows, and declines as a percent of bodyweight as heifers grow. Dietary protein and energy levels stay similar on a percentage of DMI basis, but the requirement amount increases as heifers grow larger. The protein-energy ratio relationship is critical to prevent fattening, with a goal for body condition to be around 3. Fat heifers, like fat cows, suffer from “fat cow syndrome,” which includes lower DMI, more metabolic problems and likely more calving difficulties, too. The latter is often due to internal fattening above the rumen, around the kidneys, which narrows the birth canal area.

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## **Preweaned calf period is not where farms should cut costs**

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While there is a common assumption that since calf-period feed and other costs are the greatest of the heifer growing period, that is the best place to cut costs. But, the calf period is also the most efficient period for conversion of nutrients to growth and has the greatest impact on how well that calf later produces milk. **Table 1** shows data from a large calf and heifer ranch in Spain, which I have worked with in the past. Note that the best feed efficiency was for calves during the first 65 days.

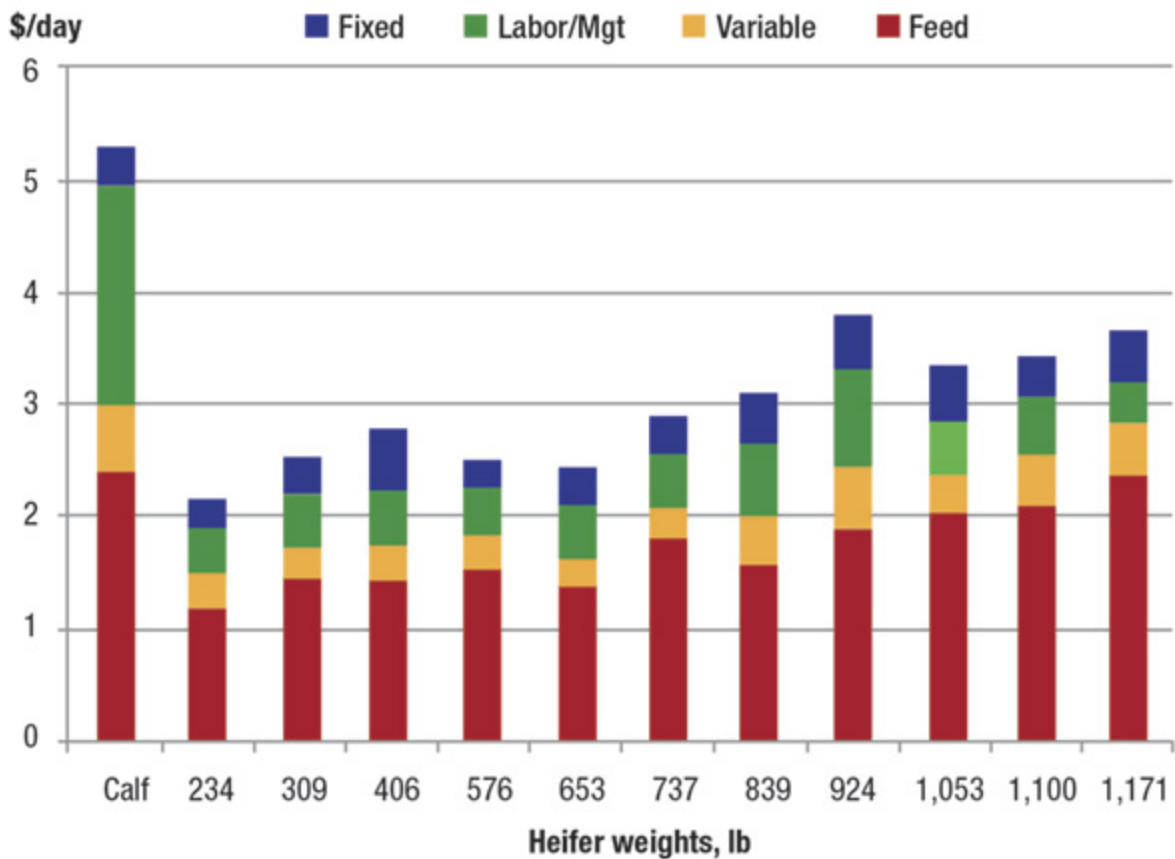
<b>TABLE 1</b>		Feed efficiency (FE) DMI/ADG from Rancho Las Nieves in Spain		
Group	Age at end, d	DMI, lb/d	ADG, lb/d	FE
1	65	2.9	1.67	1.74
2	111	5.6	2.20	2.56
3	162	11.4	2.27	5.01
4	226	14.6	2.17	6.72
5	295	16.4	2.12	7.73
6	406	19.6	1.87	10.52
7	650	23.3	1.85	12.57

Source: A.Bach, 2011 personal communication

A detailed analysis of 62 dairy operations in Wisconsin resulted in data plotted in **Figure 2**. Total costs to raise a heifer in 2013 were about \$2,200 with 16% of that cost occurring during the calf period. During that period, labor was about 37% of that cost, along with 44% for feed cost. Unfortunately, feed costs often get undue attention to reduce during the calf period – the period when nutrient conversion to growth is the greatest. On the other hand, feed costs progressively increased during the heifer period and accounted for 57% of total heifer-period raising costs. That is because while feedstuffs for heifers cost less per pound than those fed to calves, heifers being larger have more maintenance costs with less of what they eat being available for growth. That is why daily feed costs for heifers increased with larger bodyweights, as noted in Figure 2.

**FIGURE 2**

Raising costs by heifer weights – 2013



In conclusion, calves have the greatest conversion of nutrients to growth, and that growth plays out in how much milk they produce when they lactate. The calf period is not a good time to scrimp or cut corners on costs. Heifers should be fed well-balanced rations to achieve about 1.8 to 2 pounds daily gains to thereby avoid fattening and the dreaded fat cow syndrome after calving. ↗

**PHOTO:** Staff photo.

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References omitted but are available upon request. [Click here to email an editor.](#)



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