

Dairy calves are the best nutrient converters

by Al Kertz

Figure 1. How much more energy is available for growth

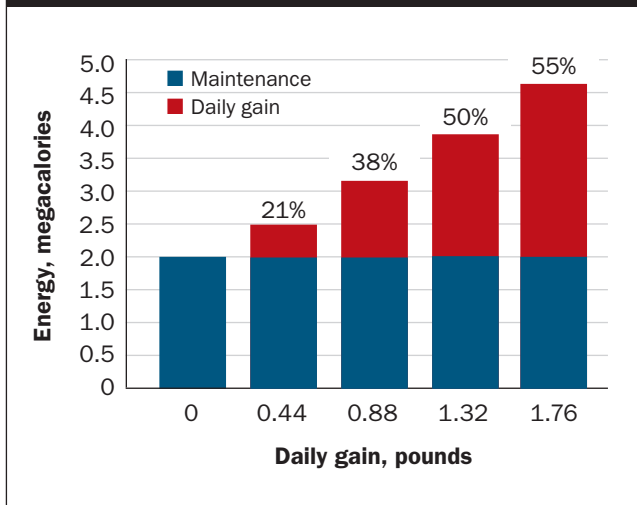
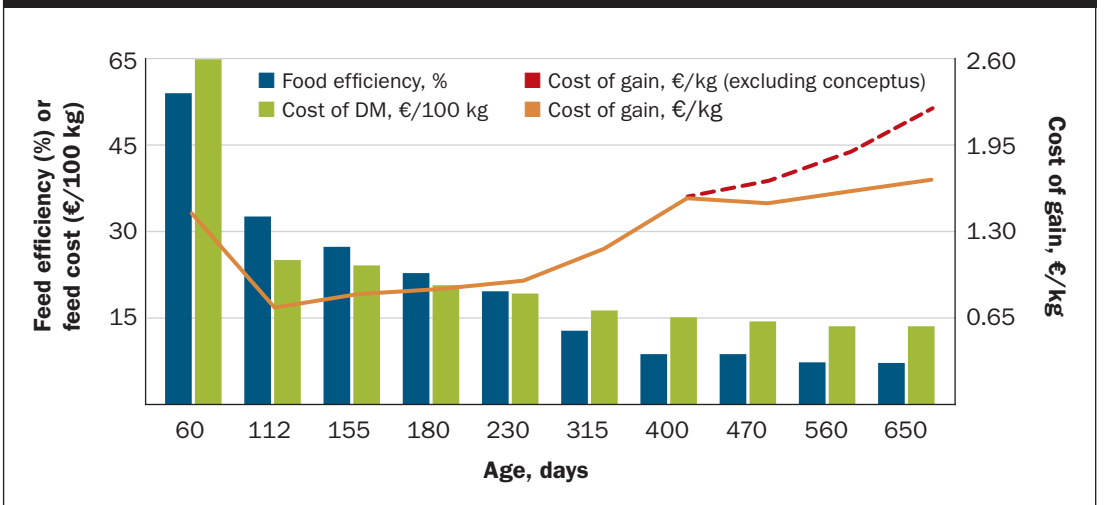


Figure 2. Feed efficiency and cost in Euros of kilogram gain over 60 to 650 days



FEEED efficiency during an animal's growth period is not well understood or appreciated in many dairy circles. I became much more attuned to this issue when doing some consulting work around 2006 with Rancho Las Nieves (RLN) in north central Spain. You can learn more about that operation by reading the article, "Spanish calf ranch researches growing strategies," in the April 10, 2008, issue on page 264.

RLN is unique in several aspects. It raises about 6,000 calves and heifers annually. However, those calves don't come from one farm; they come from nearly 130 dairy farm clients. Thus, it has specific biosecurity protocols to gather and commingle calves from so many sources and locations. They also make many measurements and have extensive data like no other calf/heifer operation that I am aware of.

The RLN managing partner is Jose (Pepe) Ahedo, whose family is involved in some dairy farm operations themselves. Alex Bach, who manages his own research group in Barcelona, also plays a big role in the region's calf-raising practices. With Bach taking the lead, Ahedo and I joined together to author the paper, "Advances in efficiency of growing dairy replacements." While we do not always agree on the feeding and management of calves and heifers, we have amicable discussions when we disagree. And that is the way science should be.

This amicable discussion while disagreeing was the background for an ARPAS presentation on dairy efficiency. I should also

acknowledge that I am a past president and current executive vice president of ARPAS.

Since there are hardly any published data on dairy calf and heifer growing efficiencies, Bach had provided me in 2011 with a summary from the extensive RLN data (see table). Note the best feed efficiencies by far are during the first 2 months of life. These feed efficiencies are not far off from growing pigs and chickens.

Yet, the cost per pound of milk replacer and starter fed during that period are the greatest for feedstuffs during the entire heifer growing period. Unfortunately, that is why too much attention is given to the greater feed cost per pound of gain during the period when the best feed efficiencies are realized. Why scrimp on feed costs when the greatest feed efficiencies are present?

Instead, we should be trying to realize the greatest conversion of nutrients to growth during this first 60 days. Note that as heifers got older and ate more, daily gains averaged about 2 pounds daily. That means that feed efficiencies became progressively poorer and poorer, from less than 2 to over 12 for the largest heifers.

Nutrients go elsewhere

As heifers grow and their body weight increases, more of their nutrient intake must go toward maintaining their growing body weight before nutrients can be available for additional growth. This is depicted in Figure 1 (NRC 2001) for a 110-pound calf, which shows how much more energy intake is available for growth as growth rate

Feed efficiency as measured by dry matter intake (DMI) to average daily gain (ADG) from Rancho Las Nieves in Spain

Group	Age at end (days)	DMI, lb./day	ADG, lb./day	Feed efficiency
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

increases. Of course, this assumes all other nutrients are balanced along with the energy intake.

Because of this increased feed efficiency at a young age, cost per pound of gain can also be the lowest at this age rather than later when cost per pound feed is lower — but more is required for that later growth.

In a 2005 Michigan State study, calves fed a traditional versus intensive milk replacer feeding program gained 0.48 pound less, had 25% poorer feed efficiency, and had 7 cents more feed cost per pound gain. In a 2000 Wisconsin field study of 62 dairy farms, feed costs per day were less for the calf period than for heifers over 900 pounds. Granted, that will depend on feed costs at the time of the study. Similar studies in 2007 and 2014 found that feed costs as a percent of total costs for heifer versus calf periods were 60% versus 38% in 2000, 52% versus 34% in 2007, and 57% versus 44% in 2014.

Finally, the main elements for RLN in efficiency are captured in Figure 2 (units are in kilograms and Euros). Note the cost per unit of gain is the lowest at the younger age

postweaned. Granted, this may vary with given databases and given feed costs. But this feed efficiency is also aligned with the higher feed cost per unit gain due to more feed needed per unit of gain. And remember, the RLN has a large database over a period of years — the largest I am aware of for calves and heifers.

Young calves win

In summary, conversion of nutrients for growth in dairy calves and heifers is greatest at the youngest age. The conversion to actual growth becomes poorer and poorer as heifers grow since they must first meet their greater body weight needs before daily gain can take place. This also means that feed cost per pound of gain may be the lowest at the younger age versus larger heifers. Despite greater feed cost per pound at the younger age, remember that more lower cost per pound feed is needed for larger heifers. 🐄

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