

what's your weakest link?

# Culling Myths...Culled

By Jane Fyksen

With the high cost of replacements today, producers should critically evaluate their culling and replacement strategies. Not only are they complex economic decisions needing to be tailored to individual herd circumstances, but fogging the issue further are "myths" within the industry that need to be loaded up and shipped off down the road.

Brain Radke, a veterinarian with a doctorate in ag economics from Michigan State, is a research economist for Alberta Agriculture, that Canadian province's equivalent to Wisconsin's ag department. He's out to dispel some of the myths about culling and replacement strategies that the dairy industry harbors.

**Myth No. 1: Simple examples can elicit optimal culling decisions and strategies.**

In other words, there are no good "benchmarks" in this realm of dairy management.

"Not infrequently, simple examples employing a partial budgeting approach are used in an attempt to illustrate optimal culling decisions. These simple examples are inadequate," he contends.

For example, if the available heifer replaces a cow, the net return in the first year will be "x" (so much in net revenue from the sale of milk and the calf from the heifer's first lactation plus money from the sale of the cull cow). This analysis, says Radke, suggests all heifers should be freshened. Not so, he contends.

This "incorrect analysis" fails to recognize that the choice is between freshening the heifer and selling the cow, or selling the potential replacement and keeping the cow another lactation (assuming no expansion).

"A similar mistake would be made if only the option of selling the replacement heifer and keeping the cow was considered in isolation," he adds, of a scenario that might generate a larger profit (so much from the sale of the replacement heifer plus so much in milk and calf revenue from the cow). That analysis suggests no heifers should be freshened!

Radke abhors such analyses for a number of reasons. First, he says any example "which results in such extreme suggestions that all or none of the potential heifers should be freshened is questionable."

Second, such examples ignore future implications of the decision of whether or not to freshen the heifer. The impact on herd genetics has been ignored. Such simplistic recommendations also ignore critical information about the animals themselves. Is the cow in her second or fifth lactation? If the latter is the case, she faces higher risk of being culled next lactation, in which case she would then be replaced by a heifer, which, due to annual genetic improvement of 1 to 2 percent, should on average be superior to the replacement available this lactation.

He warns producers not to use partial budgets to analyze replacement strategies.

Partial budgeting is inappropriate with capital assets, which include cattle. Capital assets are those assets which generate cash flows over multi-period lives.

"The general decision rule in capital budgeting, customized to culling and simplified by ignoring future replacements, is to replace the current asset (i.e. the cow) with a replacement, if the heifer's expected average profit per lactation is greater than the expected profit from the cow's next lactation, and also greater than the expected average (time-valued) profits from the cow's subsequent lactations," Radke explains. "So not only did the partial budget approach incorrectly value the profit of the replacement decision, it failed to use the correct decision 'rule' in making the decision."

**Myth No. 2: All producers should raise and freshen all their heifers.**

He says a culling rate of 20 to 30 percent as optimizing producer profit is widely supported by economic research. (These studies assume constant herd size, no seasonal effects on reproduction and production and culled cows being sold for meat, not dairy.) The average culling rate in the Alberta dairy industry is 35 percent – not atypical of culling rates throughout Canada and northern states like Wisconsin that don't suffer strong seasonal effects on reproduction and production.

The "average" producer is annually freshening roughly 35 heifers for every 100 cows, says Radke. Research "strongly suggests" fewer than 30 heifers should be freshened for every 100 cows, assuming constant herd size. "In other words, not all heifers should be freshened," he states.

He says the "unanimous results" of multiple studies on this subject are "compelling," because they were done under economic conditions in a number of countries (Canada, the U.S., England and Ireland, and the Netherlands).

Given that the "excessive" cull rates are only averages, a significant portion of herds out there have cull rates greater than average. It's likely 60 or 70 percent of the herds are culling at a rate greater than that which maximizes profit. And when expansion is considered, an even higher percentage of herds likely have an excessive culling rate, because during expansion, the optimal culling rate often decreases!

**Myth No. 3: A culling rate is a culling rate is a culling rate.**

In contrast to the 35 percent culling rate reported in Alberta, Michigan DHI reported a culling rate of 27 percent. "So for every 100 cows (milking and dry) 27 were culled, right? Not necessarily," says Radke, noting it was, in fact, 37.

"Another clue that the culling rate is not as it may appear on the DHI report is the realization that greater than 27 percent of the herd – often 40 to 50 percent of the herd – is first-calf heifers. If the percentage of first-calf heifers in the herd is constant, the herd culling rate is at least as great as this percentage corrected for the calving interval of the first-lactation heifers," he reports.



## Too Valuable

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Photo by Kelli Gunderson

"Intuitively, most people believe the culling rate is equal to: Number culled per year divided by average herd size. Alternatively, the culling rate may be calculated as: Number culled per year divided by (average herd size plus number culled)," he explains.

For the rest of this article, the first definition will be used. It assumes the herd operates at capacity, and it's also correct because the denominator represents animals at risk of being culled. The second definition is "herd turnover rate." "Mistaking the herd turnover rate for the culling rate has resulted in the errant conclusion that the industry culling rates are optimal," he notes.

**Myth No. 4: An excessive culling rate has minimal effect on profitability.**

Economic simulation models reveal increased profit from optimal culling rates varying from 2 to 40 percent. So potentially, the strategy of an optimal culling rate could be "quite profitable to dairy producers," he notes. The range is large in increased profit because some arbitrary method of culling was compared to an optimal culling strategy. The range in profit varies with how "good" the arbitrary method of culling was relative to the optimal culling for a given level of herd management.

**Myth No. 5: High culling rate strategies maximize milk production, maximize genetic progress, and therefore, maximize profit.**

Research has revealed that the excessive average culling rates commonly seen in the dairy industry maximize production and genetic improvement – but do not maximize producer profit.

"The studies that considered the optimum culling rate suggest that at higher culling rates the cost of attaining the higher milk production and genetic improvement is greater than their value," he says. "Closer examination of these costs and benefits reveals the complex economic nature of culling decisions in a herd. A large portion of the cost is the expense of identifying the lower producing – and therefore less profitable – first-lactation animals."

Assume that prior to knowing her productive capability, a heifer is worth \$1,500, and after determining she's a poor producer, she's worth less (so much in net revenue from milk sales and so much from her sale for beef). So, the farmer has "paid" the difference to identify each of the poor producers.

Usually, the economic benefit of an increased rate of genetic improvement and increase in milk production from higher selection pressure is simply not sufficient to make up for such loss on each of the first-lactation culls.

"The scientific literature suggests that there is more profit associated with culling at less than the biological maximum – i.e. not freshening all available heifers – and selling the excess heifers," Radke states.

"The drop in milk production due to decreased selection will be somewhat compensated by increasing the average age of the herd and having more cows in the higher-producing later lactations. The strategy of generating revenue from the sale of excess heifers with a coupled decrease in cull cow sales and increased average age of the herd will be more profitable than a younger herd of higher producing animals generated by a higher culling rate," he contends.

Optimum culling rates are highly dependent on the price of springing heifers relative to the price of cull animals. As the difference between the two prices narrows, the optimal culling rate rises.

If for example, springers are worth \$2,000, and they can be milked and the culls sold to another herd for \$2,000, the optimal strategy then would be to freshen all heifers, as in essence, the information identifying the best producing heifers is being attained for free.

Presumably, producers want to maximize profit and not milk production. "With everything else the same, higher producing animals are generally more profitable. So for a given culling rate, the highest producing animals are desirable, but the strategy

See Culling Myths, on Page 8