

Longevity and Burnout

We usually assume that the more lactations a cow completes, the more profitable she is. And many of us feel that the rate of cow turnover in most herds is too rapid; that cows are ‘burning out’ too early. But rapid turnover can produce faster genetic progress - older cows can be replaced by more productive young cows. So before we get too concerned about burnout, it would be useful to know how longevity affects a cow's profitability.

The economics of longevity

A few years ago, Dr. Len Bauer at the University of Alberta published the results of an analysis aimed at finding the most profitable replacement strategy for Alberta dairy herds. He calculated the annual net revenue (annuity value) produced by cows that completed from 1 to 10 lactations. Net revenue included the cost of raising the cow to first calving, the value of each calf she produced, milk income, feed and veterinary costs and salvage value at culling. Expressing revenue as an annuity value brings all costs and returns forward to a single point in time with the value of money and risk accounted for by the discount rate.

Figure 1 illustrates the results of these calculations. Replacing cows at the end of their sixth lactations resulted in the highest annuity value. But notice that the differences were minor from the third to the tenth lactation. Replacement at the end of the third lactation resulted in an annuity value that was only about 3% less than the maximum. Penalties were a lot more significant when cows lasted only one or two lactations.

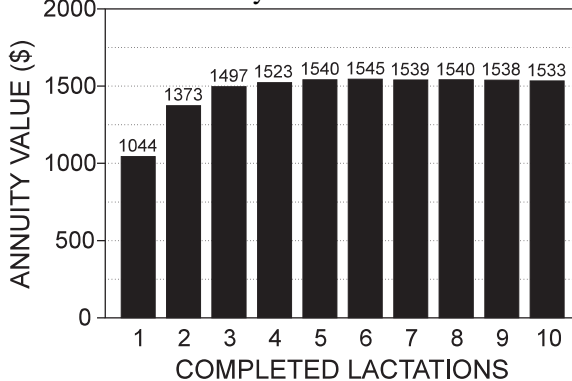


Figure 1 : Annuity values at the end of lactations 1 - 10 for base case assumptions in table 1.

SITUATION	ANNUITY VALUE LACT 6 \$	OPTIMUM REPLACEMENT AT END OF LACTATION
BASE CASE VALUES	1545	6
MILK PRICE : \$49.11/hL		
20% LOWER	926	6
20% HIGHER	2163	6
FEED PRICES : ROUGHAGE \$110/t; CONC \$250/t		
20% LOWER	1820	6
20% HIGHER	1269	6
SALVAGE VALUE : LACT 1: \$640 ... LACT 10: \$553		
20% LOWER	1518	8
20% HIGHER	1572	6
REPLACEMENT COST : \$1100		
20% LOWER	1610	5
20% HIGHER	1484	9
GENETIC IMPROVEMENT RATE : 0.5% / year		
1.0% / year	1652	6
1.5% / year	1781	9
DISCOUNT RATE : 7.5%		
5.0%	1633	6
10.0%	1487	6

Table 1 : Annuity value at the end of lactation 6 and optimum replacement time are affected by changes in base values.

These findings are sensitive to the actual values of the factors used in the analysis. Effects of these on annuity value for replacement at the end of the sixth lactation are shown in table 1. Also shown are the effects on the optimum replacement time. Although changing these values did affect the outcome of the analysis, there were still only minor penalties for replacing cows as early as the end of their third lactation.

For the last 5 years, the average number of lactations completed by cows on DHI in Alberta has been 2.5. Based on Dr. Bauer's analysis and the base values given in table 1, increasing this value to 3.0 might lead to an increased net revenue of about \$60 per cow - \$108 if it could be increased to 6.0 lactations. You might question whether the potential for increased income would justify the effort involved to increase the average herd life of your cows.

A few months ago, I came across another angle on cow longevity in a report written by a Scottish agricultural economist. He suggested that we should be looking at the potential productive life

of individual cows rather than the average number of lactations completed by a herd of cows. For example, if average herd life is 2.5 lactations, then a few cows may be completing more than 5 or 6 lactations, but many are leaving the herd in their first or second lactations. Using the figures in table 1, annual net revenue would increase by \$453 for every cow completing 3 lactations instead of only 1; \$124 for ever cow completing 3 instead of 2. How many cows leave your herd before they have completed 3 lactations?

Early burnout

To get a handle on early burnout in our herds, I was able to analyze a dataset which included records for over 20,000 cows from all 757 supervised DHI Holstein herds in the 3 prairie provinces. Figure 2 shows the number of cows remaining at the beginning of each lactation for every 100 first calf heifers that entered the milking herd. Notice that 27 of the original 100 cows were lost before their second calving; a further 23 before their third. Only 32 cows remained to begin their fourth lactation. If losses in the first 3 lactations could be reduced by half, annual net profit for this herd would increase by over \$8000.

What are the main symptoms of burnout in the first 3 lactations? If we define burnout as involuntary culling, the DHI disposal reasons that will apply include death, mastitis, udder breakdown, feet & leg problems, infertility, sickness, disease and injury. The percentage of total losses due to each of these is shown in figure 3. Low production, slow milking, poor temperament or sale to another herd are not included, since these disposal reasons are voluntary.

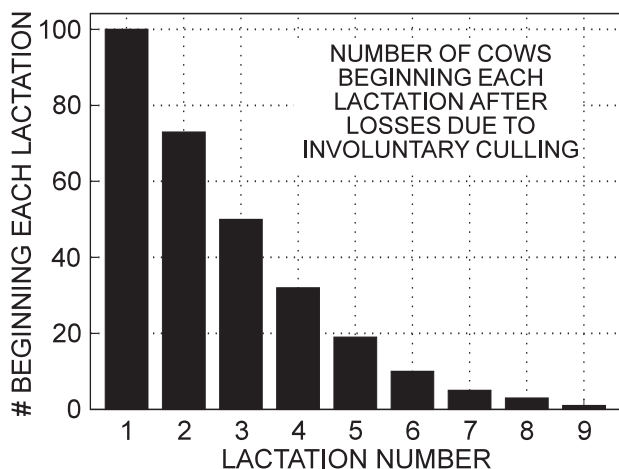


Figure 2 : Cow attrition rates derived from DHI records for the 3 prairie provinces.

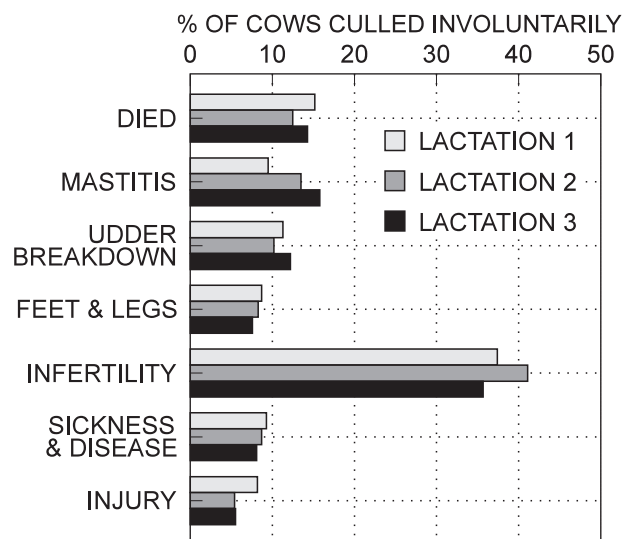


Figure 3 : Causes of involuntary culling in first 3 lactations from prairie DHI records.

‘Hot’ rations and high production are often implicated as primary causes of burnout. But DHI records demonstrate that there is little difference in the average number of lactations completed per cow when high and low producing herds are compared. Although high yielding cows are more susceptible to burnout, better management in higher producing herds prevents the added stress from limiting longevity. Because management often compensates in this way, it’s impossible to link differences in longevity between herds with the primary causes of those differences. However, by looking at the relationship between production and longevity across herds, it should be possible to establish a link, if one exists.

Analysis of the prairie DHI data revealed that every 1000 kg increase in first lactation 305-day production decreases lifetime days in milk by about 65 days. This 1000 kg increase in first lactation production was associated with an increase of only 540 kg in lifetime production. However, 305-day production in first lactation accounted for less than 3% of the cow-to-cow variation in lifetime days in milk. The bottom line is that production level is only one of many factors that can affect burnout and longevity. But production pays the bills and good management can minimize burnout in those young cows.

prepared by :
 Steve Mason, Ph.D.
 ProLivestock : Nutrition / Management Specialists
 Calgary : 284-5484