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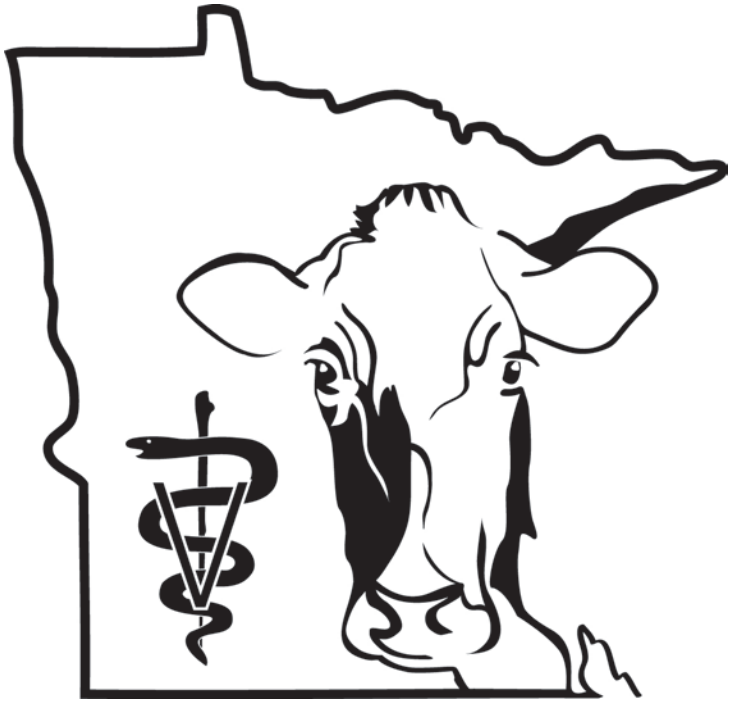

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USING RECORDS TO AID CULLING DECISIONS

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Culling decisions occur on a herd basis and an individual cow basis. Numerous studies have shown that a long herd life is important for cow profitability, but cows do need to be culled as they become less profitable than the alternatives of a replacement or empty stall.

Optimal Culling Strategies on a Herd Basis

In the U.S., average age at culling is about 60 months or after about 2½ lactations. Registered cows tend to stay in herds about 6 months longer than grades. Table 1 contains a summary of reasons DHIA producers give for culling cows.

Table 1. Percentages of cows culled for reasons as cited by DHIA herd owners[1].

DHIA termination code	% Grade Cows	% Registered Cows
Sold -- dairy purposes	14	23
Sold -- low production	42	40
Sold -- reproduction	10	8
Sold -- disease, injury	20	17
Died	5	5
Sold -- Mastitis	9	7

[1]Dentine, et al. 1987. J. Dairy Sci. 70:2616.

Generally, reasons for culling are grouped into two categories, voluntary and involuntary. Culling for dairy purposes is voluntary and results in a net financial gain if the money received for the cow is more than she would net by staying in the herd. Culling for low production is also considered voluntary and needs to be practiced at some minimal level to rid the herd of low producing, low profit cows. All other reasons for culling fall into the involuntary category. Management should be such that this category is kept to a minimum for optimal profit. Although dairy producers are asked to give a primary reason on the DHIA report why individual cows are culled, in reality individual cows are usually culled for a multiple of reasons. For example: Betsy may be just a little below average for milk production, but not poor enough to be culled. But she may also have an above average somatic cell count and already be 130 days open when first caught in estrus. It is decided to not breed Betsy and put her on the cull list for a combination of low production, poor reproduction and a high somatic cell count, even though the producer may report that the reason for culling was low production.

Rogers et al. (1988) investigated optimal culling levels for low production to maximize profits. In this study, a cow was culled when the potential net income from a replacement heifer (income minus rearing costs) was higher than the potential income for the remainder of the cow's life. The decision to cull a cow was made as early as possible

in her lactation. Cows targeted for culling were not bred back and kept until daily net income was no longer positive. Net returns per cow were maximized when 15 to 20% of 2-yr-olds were culled. Some of these were sold for injury, mastitis and breeding problems, but a number were sold for low production.

Data generated by the study are in Table 2. These data indicate that of 100 total 2-yr-olds, 82 should survive for a second lactation, 69 for a third and 56 for a fourth. Only one-third of 2-yr-olds are expected to generate enough profit to be kept for a 5th lactation.

Table 2. Optimum number of cows remaining for a subsequent lactation from an initial 100 heifers which calved.[1]

Lactation No.	No. remaining for next lactation	Percent culled per lactation
1	82	18
2	69	16
3	56	19
4	44	21
5	33	25
6	23	30

[1]From Rogers et al. 1988. J. Dairy Sci. 71:3453.

Actual culling data compiled by USDA suggests that many herd owners cull too few young cows for low production (Faust, 1993). According to the Minnesota DHIA 1994 Annual Summary, Holstein herds averaged culling rates of 12% for 1st lactation cows. Evidently the old adage "give her a second chance" is still followed. Optimum culling percentages will vary depending upon heifer replacement costs, cull cow prices, and expansion plans of the herd.

A summary of herd culling studies would indicate the optimum level of culling is between 25 and 30% for most herds (Faust, 1993). In addition, the majority of cows should be culled for voluntary rather than involuntary reasons. While culling cows for involuntary reasons should be minimized, hanging on to problem cows is not a good strategy. Instead, involuntary culling should be reduced by addressing the factors that are causing cows to leave.

Reducing Involuntary Culling in a Herd

The first step to reducing involuntary culling is to study the reasons why cows have left the herd prematurely in the last few years. Comparing these numbers to averages from other herds will help identify problem areas. Next identify the major source of the individual problems, develop improvement goals, develop an action plan, and implement it.

Management and environment account for the vast majority of differences between cows for length of productive life. Hence, changes in facilities and cow management offer the greatest opportunity for reducing involuntary culls. Put the herd on a complete mastitis control program. Analyze the reproductive problems in the herd. Feed and manage dry cows and heifers to minimize metabolic disorders at calving. Breed heifers to calving ease bulls. Develop a fresh cow transition program.

Genetics account for only a fraction of the reasons why cows leave involuntarily, but can still be important on a herd basis. A predicted transmitting ability for Productive Life (PL) is computed for all AI bulls in the U.S. The average difference for PL between the top bulls and the average bulls is about 1.5 months. This is about a 5% advantage if average productive life is around 28 months, and worth selecting for. Any genetic selection will complement efforts made in the management and environment areas but problems caused by a poor environment cannot be solved with genetics. Also, any improvement from sire selection would not be realized until 3 to 4 years later.

Decision Aids for Culling Individual Cows

To increase herd profitability we would like most of the culling to be of the voluntary nature -- culling for low production. One of the best places to begin is with the Estimated Relative Producing Ability (ERPA). ERPA is expressed as a deviation from herdmates and is an estimate of future lactation yield. ERPA is calculated by taking the average production of a cow, deviated from herdmates, and weighted for her number of records. The formula is:

$$\text{ERPA} = R \times (\text{avg. deviation from herdmates})$$

where R is the repeatability weighting factor dependent on number of records.

Number of records	Repeatability
1	.50
2	.67
3	.75
4	.80

For example, suppose a cow has three records with deviations of +2,000, +500, and +1100. Her average deviation is $1200. Her ERPA is .75 x 1200 = +900.

DHIA members receive a herd ranking twice per year in which all cows in the herd are ranked by ERPA. Improvement in milk production can be maximized when doing voluntary culling by culling off the bottom of this list. ERPA is the best single predictor of future yield.

A disadvantage of the herd ranking for ERPA is that producers only receive them twice per year. Another cow ranking tool to compare cows is the production index which appears on the monthly DHIA Lactation report. This index ranks cows by the 305 day

ME of the current lactation in progress. While the index only takes the present lactation into account, in some cases the present lactation may be more indicative of future performance than the average of past records.

Other considerations in deciding if a cow should be culled:

1. Functional physical defects such as a weak medium suspensory ligament or feet and leg problems may put cows on the potential cull list.

2. Reproductive status. If cows are bred back, it may be worthwhile to freshen them out again even if they are high on the cull list. It is best to make cull decisions early in lactation prior to when the cow is bred. This saves the cost of breeding the cow and an open cow may remain profitable longer into lactation than a pregnant cow. Regarding reproductive management, decisions also often have to be made concerning whether to breed cows that are well into lactation that if bred will have an extended lactation or long dry period. Her present production level and possibility of extending her lactation curve with BST should be taken into consideration. Many of today's high producing cows can remain profitable even with an extended lactation.

3. Somatic Cell Score. Cows that have chronic high somatic cell counts are excellent candidates for the cull list. Individual problems are culled and the herd average somatic cell count is lowered at the same time. Culling is an expensive means of reducing somatic cell counts. Unless good mastitis control measures are in place, new cows with high counts will soon replace the high count cows that were culled.

4. Another column on the DHIA sheet used to decide the best time to cull a cow slated for the chopping block is the income over feed cost. When this falls below a predetermined level for the herd (maybe $2 per day), it may be time to sell the cow.

5. Available space. Culling decisions will be influenced by space available. In stall barns, having a poor cow in the stall is generally better than having an empty stall. On the other hand, if a freshening animal needs a stall, a cow may be pushed out even if still making a net profit per day.

6. Past health history. If a cow has a history of reproductive or other health problems, they may be a candidate for culling. Remember, most of these traits have low repeatabilities, meaning they aren't apt to repeat themselves in the same animal, especially if precautions are taken.

7. Clinical problems. Whether cows with current health problems should be culled or treatment continued is dependent on several factors and the answer will be different for the different scenarios.

    a. Prognosis. What are the cow's chances of a recovery or at least chance of returning to a profitable state to pay the cost of treatment? A good herd recordkeeping program will tell the profitability of cows with similar conditions in the past.

b. Withdrawal times. If cows have already been treated with antibiotics, culling might not be an option at least until after an appropriate waiting time.

c. Available replacements. Again, if replacements are not available, treating a cow with an uncertain prognosis may be more profitable than an empty stall.

References

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