DAIRY COW CULLING AND REPLACEMENT

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INTRODUCTION

The decision on whether and when to cull or replace a particular dairy cow is one of the more complex decisions made by a dairy farmer. While in some instances the decision is involuntary due to accident, disease or death of the animal, most times some decision needs to be made.

In Australia, the Production Index (or PI) is promoted as a culling guide. As only 22% of culling decisions are because of low production (Madgwick and Goddard, 1985), other factors are taken into account by farmers in deciding whether to cull a cow. Many of these other factors are based on subjective judgement. More objective means of deciding whether and when to cull a cow would be of value in assessing replacement strategies. These strategies should be able to take into account possibilities of death or disease, and incorporate economic assessments of what it will cost to keep or replace particular animals.

Replacement policies have received a lot of attention in recent years. Gartner and Herbert (1979), Gartner (1981, 1982a, 1982b) examined the situation when replacements compete with the milking herd for resources, and looked at the dilemma of low replacement rate, low genetic improvement, higher production per cow, versus high replacement rate, higher rate of genetic improvement, possibly lower returns. How length of herdlife affects herd profitability was examined by Congleton and King (1984). Measures of the profitability of a cow include her marginal future profit over a replacement (Korver and Renkema 1979), her cost per unit of production in the present lactation, including dry period (Congleton 1984), her average monthly return (Kuipers and Shook 1980) which allows determination of when in a lactation she should be culled, and her future profitability including her production, salvage value and calves' value (Aleandri et al. 1984). Dynamic programming to develop replacement strategies has been used by McArthur (1973), Munro (1981), Stewart et al. (1978) and Van Arendank (1985). This technique incorporates probabilities of death and failure.

Ultimately, there are two questions posed by the farmer: Should I keep this cow or not? If not, when should I get rid of her? While the two questions posed seem straightforward enough, the information which goes into providing the answer is quite complex. This paper describes preliminary work on a model for Australian conditions to provide answers for these two questions for dairy farmers and their advisers with micro-computers.

METHODOLOGY

To allow examination of the factors involved in the decisions of whether and when to cull, the model is being developed as a series of modules. At the gross level, there are three areas to be examined:- factors affecting the cow herself, factors affecting the herd in which she is being milked, and economic aspects of the industry in which she is being asked to perform. Within each of these levels, a series of modules are being developed which will help in making the decision: cull this cow now.

The Cow.

Her production. The production index provides the best estimate of how well the cow is performing in her current lactation. Past PI's, age and current PI will give indications of possible future performance.

Her genetic merit. Her ABV provides a measure of her genetic worth, which in turn provides a measure of whether she is worth keeping for the value of her offspring.

Her health. Veterinary fees, and risks of health problems associated with age and previous history contribute to her profitability.

Her temperament. No farmer likes to keep a cow that kicks every milking, but is prepared to tolerate one that gives the occasional kick if she's producing well.

Her mastitis status. Previous mastitis status (cell count and clinical cases) determine her risk of being a continual mastitis risk, the cost of future treatment, and projected losses in milk yield.

Her reproductive status. Whether she is in calf or not, when she is due to calve, and her history of reproductive failure will influence the decision to keep or cull. Also of interest is which bull she is in calf to, as that could affect the value of the unborn calf.

Her type. Whether she has any serious type defects which could result in her not lasting the current or next lactation. Or whether, in a stud herd, she has show potential despite her other failings.

Other aspects. Milking ease, whether she is a recipient in a embryo transfer programme, farmers pet, are other aspects which influence the attitude to keep or cull.

The Herd.

The herd situation. Is the herd trying to build-up numbers, maintain a steady number of cows, or reduce numbers?

Replacement availability. Are there replacements available, can the farmer afford to buy replacements, do they compete for resources with the milking herd, what is their quality?

Seasonality of calving. Does the herd fit a strictly seasonal pattern? This will influence whether a cow not in calf or calving out of season should be culled.

Feed availability. What feed is available on the property, or needs to be bought in, will help to decide whether to cull a doubtful cow now, or keep her a little longer.

The Industry.

Milk Prices. Projected and current milk prices will influence return from a cow. When milk prices fluctuate throughout a season, or some quota needs to be met, it may be better to keep a cow until the end of the current lactation, rather than cull her immediately.

Cost of Replacements. If replacements need to be bought in, and reasonable production/income levels need to be maintained, the cost of buying in a replacement needs to be weighed against the cost of keeping the current cow (less her resale value as a chopper cow).

Calf Prices. Is it worth keeping the cow and mating her to a beef bull for the value of the calf?

Other prevailing prices. Such as veterinary fees, herd improvement fees, cost of feed, etc.

Each module will have a series of inputs, intrinsic relationships, and outputs. From each module, the major output will be cull or keep, or an economic asessment of the worth of the animal to allow that decision to be made.

It is intended that the system wil operate by establishing a data base initially which will contain most of the information required. Then only minor updating will be required each time the model is used. As much as possible, intrinsic relationships (i.e. information generated from another module or built into a module) will be used.

The model should provide not only a useful tool for dairy farmers and their advisers, but also answer questions for researchers.

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