Culled early or culled late: economic decisions and risks to welfare in dairy cows

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Abstract

Involuntary culling (IC) is where a cow is disposed of due to injury, poor health or infertility. The main reasons for IC are infertility, mastitis and lameness. These reasons have differing age profiles in when they affect cows, cost variable amounts to treat and have an effect on the value of the cow at market. They also reduce cow welfare in different ways. These factors influence the economically optimum cow replacement decision, which must balance the risks of future loss from the current cow against its future prospects and the net costs of a replacement. So the farmer's economic decision as to when to cull a cow may not occur at the same time as when the cow could, and sometimes should, be culled to maximise her welfare. To explore this dilemma, we developed a Dynamic Programme (DP) model to assess the optimum replacement policies for each of 180 possible cow states (12 parities and 15 milk-yield levels) under a simplified set of alternative husbandry systems and remedial practices. The DP was used to explore the relationships between financial outcomes, investment in improving welfare, lifespan and IC in dairy systems. There is a trade-off between dairy cattle lifespan and risk of suffering over which farmers have some control by the replacement and investment decisions they make. Our results show that improving cow welfare by reducing mastitis, lameness or infertility over the long term increases the mean longevity of the herd and also reduces the potential of long-term suffering resulting from chronic conditions. Additionally, it has the effect of increasing replacement opportunities and the annuities for each cow (£ per cow per year) mainly by increasing milk yield and reducing costly on-farm culls, creating a win-win situation for both farmer and cow.

Keywords: animal welfare, culling, dairy cows, Dynamic Programme, economic values, longevity

Introduction

Dairy cows are culled (defined as a cow being euthanised on-farm or being sold for slaughter into the human food-chain or disposal of the carcase) at the end of their working life due to low milk yield, if there is an untreatable health or welfare problem, or if the cow is unable to become pregnant during lactation. The relationships between the factors leading to culling, whether or not the farmer has been able to actively make the decision to cull the cow and the timing of where within the cow’s potential lifespan that culling occurs, affects the overall cost to the farmer. These factors also affect the welfare of the cow. There have been a number of recent reviews on culling (eg Forbes et al 1999), the reasons for culling (eg Logue et al 2000), and decision-support tools for farmers on optimising financial outcomes for the farmer by the timing of culling (eg Kennedy & Stott 1993). This study aimed to build on that research by examining trade-offs between the humane end-points for the cow and the optimum culling decision from the farmer’s financial point of view.

There are two main reasons why culling occurs (Fetrow et al 2006). Animals that the farmer chooses to cull for his/her own reasons (the animal makes way for one with higher potential) are culled ‘voluntarily’ (voluntary culling: VC). VCs are usually sold for slaughter into the human food chain. Some farmers will also include the cows they have sold ‘in-milk’ as VCs (ie the cows sold to another farm mid-lactation carrying on as a productive animal at their new farm — usually due to a lower yield than required on the first farm) but these are not strictly covered by the term ‘cull’ and are not counted as such in our modelling process. ‘Involuntary culling’ (IC) is where a farmer must dispose of a cow before he/she would otherwise choose to because of injury, poor health or infertility in the cow. IC cows may be milked part-way or throughout the lactation and sold direct to slaughter for human consumption or other use depending on the carcase grade (Shemeis et al 1994). IC also includes those cows that die on-farm due to accident, injury or are euthanised. Total culling rates include both VC and IC. Recent studies have estimated the UK total culling rate to be 22–25% per year (Whitaker et al 2000; Bell et al 2010; Orpin & Esslemont 2010). This is lower than the USA rate of...