A herd health approach to dairy cow nutrition and production diseases of the transition cow

[1]F.J. Mulligan, [1]L. O'Grady, [2]D.A. Rice and [1]M.L. Doherty

[1]School of Agriculture, Food Science and Veterinary Medicine,University College Dublin

[2]Nutrition Services International, Randalstown, Co. Antrim, Northern Ireland

Abstract

This paper presents a practical, on-farm approach for the monitoring and prevention of production disease in dairy cattle. This integrated approach, should be used in an interdisciplinary way by farmers, veterinarians, nutrition advisors and other relevant professionals for the improvement of animal health and welfare and producer profitability. The key areas that form the basis for this approach are body condition score management, negative energy balance, hypocalcaemia, rumen health and trace element status. Monitoring criteria are described for each of these key areas facilitating the assessment of dairy cow health with regard to clinical and subclinical disease. The criteria, which are informed by published scientific literature are based on farm management and environmental factors, clinical data, milk production records, dietary analysis, assessment of blood and liver concentrations of various metabolites or trace elements. The aim is to review the efficacy of production disease control measures currently in place, and if necessary to modify them or formulate new ones.

Introduction

Some of the most important aspects of producer profitability in dairy farming are the costs associated with replacement rates and infertility. Given the need for cost efficient dairy production systems going forward, it is important that we try and reduce the levels of involuntary culling that currently occur on dairy farms across the world. This approach will prevent the leaking of profit in replacement and infertility costs and will improve the opportunity available to dairy farmers to increase profitability by increasing the herd's genetic merit.

The nutrition and management of dairy cows has a significant influence on many of the transition cow production diseases that result in higher levels of involuntary culling, reduced fertility and reduced dairy cow welfare. This paper presents a practical, on-farm approach for the monitoring and prevention of production diseases in dairy cattle. The integrated approach proposed, should be used in an interdisciplinary way by farmers, veterinarians, nutrition advisors and other relevant professionals for the improvement of animal health and welfare and producer profitability. The key areas that form the basis for this approach are body condition score management, negative energy balance, milk fever, rumen health and trace element status (Mulligan et al., 2006).

Why monitoring herds for production diseases is important

When considering the cost of production diseases it is important to realise that producers are not only faced with the cost of treating dairy cows for specific conditions (eg milk fever), but they often incur additional consequential costs. For example, dairy cattle that develop milk fever are eight times more likely to develop mastitis and have been shown to have a reduced fertility in the next lactation. Therefore, while we might know that the average direct cost of one case of milk fever is approximately €312 (Ryan and O'Grady, 2004), the consequential cost is likely to be much greater. Furthermore, apart from the losses arising from the clinical diseases we detect, the losses arising from insidious sub-clinical disease in herd mates, together with the proven deleterious consequences for reproductive performance, lameness and mastitis, make the prevention of these nutritionally related production diseases of paramount importance, for financial and animal welfare reasons. Therefore the concept of a preventative approach to dairy cow nutrition and production diseases has great potential to assist farmers by providing increased profitability and reassurance regarding the health status of the farm livestock.

While it is important to have an idea of the average level of production diseases for dairy cows in different production systems, it is equally important to be able to monitor dairy herds to predict which herds have problems with conditions such as ruminal acidosis or energy balance in early lactation and which ones do not. It is only after this monitoring process can we make a decision regarding the appropriate nutrition and management of these herds to prevent reduced performance and ill health. This point is most easily demonstrated when one considers the question of whether or not concentrate supplementation level should be increased to improve energy balance for early lactation dairy cows. It is our view that this question can only be answered after the dairy herd has been subjected to a valid monitoring process for energy balance in the current nutritional scenario. The results of this monitoring process will reveal that some herds have acceptable levels of energy balance and some do not. It is this latter group only that may benefit from increased levels of supplementation.

The approach used

The preventative approach presented is based on the monitoring of body condition score (BCS) at drying-off, at calving, at AI or breeding and twice in late lactation. Targets have been set for BCS at these key stages in the lactation cycle based on published literature. It is our view that sadly too few farmers focus on monitoring BCS in their dairy herds.

A monitoring tool is presented for energy balance in early lactation, which is of course important for optimal fertility and low rates of involuntary culling. This section of the monitoring approach uses criteria such as milk protein percentage, milk fat : protein ratio, BCS loss in early lactation,

and blood metabolite analysis together with environmental factors such as feed trough space and assessment of grazing severity to try and identify herds where energy balance in early lactation is excessively negative and may potentially reduce fertility.

Milk fever is still the most important macro-mineral disorder of dairy cows and has been linked to other conditions such as retained placenta, mastitis, reduced fertility and reduced feed intake in early-lactation. We still find many Irish farms with high levels of clinical milk fever and this together with the high rates of sub-clinical milk fever reported (up to 50%) make the prevention of this condition a must for good production and reproduction.

Sub-acute ruminal acidosis has important implications for feed intake, lameness and fertility. Recent published research from Australia and our own pilot research would indicate that there are some grazing dairy herds that have quite a high level of sub-acute ruminal acidosis (SARA). The low fibre and high moisture levels often found in temperate climate region grasses may mean that we should be more careful in supplementation of grazing cows. Not all farms are affected, and again it is important to differentiate the lower proportion farms that have a SARA problem from those that do not. The criteria presented for this monitoring include: rumen pH, milk fat percentage, the difference in milk fat and protein percentage, locomotion scoring, the incidence of laminitis in a herd and the level of fibre in the diet that comes from forage.

The final area considered in the preventative strategy for production diseases is trace element status. The emphasis is placed on Copper (Cu) Selenium (Se) and Iodine (I). However, regional variation should be considered in assessing the trace element status of a dairy herd. Herd investigation strategies are discussed for trace element status. Some of these trace elements play important roles in transition cow health and subsequent fertility For example; we often find retained placenta problems that respond to Se supplementation. The retained placenta is likely to reduce fertility in the next lactation and if a uterine infection develops feed intake is also likely to be lower than optimal.

Conclusion

Production diseases that are preventable often reduce dairy farm profitability. The development of a strategy for the prevention of production diseases in dairy cows relies upon the use of optimal nutritional and management strategies, as well as the close monitoring of clinical and sub-clinical disease. Criteria have been presented that may be used in the monitoring and prevention of production diseases. Ideally herds should be assessed using the suggested monitoring criteria in each key area, facilitating the assessment of the preventative measures currently being employed. This exercise will also facilitate the diagnosis of sub-clinical conditions and characterise the overall prevalence of production disease. The integrated approach described has been used effectively in many dairy herd health investigations in Ireland, and opportunities exist to assess its impact in terms of animal health and profitability in detail.

References

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