



Associations between sole ulcer, white line disease and digital dermatitis and the milk yield of 1824 dairy cows on 30 dairy cow farms in England and Wales from February 2003–November 2004

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Abstract

The milk yields of 1824 cows were used to investigate the effect of lesion-specific causes of lameness, based on farmer treatment and diagnosis of lame cows, on milk yield. A three-level hierarchical model of repeated test day yields within cows within herds was used to investigate the impact of lesion-specific causes of lameness (sole ulcer, white line disease, digital dermatitis and other causes) on milk yield before and after treatment compared with unaffected cows. Cattle which developed sole ulcer (SU) and white line disease (WLD) were higher yielding cattle before they were diagnosed. Their milk production fell to below that of the mean of unaffected cows before diagnosis and remained low after diagnosis. In cattle which developed digital dermatitis (DD) there was no significant difference in milk yield before treatment and a slightly raised milk yield immediately after treatment. The estimated milk loss attributable to SU and WLD was approximately 570 and 370 kg, respectively. These results highlight that specific types of lameness vary by herds and within herds they are associated with higher yielding cattle. Consequently lesion-specific lameness reduction programmes targeting the cow and farm specific causes of lameness might be more effective than generic recommendations. They also highlight the importance of milk loss when estimating the economic impact of SU and WLD on the farms profitability.

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1. Introduction

A number of studies have now reported that higher yielding cows are more likely to become lame (Dohoo and Martin, 1984; Rowlands and Lucey, 1986; Barkema et al., 1994; Green et al., 2002). These lame cows might produce absolutely less milk than unaffected cows (Tranter and Morris, 1991; Warnick et al., 2001; Hernandez et al., 2002) or less milk than their potential as demonstrated by Green et al. (2002) and as predicted by Rowlands and Lucey (1986).

This is of huge economic importance with the current high prevalence of lameness in dairy cows, estimated to be 15% in the USA (Wells et al., 1993) and 22% in England (Whay et al., 2002). Milk loss per cow because of lameness has been estimated to be 440 and 270 kg for early lactation and mid to late-lactation, respectively, in France (Coulon et al., 1996); 1.5–2.8 kg/day two weeks from diagnosis in Finland (Rajala-Schultz et al., 1999); 1.5 kg/day two weeks from diagnosis in the USA (Warnick et al., 2001) and up to 2 kg/day for up to 5 months before and after diagnosis in the UK (Green et al., 2002).

Few studies have differentiated the lesion-specific cause of lameness when estimating milk loss. Hernandez et al. (2002) studied 531 cows in one herd in the USA, where cows that were lame with interdigital phlegmon produced significantly less milk over a lactation than unaffected cows (7767 kg vs. 8622 kg, respectively), with no significant milk loss attributable to other foot lesions. In a study of two farms, Warnick et al. (2001) reported that on one farm cows that were lame with a sole ulcer (SU) had the greatest loss of milk, followed by sole and white line abscesses and then interdigital phlegmon with no significant effect of foot warts (digital dermatitis). However, there were no lesion-specific associations with reduced milk yield on the second farm.

One reason for the paucity of lesion-specific studies of lameness and milk yield is that whilst lameness is common, e.g., up to 70 cases/100 cows/year (Green et al., 2002), lesion-specific causes of lameness are far less common: a rate of 10 cases/100 cows/year for any one cause of lameness would be high and highly variable between farms (Green et al., 2002). Consequently, a large sample of cows with several herds is required to elucidate the associations between lesion-specific lameness and milk yield. Ideally this would be a random sample of herds, however, the compliance required from farmers to access milk records and to record treatments for lesion-specific causes of lameness make this impossible currently, certainly in GB.

As part of an EU funded project (EU funded framework 5 project OLRT-2001-00969) all 4771 cows on 30 convenience selected farms were monitored for 18 months. Farmers were trained to identify foot lesions by one veterinarian (RB) and recorded all cases of treatment for lameness from February 2003–November 2004. Individual cow productivity data were recorded on a milk quality programme (National Milk Records (NMR)). The aim of this study was to investigate the associations between milk yield and lesion-specific causes of lameness.

2. Materials and methods

The original data included 4771 cows from 30 farms in England and Wales. The data set included 55,294 test day yields (TDYs) from February 2003 to November 2004. In the final analysis only complete lactations within the study period were used in the analysis because of the potential that a cow might have become lame before or after the data collection period within the same lactation (i.e., non-random missing data). As a result, 17,140 TDY from 1824 cow complete

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