Why are sheep lame? Temporal associations between severity of foot lesions and severity of lameness in 60 sheep

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Abstract

We investigated the temporal associations between the severity of foot lesions caused by footrot (FR) and the severity of lameness in sheep. Sixty sheep from one farm were monitored for five weeks. The locomotion of each sheep was scored once each week using a validated numerical rating scale of 0–6. All feet were then examined, FR was the only foot lesion observed; the severity of FR lesions was recorded on a scale from 0 to 4. Sheep had a locomotion score > 0 on 144/298 observations. FR lesions were present on at least one foot on 83% of observations of lame sheep but also present on 27% of observations where sheep were not lame; 95% of these sheep with a lesion but not lame had FR score 1. The results from a linear mixed model with locomotion score as the outcome were that the mean (95% CI) locomotion score of 0.28 (0.02, 0.53) in sheep with no lesions increased by 0.35 (0.05, 0.65) in sheep with FR score 1 or 2 and by 1.55 (1.13, 1.96) in sheep with FR score > 2 at the time of the observation; indicating that as the severity of the lesion increased, the severity of lameness increased. One week before an FR score > 2 was clinically apparent, sheep had a locomotion score 0.81 (0.37, 1.24) higher than sheep that did not have an FR score > 2 in the subsequent week. One week after treatment with intramuscular antibacterials the locomotion score of lame sheep reduced by 1.00 (0.50, 1.49). Our results indicate a positive association between severity of FR lesions and locomotion score and indicate that some non-lame and mildly lame sheep have footrot lesions. Treatment of even those mildly lame will facilitate healing and probably reduce the spread of infection to other sheep in the same group.

Keywords: animal welfare, footrot, lameness, locomotion, multilevel model, sheep

Introduction

Lameness has a considerable impact on the welfare of sheep by causing pain and discomfort (Fitzpatrick et al 2006). It also leads to significant production losses (Marshall et al 1991), eg poor body condition in ewes, which leads to production of fewer lambs and increased ewe and lamb mortality. In contrast, no lameness or lameness of a short duration and low severity, because of prompt treatment, has been associated with few ewe and lamb deaths, good body condition in ewes and fast growth rates in lambs (Wassink et al 2010).

Sheep farmers in the UK attribute > 90% of lameness in their sheep to footrot (FR) (Kaler & Green 2008a), with 60% presenting as interdigital dermatitis with no separation of the hoof horn (FR scores 1 or 2 [Egerton & Roberts 1971]) and 40% with interdigital dermatitis and separation of the hoof horn (FR scores 3 or 4). The strain of Dichelobacter nodosus and the environment play an important role in the spread and severity of FR. Warm, moist conditions soften the interdigital space and predispose sheep to interdigital damage. Skin damage facilitates invasion of D. nodosus, the causal agent of FR, (Beveridge 1941) leading to development of FR with a range of severities. Warm, moist conditions also facilitate survival of D. nodosus on pasture for 7–14 days, where it can spread from sheep-to-sheep (Beveridge 1941).

In a recent study (Kaler & Green 2008b), when farmers were shown video footage of sheep with a range of locomotion scores (Table 1; Kaler et al 2009), farmers could identify lame sheep of locomotion score 2 or higher with ease. However, only 50% of these farmers said that they would catch a sheep with a locomotion score of 2 with the intention of treating it when it was the only lame sheep in a group. The remaining 50% said that they would not inspect a sheep until it was lame with a locomotion score of > 2. These latter farmers considered that mildly lame sheep were not ‘lame enough’ to treat.

Remarkably, there has been no study to-date to investigate the relationship between lameness and FR lesions in sheep. If even mildly lame sheep have FR lesions then delaying treatment affects a sheep’s welfare and productivity and might lead to progression of disease, in addition, if these sheep are infectious, delayed treatment will facilitate trans-