

IDENTIFYING THE CAUSES OF LAMENESS: ON FARM DATA COLLECTION METHODS FOR A COHORT STUDY

Zoe E. Barker*, J.R. Amory*, N.R. Brassey*, R.W. Blowey[§], L.E. Green*

* Ecology and Epidemiology Group, Dept. of Biological Sciences, The University of Warwick, Coventry, CV4 7 AL, United Kingdom

[§] Wood Veterinary Group, St Oswalds Road, Gloucester, GL12SJ, Gloucestershire UK

Introduction

Lameness encompasses a whole range of diseases and conditions that impair walking. As such identifying the causes of 'lameness' is inherently difficult. Some risk factors for specific feet and leg conditions have been identified in previous studies. For example, floor type, cubicle dimension, stage of lactation and milk production have been demonstrated to be associated with lameness in cattle (Faull et al., 1996; Leach et al, 1997; Green et al, 2002; Webster, 2002). As yet the relative importance of such factors has not been investigated and the associations between specific causes of lameness and management, environment and individual cow characteristics has not been fully elucidated.

This study aims to identify environmental and management conditions that influence the level and type of lameness on 53 dairy farms in England and Wales. The study uses data on occurrence of lameness collected by the farmers together with a range of recording techniques collected at visits to the farms. The data collection techniques and data collected at each visit to the farms are described below.

Materials and Methods

Fifty-three dairy farms in England and Wales were enrolled into the study in February 2003. The farms vary both in size (27-450 cows) and geographical location (Cornwall, Devon, Somerset, Dorset, Gloucestershire, Wiltshire, Oxfordshire, Warwickshire, Staffordshire, Derbyshire, Yorkshire, Cheshire, Lancashire and Wales). One, or more, of three recorders; Zoe Barker (ZB), Rebecca Brassey (RB) and Jonathan Amory (JA) are visiting each farm 3-4 times between February 2003 and March 2004 (Table 1).

Recording lameness

The lesion recording form (Figure 1) has been provided to farmers/herdsmen and is been completed and returned by post each month. This is used to record the type and position of lesions. The age and production of each cow will be collected from national milk records.

Figure 1. Lesion recording form completed by farmer/herdsmen during foot trimming, one row per foot

Cow number identity	Site of lesion (place a cross)	Foot affected (circle one only)	Lame (circle one)	Lesions seen (circle all appropriate, star * cause)	Date today dd/mm/yy	Time in milk (weeks)	Who trimmed foot (circle all appropriate)
		LF RF LH RH	Sound Not sound Definitely lame Hobbling	Sole ulcer White line Digital dermatitis Foul Other (please state) _____			Farmer Foot Trimmer Vet

Definitions of observations made at the visits

All milking and dry cows present on the farm are locomotion scored, scored for cleanliness and hock damage; these scores may vary with time, and so are made at each visit (Table 2). The method for locomotion scoring is based on that described by Sprecher *et al.*, (1996)

which assesses the posture of the animal through the presence or absence of an arched back when walking and standing. The method was validated on farm to ensure good agreement between recorders. Faecal consistency scores (Hughes , 2001) (Table 3) are also made at each visit.

Permanent structures on the farm such as buildings, yards, tracks and walkways are not expected to vary between visits so have been assessed once either at summer or winter visits. The observations are comprised of visual assessments and measurements of dimensions of e.g. cubicles, tracks and buildings. Methods to determine the suitability of the cubicles in terms of size and comfort are currently being developed and will be used during visit 4.

A farmer interview was done at visit 2. This requested data on the management of all aspects of the dairy system, including housing, breeding, nutrition and herd health. A second questionnaire will be completed at the final visit and is designed to gauge farmers' attitudes to their system and lameness in their herds.

Table 1 – Timing of farm visits and observations made

	Visit 1	Visit 2	Visit 3	Visit 4
Time	Feb-May 03	June-Aug 03	Nov- Dec 03	Jan – Mar 04
Number of farms visited	53	52	<51	51
Location of herd	Housing/ early turnout	Summer Grazing	Early winter housing	Late winter housing
Recordings Taken				
<i>From each identified cow</i>				
Locomotion score	✓	✓	✓	✓
Cleanliness of hind quarters	✓	✓	✓	✓
Evidence of hock damage	✓	✓	✓	✓
<i>From the environment</i>				
Assessment of bedding quality and quantity	✓		✓	✓
Consistency of faecal pats	✓	✓	✓	✓
Observations of summer environment		✓		
Observations of winter environment			✓	✓
Observations of cubicle use				✓
<i>From the farmer</i>				
Records of all foot trimming, posted each month				
Farmer interview Questionnaire		✓		
Final interview Questionnaire				✓

Table 2 – Scores used to assess cow condition and environment

	Score 1	Score 2	Score 3
Locomotion scores (all cows)	Flat back when standing Flat back when walking	Flat back when standing Arched back walking	Arched back when standing Arched back when walking
Cow cleanliness (all cows)	Completely clean hind quarters	Dirty feet and legs	Dirty feet, legs and flank
Hock damage (all cows)	No Lesions on hock	Lesion(s) visible on hock	Severe lesion, bleeding or swelling
Bedding cleanliness (all houses)	Bedding clean and dry	Bedding lightly soiled but dry	Bedding heavily soiled and wet
Bedding depth (all houses)	Bedding deep and even	Bedding uneven and patchy	Lack of Bedding

Table 3 – Faecal scoring system (Hughes 2001)

DESCRIPTION	SCORE
Dehydrated - Dry and stiff	1
Normal - Circular pat with depression in centre	2
Loose - Slightly liquid, and thinly spread	3
Liquid – Thin watery faeces, may be abnormal colour or contain undigested forage	4

Results

The scores used to assess the cows condition and their environment have been a successful method to collect data on the farms, with minimal disruption to the farmers/herdsmen. The main problem remains the identification of cows with dirty or faded brand numbers during locomotion scoring if either the farmer/herdsman is not available or the cows are exiting the parlour in large groups. The cow cleanliness score may not be as sensitive as hoped as the feet of very few cows remain completely clean so over 99 per cent of cows in visits 1 and 2 were score 2 or 3.

There was 100% compliance for the farmer interview questionnaire. The data collected may be prone to recall bias because of differing opinions among the farmers/ herdsmen as to its importance (Martin et al, 1987). However, our direct observations will assist in assessing the internal validity of the study.

Visit 3 is currently under way and observations of the winter housing are being made. Farmers/herdsmen remain enthusiastic and continue to return lesion recording forms regularly. To date, two farms have withdrawn from the study. One farmer has sold her herd and another reduced herd size and extra responsibilities.

Conclusions

The data on potential risks will be compared with locomotion score and lesion records and the significance of these risk factors determined. The final aim is to produce a clear list of recommendations specific to farms, which farmers may use as a tool to reduce lameness in their herd.

Acknowledgements

This study is part of LAMECOW an EU funded project (OLRT-2001-00969). The methods described have been developed in conjunction with all participants.

References

- FAULL, W.B., HUGHES, J.W., CLARKSON, M.J., DOWNHAM, D.Y., MANSON, F.J., MERRIT, J.B., MURRAY, R.D., RUSSELL, W.B., SUTHERST, J.E., AND WARD, W.R. (1996). Epidemiology of lameness in dairy cattle: the influence of cubicles and indoor and outdoors walking surfaces. *Vet Rec.* **139**:130-136
- GREEN, L.E., HEDGES, V.J., SCHUKKEN, Y.H., BLOWEY, R.W. AND PACKINGTON, A.J. (2002). The impact of clinical lameness on the milk yield of dairy cows. *J. Dairy Sci.* **85**:2250-2256
- HUGHES J. (2001). A system for assessing cow cleanliness. In *Practice* **23** 517-524/
- LEACH, K.A., LOGUE, D.N., KEMPSON, S.A., OFFER, J.E., TERNENT, H.E., AND RANDELLS, J.M. (1997) Claw lesions in dairy cattle: development of sole ulcer and white line haemorrhages during the first lactation. *The Vet. Journal.* **154**: 215-225
- MARTIN, S.W., MEEK, A.H. AND WILLEBERG, P. (1987) *Veterinary Epidemiology, principles and methods.* Iowa State University Press, Ames, Iowa.
- SPRECHER, D.J., HOSTLER, D.E., AND KANEENE, J.B. (1996). A lameness scoring system that uses posture and gait to predict dairy cattle reproductive performance. *Theriogenology.* **47**:1179-1187.
- WEBSTER, A.J.F. (2002) Effects of housing practices on the development of foot lesions in dairy heifer in early lactation. *Vet Rec.* **151**:9-12