Key housing and management factors affecting lameness levels on Northern Ireland dairy farms

L.G. Baird[1], D.N. Logue[3], A.F. Carson[1], M.A. McCoy[2], N.E. O'Connell[4]
[1]Agri-Food and Biosciences Institute, Hillsborough, United Kingdom, [2]Department of Agriculture and Rural Development for Northern Ireland (Veterinary Service), Lurgan, United Kingdom, [3]University of Glasgow Veterinary School, Glasgow, United Kingdom, [4]School of Biological Sciences, Queens University Belfast, Belfast, United Kingdom
Email: niamh.oconnell@qub.ac.uk

Introduction Lameness in dairy cows continues to have a negative effect on the welfare of affected animals, on the economics of dairy production and on consumer perception of the dairy industry. The aim of the current study was to identify the farm management and housing factors most associated with lameness in dairy cows.

Materials and methods Fifty-nine dairy farms in Northern Ireland were visited once during the winter housing period of either 2005/6 or 2006/7. Farms were selected on the basis of being participants in a previous postal survey, and through recruitment at dairy discussion groups and exhibitions. Farms were located in each of the 6 counties in Northern Ireland, and were selected with no prior knowledge of lameness levels. The farms had an average milking herd size of 138 ± 53 cows (mean $\pm$ SD), and average 305-day milk yield of 8284 ± 1543 litres. Forty-nine farms had at least 90 % purebred Holstein cattle. A one-hour interview with a set questionnaire was carried out with the person who made the majority of lameness management decisions. The questionnaire gathered the following farm information: mixed enterprise (yes or no), herd size (≥ 135 or < 135 cows), amount of concentrates fed (> 2.2 or ≤ 2.2 tonnes/cow/year)), average milk yield (>8500 or ≤ 8500 l/lactation), % Holstein in herd (100% or <100%), winter forage (grass silage only or alternative forages included), floor type used in cubicle houses (slats, solid or a mix of slats and solid), whether or cubicle houses were overstocked (yes or no), whether or not flooring of cubicles was concrete (i.e. no mat/mattress) (yes or no), the foot trimming regime used (once per year, as needed, only lame cows, never), if a footbath is used on the farm (yes or no), how soon mild cases of lameness are treated (within 1 day, 2 days, 3-4 days, 5-7 days, or after more than 7 days/ never). The following housing factors were judged by visual assessment: floor maintenance (excellent, good, average/poor), if adequate bedding was provided in cubicles (yes or no), the overall comfort level of cubicles (excellent, good, average/poor), the overall cleanliness of passageways (excellent, good, average/poor). All cows in the milking herd were assigned a locomotion score of between 1 and 5 during the same visit (Flower and Weary, 2006). Cows assigned a score of 3 or higher were considered clinically lame (score 3 = slight limp detected). Two farms were excluded from final analysis, and the locomotion score of 6292 cows was included in final analysis. The response variables assessed were % of cows with a locomotion score greater than or equal to 3 or 4. Associations with explanatory variables detailed above were assessed using linear regression analysis. Any relationship with a probability value less than 0.25 was allowed to go forward to stage 2 ("Best Subsets Regression"). The Akaike Information Criterion was used to select the best model for each response variable.

Results The number of lame cows (locomotion score 3 or higher) as a percentage of the cows scored on each farm ranged from 1.5 to 74.7 % (mean: 32.6, SD: 14.1). The mean prevalence for lameness score 4 or higher was 3.9 % (SD: 4.03). The main variables associated with lameness (score 3+) are listed below (Table 1).

Table 1 Influence of management and housing factors on the percentage of lame cows (score 3+) in herds

Variable	Levels	Predicted mean	Lower C.I.	Upper C.I.	P
Concentrate feeding level	High (above 2.2 tonnes/animal/yr)	39.41	31.70	47.39	
	Low (less/equal to 2.2 tonnes/animal/yr)	28.94	23.71	34.47	<0.05
Flooring	Slats[b]	41.84	35.28	48.56	
	Solid[ab]	32.21	22.16	43.17	
	Slats/solid[a]	28.49	22.57	34.81	<0.01
Concrete in cubicle	No	29.78	25.20	34.58	
	Yes	38.51	29.87	47.53	<0.06
Cubicle comfort	Excellent[a]	28.77	19.72	38.77	
	Good[a]	30.97	25.11	37.16	
	Average/poor[b]	42.86	35.32	50.57	<0.05

[ab]Levels within the same variable with a different superscript differ significantly

The variables associated with severe lameness (score 4+) were the same as those listed above, except that 'concentrate feeding level' was replaced in the model by 'winter forage'. The predicted mean level of severe lameness was higher when alternative forages were used rather than grass silage as the sole forage (P<0.07).

Conclusions These results suggest that farmers should ensure that cubicles are comfortable by providing mattresses or mats and adequate bedding, and by replacing outdated designs. The negative effect of slats may have been related to the fact that often they were not cleaned. Housing and feeding factors appeared relatively more important than the lameness management strategy used on farm.

References

Flower, F.C. and Weary, D.M. 2006. Effect of hoof pathologies on subjective assessment of dairy cow gait. Journal of Dairy Science 89, 139-146.