The effect of the “Comfort Slat Mat” on hoof health of dairy cows

Summary report of a field study on Dutch Dairy Farm

Farm inspected: July and August 2013

Commissioner: Beerepoot Agri, Irish Custom Extruders Ltd

Project carried out by The Dutch Hoof Health Centre

Introduction

The Dutch Hoof Health Centre has been asked to assess the effect of the "Comfort Slat Mat" on hoof health in dairy cattle. As previous studies around the world demonstrated, lameness affects Dry Matter Intake and subsequently milk yield (Table 1), body condition score, fertility and therefore causes major losses to the farmer.

Table 1. Effect of lameness on Dry Matter Intake and Milk Yield*

	DM Intake	Milk Yield
Locomotion Score	---- *% reduction vs. locomotion score=1* ----	
2	1	0
3	3	5
4	7	17
5	16	36

* from P.H. Robinson, University of Colorado

Another important area is animal welfare. In a study on welfare indicators, 24 European welfare experts were asked to rank animal based indicator in dairy cows to assess on-farm animal welfare. The results indicated that "the number of lame animals", and related indicators like "hock score" an "locomotion score" ranked within the top 10 most important indicators (Lievaart & Noordhuizen 2011)

Studies on the incidence or prevalence of lame cows including which conditions are rare. A recent study in The Netherlands reported that 80% of cows in barns with slats have "a" conditions, but not all of these 80% were lame. It indicates subclinical lameness is an important area as well (Somers, et al. 2003).

The aim of the study was to assess the effect of the "Comfort Slat Mat" on hoof health in dairy cows and compare this to other studies around the world.

Materials & Methods

For the selection of the farms Beerenpoot Agri handed over contact details of farms which met the following criteria

1. cows housed indoor permanently

2. the floor was installed at least 1 year ago

Subsequently the researcher made a random selection of farms to visit and approached farmers for an appointment during milking time or when a milking robot was installed during feeding time. Cows were therefore either monitored during exciting the milk parlour or when walking to the feeding pad. If cows were not standing up after feeding at the farms with the milking robot, they were gently

forced to stand up and walk away from the researcher. Only the milking herd was assessed, not dry cows nor young stock.

The method used to assess the mobility of cows was a qualitative locomotion score with a scale from 1 to 5 also known as the Sprecher method (see appendix 1).

Score 1	Description	Goal (% of the herd)*
1	Normal	65
2	Mildly lame	20
3	Moderate lame	15
4	Lame	0
5	Severe Lame	0

* Cook, Wisconsin University

This method is frequently used in research and seen as one of the standard methods for mobility score of cows.

In total 8 farms were visited and all cows within the milking herd were assessed. As an addition also data on management and environment regarding hoof trimming, foot bathing and treatment protocols were collected.

Results

On average 121 cows per farm (range 66, 200) were assessed for a locomotion score with a scale from 1 to 5.

Table2. Number of cows assessed and divided per category of locomotion score (absolute numbers)

Farm	No. Cows	Locomotion score 1	Locomotion score 2	Locomotion score 3	Locomotion score 4	Locomotion score 5
A	71	59	9	3	0	0
B	94	85	7	2	0	0
C	66	60	2	4	0	0
D	160	141	12	5	2	0
E	132	127	5	0	0	0
F	200	173	13	9	5	0
G	160	145	7	3	2	3
H	85	76	2	4	3	0

Table3. Number of cows assessed and divided per category of locomotion score (percentage)

Farm	% Locomotion score 1	% Locomotion score 2	% Locomotion score 3	% Locomotion score 4	% Locomotion score 5
A	83,1%	15,3%	4,2%	0,0%	0,0%
B	90,4%	8,2%	2,1%	0,0%	0,0%
C	90,9%	3,3%	6,1%	0,0%	0,0%
D	88,1%	8,5%	3,1%	1,3%	0,0%
E	96,2%	3,9%	0,0%	0,0%	0,0%
F	86,5%	7,5%	4,5%	2,5%	0,0%
G	90,6%	4,8%	1,9%	1,3%	1,9%
H	89,4%	2,6%	4,7%	3,5%	0,0%
Average	89,4%	6,8%	3,3%	1,1%	0,2%
Min	83,1%	2,6%	0,0%	0,0%	0,0%
Max	96,2%	15,3%	6,1%	3,5%	1,9%

Figure 1. Percentage lameness score per category on each farm (only category 1 highlighted)

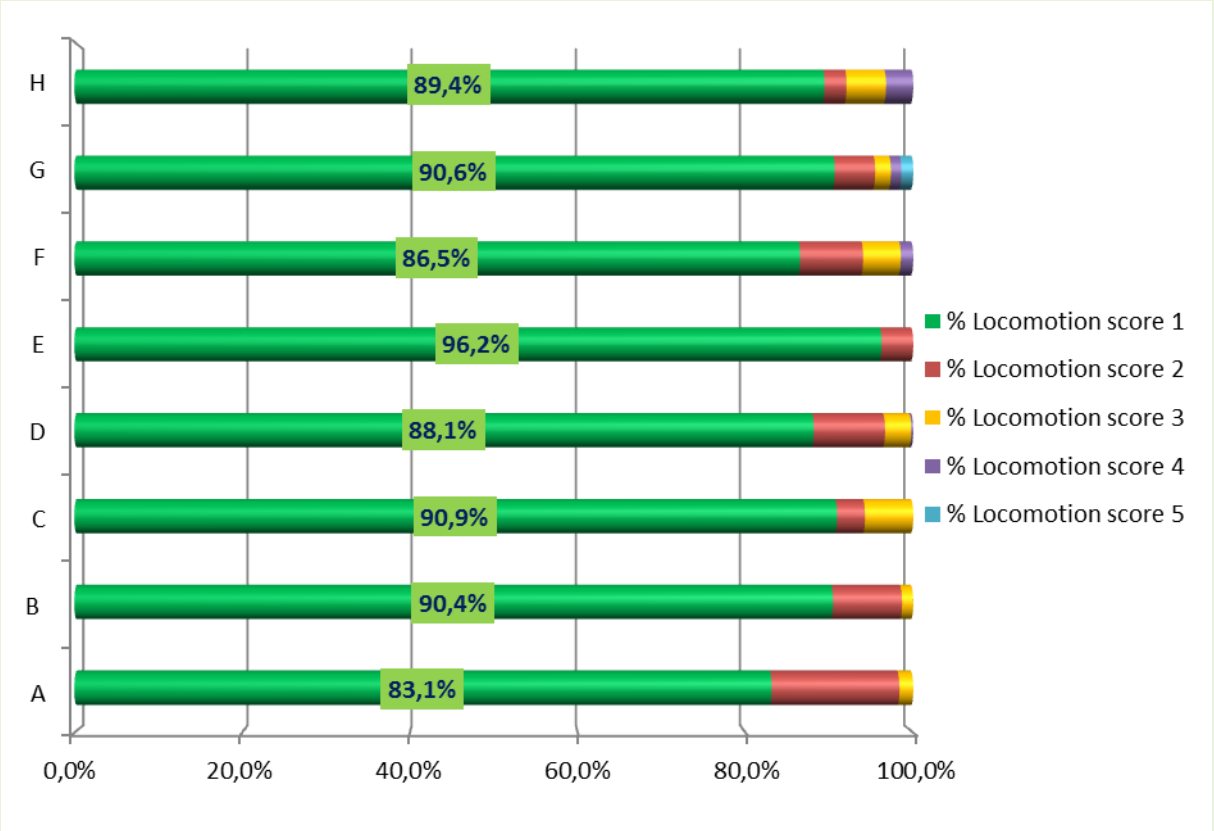


Table 4. Other information per farm included in the trial

Farm	No. Cows	Robotic Milking	Score > 1 (%)	Automatic Manure Scraping	Footbath frequency	Trimming Frequency
A	71	no	16,9%	no	weekly	6 months
B	94	yes	9,6%	yes	3 months	6 months
C	66	partly*	9,1%	yes	not applied	only when needed
D	160	partly	11,9%	no	fortnight	dry off / 100 days
E	132	yes	3,8%	no	weekly	dry off / 100 days
F	200	no	13,5%	no	weekly	dry off / 100 days
G	160	no	9,4%	no (twice daily with tractor)	weekly	6 months
H	85	yes	10,6%	yes	not applied	6 months

* a small percentage was still milked in the old milking parlour

Comparison to other studies

A cross-sectional study conducted assessed 5626 Holstein cows housed in 50 free stall barns in Minnesota during summer. Locomotion and body condition scoring were performed on a total of 5,626 cows in 53 high-production groups (Espejo, et al. 2006). The mean prevalence of clinical lameness (proportion of cows with locomotion score >or=3 on a 1-to-5 Sprecher scale was 24.6%. Data indicate that the best 10th percentile of dairy farms had a mean prevalence of lameness of 5.4% with only 1.5 % of cows with locomotion score = 4 and no cows with locomotion score = 5(Espejo, et al. 2006).

A study of 24 selected free-stall farms in Transylvania was assessed based on the locomotion score devised by Sprecher et al. The percentage of cows with different locomotion scores was established. The lameness prevalence was calculated as the proportion of cows with locomotion score 3 or more. Of the 2519 cows assessed, normal locomotion was found in 27.04% in winter (24.69% in summer), slight lameness in 40.69%, (45.30% in summer), moderate lameness in 27.87% (25.96% in summer), lameness in 3.33% (2.82% in summer) and severe lameness in 1.07% (1.23% in summer) (Popescu et al. 2013)

In a Danish study of 1340 cows on 42 dairy herds the locomotion score was 38% (score 1), 33% (score 2), 17% (score 3), 9% (score 4) and 3% (score 5)(Thomsen, et al. 2012). In a study in the England and Wales on 205 dairy farms between October 2006 and May 2007 milking cows were locomotion scored (lameness scored) using a 4-point scale (0 = sound locomotion, 1 = imperfect locomotion, 2 = lame, 3 = severely lame). The mean prevalence of lameness (scores 2 and 3) across the study farms was 36.8% (range = 0–79.2%)(Barker, et al. 2010).

In the US, Brotzman et al. scored 66 herds and found on average 13.2% cows belonging to scored 3,4 and 5 (Sprecher 1-5 scale).

A study in Chili by Galleguillos and Bokert, 11829 cows in 23 herds, were assessed on a 1 – 3 scale, meaning 1 being normal, 2 abnormal and 3 an arched back. The cows were scored ones and 81.5% had score 1 meaning no clinical lameness, 4.7% a score of 2 and 13.7% a score of 3. In this case on

the score 1 (normal) can be used to compare as the other two scores 2 and 3 are a different classification compared to the Sprecher system.

In a study of Akin in the United States 3022 cows were assessed on 6 farms using the Sprecher method. The number of cows reported 63% of the cows had a locomotion score of 1 , 24% a score of 2, 8% a score of 3, and 5% a combined score of 4 and 5.

Conclusions

1. All farmers visited were very enthusiastic about the floor and the positive effect on hoof health.

2. The percentage of lame cows is low. On average 89,4% of the cows did not show any clinical signs of lameness (cows were assessed using the Sprecher method on a scale 1 – 5) compared to other studies reported above.

3. The average prevalence of lame cows (lameness score >2) was 4.6% (range 0 to 8%) and lower compared to other almost similar studies which reported around 13%.

4. One study reported an almost similar prevalence of 5.4% (our study 4.6%) of lame cows (lameness score >2) within the top 10% of the best farms.

5. Possible confounding factors in this study could be “new barns”, better management compared to the average farm, more attention to hoof health as farmers did choose for this type of flooring, and it’s a cross sectional study instead of a longitudinal study.

6. When moving from a “conventional” slatted floor to the “Comfort Slat Mat” farmers felt the number of lame cows did decrease rapidly and the locomotion improved.

7. A side effect of the “Comfort Slat Mat” is that cows which are lame were treated too late by farmers as they still could cope walking on the “Comfort Slat Mat”.

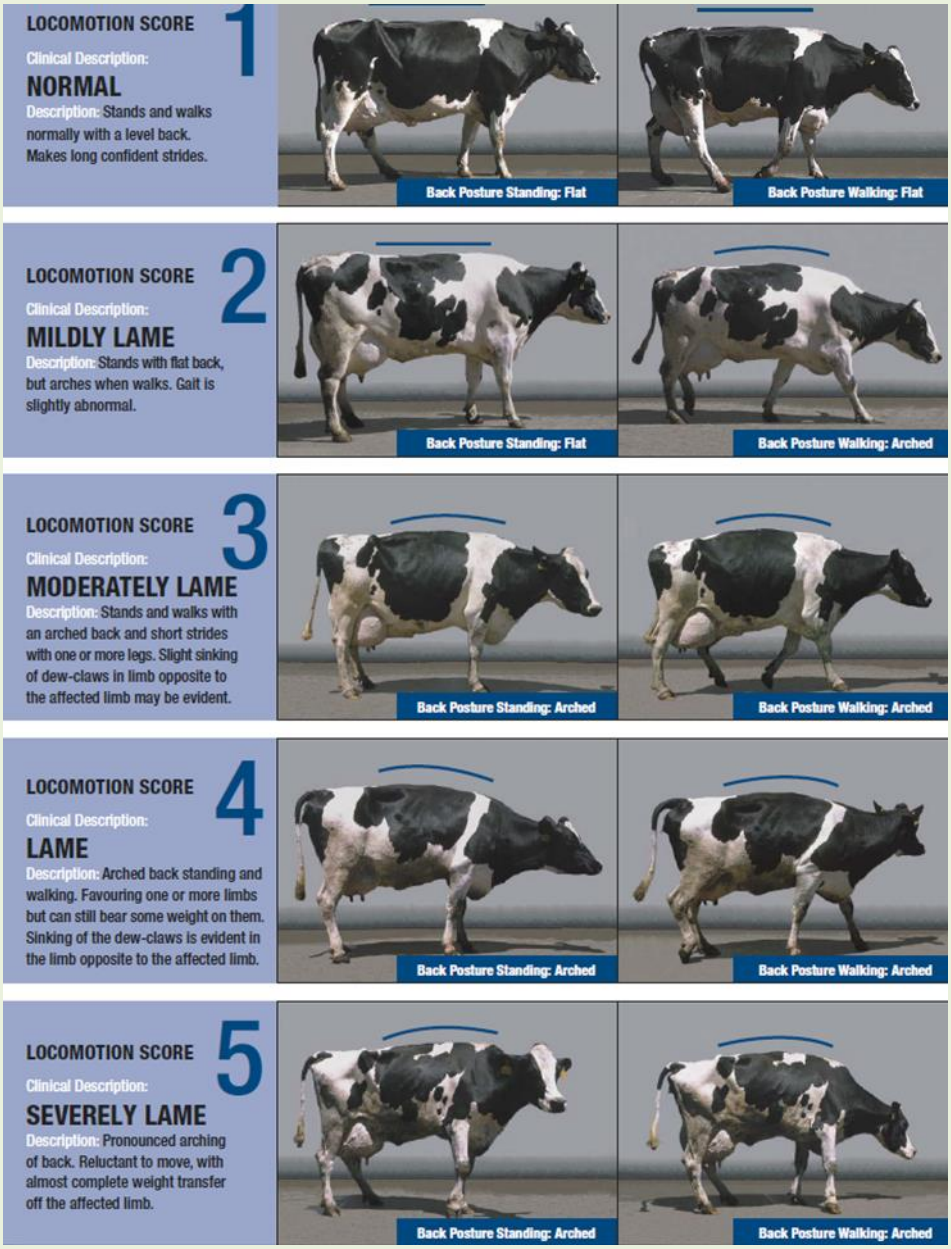
Other comments

1. Some farmers gave me the impression they believed the floor was slippery (information before they visited a farm with the floor installed) and therefore in first instance didn’t consider this floor as an option. Only after they visited a farm which had the floor installed and asked the farmer (and told them this wasn’t the case) they were convinced to buy this floor.

2. Most farms (6 out of 8) build a new barn for the milking herd but not all included the dry cows and heifers (> 1 year of age). This resulted in a combination of housing the milking herd in the new barn and the dry cows and young stock in the “old” facilities. As a result, the conditions were very poor for hoof health, especially for skin diseases like digital dermatitis

and interdigital dermatitis. Cows and fresh heifers entering the milking herd were in these instances the most common source of new infections.

Appendix 1: Sprecher scoring method



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