Improving Claw Health in Dutch Dairy Herds

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Abstract A study was done to investigate the possibility to improve claw health at herd level within a period of 1 year in 18 dairy herds. Claw health was monitored using an individual cow based claw-herd health score (CHS) system that corrected recordings of claw trimming for parity, stage of lactation and moment (=season) of claw trimmings. Herd-specific advice was given during regular meetings and on general consensus with a team of different claw-health advisors. It was found that even with this intensive team approach chosen, on average 62% of advice given was implemented with great variation between herds (20-100%). Over time, the CHS improved by 15%. The overall conclusion was, that based on the improvements achieved in most of the participating herds, substantial progress in claw health in dairy herds in The Netherlands can be realized within a one-year period.

Cite This Article: Menno Holzhauer, Chris J. M. Bartels, and Theo J.G.M. Lam, "Improving Claw Health in Dutch Dairy Herds." *World Journal of Agricultural Research* 1, no. 6 (2013): 130-132. doi: 10.12691/wjar-1-6-7.

1. Introduction

Healthy claws are a prerequisite for a good and long lasting life of dairy cows [1]. After mastitis and infertility, claw health problems are the third most common reason for involuntary culling of dairy cows [2,3]. In the early 90's different studies in The Netherlands estimated the prevalence of different claw disorders between 5 and 50% and despite increased knowledge claw health has not improved over the years [4,5].

In a Dutch study on mastitis, the local practitioner was found to be the first approached advisor in case of problems [6]. This was different from a comparable study on claw health held amongst 300 dairy farmers in The Netherlands (results not shown) where there was no preference for the private practitioner, the claw trimmer or the feed advisor. In order to improve claw health advice, a team approach was chosen in our current study, whereby as a result of consensus among different advisors was pursued to convince the dairy farmer that this uniform advice should realize improvement [7]. To have a successful program, it was considered of utmost importance that the opinions of the herdsmen involved were fully acknowledged and that they were motivated to implement the suggested claw health management plans.

The objective of this study was to investigate the possibility of improving claw health at the herd level within a period of 1 year by a joint approach of claw health advisors agreeing on a claw health management plan and supported by the farmer.

2. Material and Methods

2.1. Study Design

The study was conducted during 2007 and 2008 and included 21 dairy herds. Herds were chosen as a convenience sample, following the claw-trimmers' proposal, based on claw health that could potentially be improved and the willingness of the herdsman to cooperate. Advice given was based on the Claw Health Score (CHS, see cadre) and a meeting organised between the herdsman, and all claw-health advisors involved: claw trimmer, local practitioner and feeding advisor. The role of the project manager was to facilitate and preside the meeting. The team evaluated the CHS and the presence of related risk factors and made a management plan to improve claw health in the short and long run including issues such as housing, ration and protocols of treatment of lesions by the herdsman (see Table 1). As a result of this discussion, general consensus by the team was realized on the items to be improved in the herd and recommendations were given, that were fully endorsed by the farmer and that he agreed to implement.

The evaluation of claw health was based on data of regular claw trimmings 6 (autumn 2007) and 12 months (spring 2008) after the start and the deductive scores. Claw health scoring in each herd was executed by the same claw trimmer every time. The level of implementation and effect of recommendations was estimated by the project manager, based on interviewing the farmer after 12 months.

2.2. Statistical Evaluation

For the 21 herds in our study, the magnitude of the relative difference between expected and observed claw disorders was set against the CHS scale (0-100) to express the CHS for each herd at each moment of claw trimming. Changes in claw health were calculated based on the

relative improvement of CHS (ΔCHS= (CHS (at the end of the study) - CHS (at the start of the study))/ CHS (at the start of the study)). Differences in ΔCHS between groups were tested using the Wilcoxin Rank Sum test.

Based on the claw health management plans designed at the start of the study and the percentage of these plans that was implemented, the correlation between the levels of implementation of the management plans and ΔCHS was calculated using Pearson's correlation coefficient.

3. Results

The average herd size of the 21 participating herds at the start of the study was 78 dairy cows (range: 37-141), with a mean herd CHS at the start of the project of 66 (range: 30-90). In 3 herds compliance was insufficient; they were trimmed and scored only once. These data were excluded from the analysis. Eleven herds were scored three times (with an average interval of 6 months), while 7 herds were scored twice (at the start and the end of the study, average interval 9 months). Intervals between CHS per herd during the study were comparable to the period before the study. Overall, the mean CHS at the end of the study was 76 (range: 40-100) and thus increased with 15 percent. Herds that were trimmed and scored three times had a significant higher ΔCHS than herds that were trimmed twice, +17 and 0 respectively (Wilcoxin rank sum, P=0.02, Figure 1). Disorders that influenced CHS most negatively were DD and WLD.

The level of implementation of the claw health management plan is presented in Table 1. The overall level of implementation of the management plans was moderate (on average 62 percent of the plan was executed (range 20 - 100). In herds with 3 trimmings, changes in claw health management and CHS were positively correlated, although statistically not significant (correlation coefficient = 0.42, P= 0.19). The most important reasons mentioned by farmers for not implementing the management plans, were problems with changing routine behaviour (such as immediate local treatment of lame cows) and the availability of financial means for reconstruction of housing (e.g. quality of walking tracks).
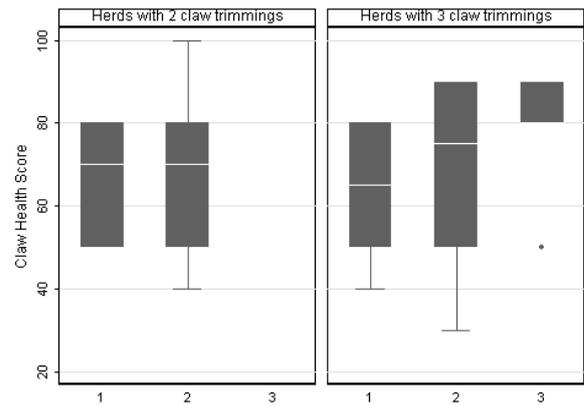
Figure 1. The average claw-health score for dairy herds, whereby in 7 herds claws were trimmed and scored twice and in 11 herds claws were trimmed and scored three times during a one year period (March 2007-April 2008)

Table 1. Subjects on which advice as related to claw health was given in 18 herds and their level of implementation.

		No. of herds advised	Level of implementation
Housing	Cubicle size (e.g. position of neck rail)	11	76%
	Walking track (hygiene)	6	28%
	Ventilation	8	52%
	Equality of the floor in the stable	16	44%
Ration	Mineral supply	7	86%
	Structure	8	73%
	Feeding management (e.g. mixing and kg concentrate at the same moment)	3	56%
Treatment protocol	Timely treatment of disorders	3	67%
	Timely treatment of lame cows	10	43%
	Walking-through footbath	17	77%

4. Discussion

Knowledge on risk factors, treatment and prevention of lameness and claw-horn lesions is not enough to actually improve claw health in dairy herds. Despite much technical research, prevalence of claw disorders as measured at the moment of regular claw trimming remains high [4,5,8]. This is in line with the claw health situation in most other European countries and in the US [9,10]. In our study, we demonstrated that it is possible to improve claw health within a period of 1 year. Improvement was only realized in herds with a 6 month interval between claw trimmings. In these herds a correlation was found between improvement of claw health and the level of implementation of the management plan. The selection of herds was based on the claw trimmers' proposals, and was found to be mainly based on the willingness of the herdsmen to participate in the project. Not all of these herds were experiencing serious claw health problems. When more herds would have had a worse claw condition at the start of the study, ΔCHS would probably have been better than the average 15 percent, indicating that there are possibilities to significantly actually improve claw health.

The results of our study are in line with a comparable study in the UK among 24 dairy herds in 2004, matched on herd size, housing type, locomotion score and rates of claw lesions. In that study claw health was monitored based on locomotion score, combined with 3 specific lesions (Digital dermatitis, Sole ulcer and White line disorders). Although in that study only a quarter of all recommendations were implemented, the prevalence of sole ulcers and lameness was reduced significantly [11].

Although the improvement of claw health seems to be positively influenced by the team approach chosen and the commitment of the dairy farmers involved, only 62 percent of the proposed management plans were implemented. Advice that was not consuming much time and/or money were implemented easiest (like adaptation

of the cubicle size, mineral supply and structure amount of ration, see Table 1). This is comparable to studies on the implementation of mastitis management practices, which showed that implementation is not only based on technical arguments. Management style and accompanying dispositions, beliefs and attitudes towards different aspects of advice given, were equally important [7]. Probably due to the small number of herds participating in our study, we did not find a significant relation between the level of compliance and the improvement of claw health. Nevertheless, based on the significant improvement in CHS in herds that trimmed there cows 3 times each year, we conclude that compliance is essential for the success of a management plan to improve claw health. This was also found in a comparable study on udder health in the UK [12]. Motivations of dairy farmers, non-monetary factors relating to internal esteem, knowledge, training and awareness, taking pleasure in healthy animals on the farm, as well as monetary factors are important factors in implementing claw health management plans [7,13]. These factors, however, were not evaluated in this study and need to be investigated further. This pilot study showed that improvement of claw health at herd level can be realized if the subject has enough priority and reinforces the necessity of working with a team approach. Factors influencing motivation to work on claw health need further study.

Acknowledgement

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Cadre: Claw Health Score

The claw health score (CHS) was developed to objectively compare claw health situations between herds and was based on a dataset of 421 randomly selected Dutch dairy herds in which more than 21,000 cows were scored. The scoring was performed by claw trimmers during regular claw trimmings for presence of claw disorders: digital dermatitis, interdigital dermatitis, sole haemorrhage, chronic laminitis, white line disease, sole ulcer and interdigital hyperplasia. Using multivariate, logistic regression models, associations between each of the seven lesions and breed, parity, days in milk and season were calculated and expressed as beta's (β). These β's allowed calculating the risk of getting one of the seven lesions for every single cow, given parity and lactation stages of the cow and part of the season in which the cow was trimmed. The expected number of lesions in a herd was estimated by adding up the risk of having a lesion for all cows in a herd at one point in time. Next, the expected number of lesions was compared with the actual number of observed lesions and this was expressed as the relative difference (RD = (expected minus observed) / expected). These RD results were ranked and this ranking was transformed into a score between 0 (the minimum RD value of -173.4) and 100 (theoretical maximum RD score of a herd without disorders). For simplicity, the score was rounded to tens e.g. a proportional ranking of 76 meant a score of 80 based on a scale 0-100.

To illustrate an example:

A herd with a RD of -7.4% had a ranking of 246 (out of 421 herds on the original list), which translated to a proportional score of 41.9 and this was converted into a score of 40.