

An evaluation of the agreement between digital dermatitis scoring methods in the parlor, pen and hoof-trimming chute

T. Winders, BS²; M. Socha, PhD, PAS, DACAN²; G. Cramer, DVM, DVSc¹

¹Department of Veterinary Population Medicine, University of Minnesota, St. Paul, MN 55108

²Zinpro Corporation, Eden Prairie, MN 55344

Introduction

Digital dermatitis (DD) is 1 of the most common causes of lameness in dairy cattle with prevalence levels of approximately 20% at the time of hoof trimming. The disease is characterized by a variety of clinical signs including hyperkeratosis and ulceration predominately affecting the interdigital cleft or skin surrounding the interdigital space on the plantar aspect of the foot. The disease has a significant impact on milk production, profitability, and the welfare of dairy cattle. To minimize the effects of DD on the animal and the farm there is a need for rapid detection methods. In addition, an accurate rapid scoring method would allow for a mechanism to evaluate the impact of a change in management practices at the herd level. Currently, the gold standard in detecting cows with DD lesions is the hoof trimming chute. Scoring in the hoof trimming chute is time consuming, and other scoring methods have been developed to identify cows with digital dermatitis in the milking parlor. The objective of this study was to evaluate the performance of a 5 point DD scoring method in 3 different parlor types and in 3 alternative locations on dairy farms.

Materials and Methods

Herds were recruited to participate using a convenience sample from Wisconsin and Minnesota. To be eligible for inclusion in the study herds had to use freestall housing, a herringbone, parallel, or rotary parlor, a professional hoof trimmer regularly, and have some DD present. Once herds were identified all herds were visited prior to or on the day of hoof trimming to score cows in the parlor and pen, headlocks, or management/chute lane. All cows were scored in the parlor and in 1 of the other locations prior to being examined in the hoof trimming chute. To assess the feet in all locations, the feet were examined visually using a flashlight. Digital dermatitis status was recorded using the modified 5 point M scoring system. To evaluate the performance of the scoring system in each

location, the Cohen's kappa statistic and sensitivity (SE) and specificity (SP) were calculated with DD status from the chute evaluation being the gold standard.

Results

A total of 1104 legs were evaluated in 17 herds. Herds ranged in size from 100 to 4200 cows and used a variety of bedding surfaces including sand, wood shavings, straw, and manure solids. Foot bathing frequency ranged from monthly to daily with a median of 4x/week. A total of 9 herringbone, 5 parallel, and 3 rotary parlors were scored. No significant differences were found in M scores between right and left hind legs in any of the locations thus, further analysis was completed without considering leg side. In the chute, 56% of cows did not have any signs for DD. Overall, the 5 point M scoring system had slight agreement with chute scoring for all locations with chute scoring. Dichotomization of the scoring system based on lesions >2cm in size improved agreement to a moderate or substantial level. When the data was evaluated for diagnostic test performance for lesions >2cm, SE ranged from 65 to 78% and SP from 93 to 99% in the different parlor systems. For the other locations SE was highest for headlock and lowest for pen scoring. For parlor scoring when the system was evaluated as a screening test for cows in need of treatment (M2), SE was very low (9%).

Significance

This study has shown that the most accurate places to score cows for the presence of DD lesions >2 cm were in the headlocks or the parlor. Parlor type was not shown to have an effect on kappa or for SE and SP compared to scoring feet in the hoof trimming chute. The performance of the scoring system to differentiate different stages of DD was limited in all locations when compared to the chute scoring. This study showed that a simplified 2 point scoring system would allow the dairy industry to both screen cows for DD and evaluate the effect of interventions at the farm level.