

Correlation between Visual Locomotion Scoring System and an Electronic Locomotion Scoring System

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Introduction

Detection of lameness is a bottleneck on many dairy farms. Large dairy farms set goals to decrease the costs of labor. Lameness economic losses can be amplified by delayed detection and treatment. An accurate electronic lameness detection system could minimize losses caused by lameness. The objective of this study was to evaluate the correlation of a visual locomotion scoring system and an electronic scoring system (stepmetrix).

Materials and Methods

Data were collected from one dairy farm located near Ithaca, NY, from October 15, 2005 to January 15, 2006. The farm milked 2,800 cows. The herd consisted of Holstein cows housed in freestall barns covered with rubber mattresses and bedded with waste paper pulp. Cows were milked three times a day in a double 54 milking parlor. Lactating cows were fed a total-mixed-ration consisting basically of 55% forage (e.g. corn silage, haylage, alfalfa hay, wheat straw) and 45% concentrates (e.g. corn meal, high-moisture corn, soybean meal, canola, cottonseed, citrus pulp, brewer's grain).

All cows in the study group were visually scored on a weekly basis. The locomotion scores were done when the animals were exiting the milking parlor. The scores were always done by the same veterinarian and the system used was a five-point scale: 1=normal, 2=slightly lame, 3=moderately lame, 4=severely lame and 5=extremely lame (non-weight-bearing lame). The locomotion scores were entered in a data base created for the study.

The stepmetrix machine was located in a single-lane return alley from the milking parlor to the freestall

barn. The score generated by the stepmetrix was a raw average from all scores accumulated for the period of one week. On average, the cows walked 12 times through the machine each week.

Results

A total of 396 cows was used for the analyses. Data were analyzed by ANOVA (Proc GLM) after one observation per cow was picked at random.

A significant correlation between visual score and stepmetrix score was found ($P < 0.0001$). However, when the threshold for identification of lame cows was used, the level of agreement between stepmetrix and visual score was weak. The threshold for lameness recommended by the manufacturer is 39 in a 1 to 100 scale. Considering that scores above 39 represented lameness (L) and below 39 soundness (S), for visual score 1, 54% were S and 46% were L; visual score 2, 58% S and 42% L; visual score 3, 50% S and 50% L; visual score 4, 30% S and 70% L; visual score 5, 100% L. There were only two animals with a visual score 5.

Significance

The study identified a significant correlation between visual score and the stepmetrix score. The electronic locomotion scores generated by the stepmetrix machine could potentially be of some practical application; however, the large number of false positives—visual scores 1 and 2 considered lame by stepmetrix—represents a real obstacle for the adoption of this technology in commercial dairy farms.