

Use of Animal-Based Parameters to Evaluate Tie-Stall Design and Stockmanship on Dairy Farms in Ontario

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Introduction

Injury, poor claw health, lameness and mastitis due to fecal contamination are negative results from inadequate stockmanship or tie-stall design. These problems affect cattle welfare and increase the probability of premature culling, lost production and negative attitudes by the public toward the dairy industry. Animal-based parameters can be used to measure the cow's response to management choices. This information can be used to evaluate husbandry choices and improve animal welfare and productivity.

Materials and Methods

All of the lactating cows on 317 randomly selected tie-stall dairy farms across Ontario were used in this cross-sectional study. Trained personnel scored each cow for the presence and/or severity of the following variables: hock and neck lesions, arched backs, outward rotation of the hind claws, cleanliness of the udder and hind limbs, teat injury and broken and docked tails. The variables were analyzed descriptively and for correlations with tie stall length, stall width, tie rail height and chain length using Pearson correlations, zero inflated Poisson regression and negative binomial regression in STATA. Scored variables were also analyzed for correlations with the outcome variables of milk production, somatic cell count and culling risk.

Results

Average herd size of the study farms was 56 lactating cows. Descriptive results are presented in Table 1.

Significance

Average herd size of the study farms approximates the average lactating herd size of Ontario dairy farms. Prevalence of lameness, cleanliness and injuries of cattle on Ontario tie-stall farms was not previously known. Benchmarking these values allows individual farms to assess their own herd scores and thereby to determine their farms' strengths and weaknesses. Broken tails in cattle housed in tie stalls generally result from the tail being stepped on or forceful manipulation of the tail by stockpeople during handling. It could be expected that affected cows might show either no signs, pain and discomfort and/or decreased tail movement. Presence of the latter two could cause a dirty tail and may explain the positive correlation between broken tails and dirty udders and hindlimbs. Alternatively, broken tails and dirty cows may both be associated with poor stockmanship.

Occurrence of several cows in a herd with the same types of injuries suggests a problem. Understanding the relationships between injuries is the first step to improving husbandry, cattle housing and ultimately productivity.

Table 1. Use of animal-based parameters to evaluate tie stall design and stockmanship on dairy farms in Ontario.

Variable	% of farms with unaffected cows	% of farms with 10% or more affected cows
Arched Back	47	8
Hindclaw rotated outwards	6	76
Neck abrasion	71	13
Hair loss from hocks	3	88
Open wounds on hocks	25	28
Significantly dirty udder	48	13
Dirty hindlimbs (manure up and over hock joint)	13	57
Docked tails	81	9
Broken tails	61	7

Initial analysis of the outcome variable "broken tails" indicated that as neck rail height increased, fewer cows had broken tails. ($p < 0.0001$). Percentage of cows with broken tails was positively correlated with percentage of cows with dirty hindlimbs and dirty udders. ($r = 0.2934$, $p < 0.0001$ and $r = 0.3399$, $p < 0.0001$)