



# Feeding behaviour of dairy cows at peak lactation

Trevor DeVries, Marina von Keyserlingk, Dan Weary, and Karen Beauchemin

THE UNIVERSITY OF  
BRITISH COLUMBIA

## Introduction

New technology has been developed that allows the passive monitoring of feeding behaviour of cows fed via a feed alley in a free-stall barn. The objectives of this research were to: 1) objectively define meal criteria (minimum interval between meals) of free-stall housed cows fed via a feed alley, 2) determine which measures of feeding behaviour were most repeatable, and 3) describe changes in these measures over peak lactation.

## Materials and Methods

- The GrowSafe™ system recorded cow presence (hits, 6 s resolution) at the feed alley for 21 cows for two 8-d periods: period 1 starting at  $57 \pm 16$  (mean  $\pm$  SD) DIM, and period 2 starting at  $94 \pm 16$  DIM.
- Meal criterion (27.74 min) was calculated using a mixed distribution model to fit the  $\log_{10}$  frequency distribution of the intervals between hits. This criterion was used to calculate total daily meal time (min  $d^{-1}$ ), meal frequency (meal  $d^{-1}$ ), and meal duration (min meal $^{-1}$ ). Feeding activity (hits  $d^{-1}$ ) and feeding intensity (hits per meal) were also calculated.
- Linear regression was used to determine within cow repeatability and changes in measures of feeding behaviour from period 1 to period 2.

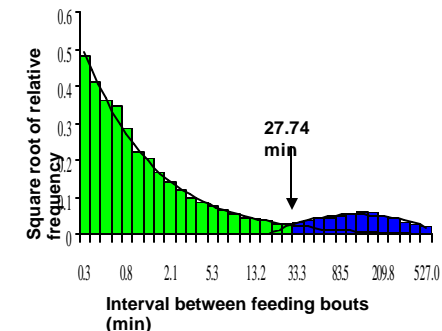


Figure 1. Square root transformed relative frequency distribution of the intervals between hits fitted with a mixed distribution model.

## Results

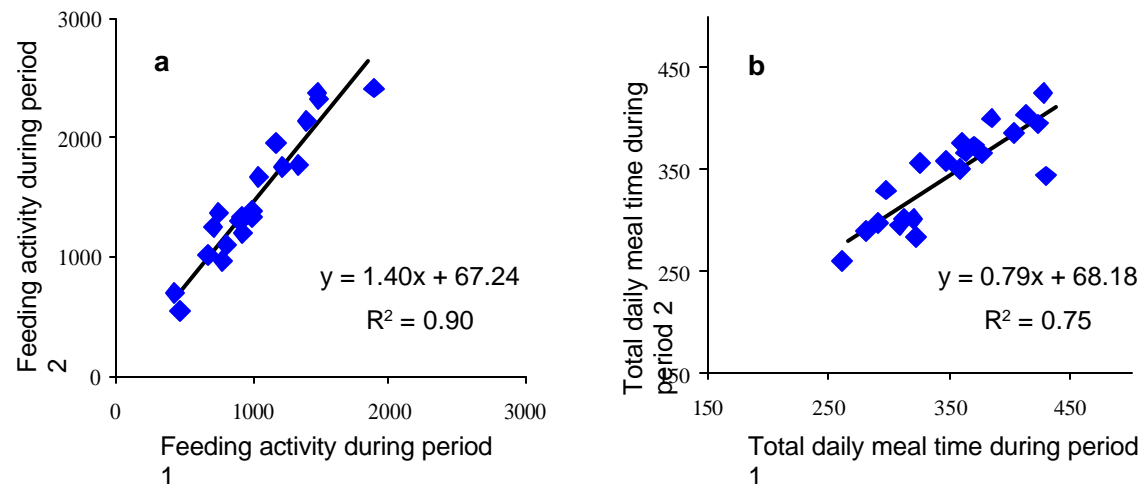


Figure 2. The relationship of (a) feeding activity (hits  $d^{-1}$ ) and (b) total daily meal time (min  $d^{-1}$ ) between period 1 and period 2.

- The  $\log_{10}$  frequency distribution shows a first distribution corresponding to intervals within meals and the second distribution representing the intervals between meals (Figure 1).
- Within cow repeatability was highest for feeding activity (Figure 2a) and feeding intensity ( $R^2=0.91$ ), moderate for total daily meal time (Figure 2b) and meal duration ( $R^2=0.50$ ), and lowest for meal frequency ( $R^2=0.22$ ).
- Cows with high feeding activity and intensity during period 1 showed proportionally greater increases during period 2.

## Implications

These results illustrate that some measures of feeding behavior are highly repeatable within cows, but variable between cows and across periods of lactation. Thus, tests of treatment effects on feeding behavior should be within cow and control for days in milk.

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