

CYCLIC CHANGES IN DAILY BODY WEIGHT OF HIGH PRODUCING DAIRY COWS ARE ASSOCIATED WITH OVARIAN ACTIVITY

van Straten, M.^{1,2,3} and Friger, M.²

¹*Clinical Research Unit, "Hachaklait", Israel*

²*Faculty of Medical Sciences, Ben-Gurion University of the Negev, Israel*

³*Koret School of Veterinary Medicine, Hebrew University of Jerusalem, Israel*

High producing dairy cows undergo a state of negative energy balance (NEB) in early lactation. Excessive or prolonged periods of NEB indicate inability to properly adapt to NEB. Poor adaptation has been repeatedly shown to be detrimental to the cow health and productivity. Individual variation in adaptation to NEB has been described, but estimating this variation is problematic. Daily body weight (BW) measurements through automated technology are available and present a cost effective method to potentially monitor NEB.

The objectives of this study were to investigate, describe and quantify daily BW changes in high producing dairy cows in the first 120 days of lactation.

A prospective cohort study was conducted in 7 typical Israeli commercial dairy herds consisting of 251-824 high producing Israeli Holstein dairy cows. Data were collected between March 2006 and August 2007 and included health, production, reproduction and management records and over 250,000 daily BW measurements from 2,167 cows.

Time series analysis was performed using "classical" time series techniques in which every series of BW measurements was decomposed into trend, periodic components and "white noise". For generating variables representing BW change in early lactation, individual series of BW measurements were smoothed using cubic splines. In order to construct "standard" relative body weight curves, mixed models for repeated measurements were fit to the smoothed data and the estimated least squares means were plotted.

Seven day (industrial) and 21 day cycles in BW were presented in 247 (11.4%) and 715 (33.0%) of the cows, respectively. Presence of 21 day cycles was associated with the reduction of 33% in the risk of being diagnosed with inactive ovaries. Days from calving to nadir BW were 37, 54 and 61 for the first, second and older parity cows, respectively. Loss in BW (kg) from calving to nadir was 46.5, 68.2 and 78.3 for the first, second and older parity cows, respectively. The "average" first parity cow lost 6.5% of its calving BW as opposed to 8.5% in the older cows. Gain in BW following the nadir value was markedly more rapid in the first parity cows.

The presence of 21 day cycle in BW is probably physiologically-based and related to the sexual cycle, as indicated by its relationship with inactive ovaries. Monitoring the presence of these cycles could be useful for indirectly assessing ovarian activity in dairy herds. When comparing to older cows, fewer days from calving to nadir BW and smaller BW loss from calving to nadir (along with a faster post-nadir increase in relative BW in first parity cows) indicate a smaller energy deficit in early lactation in this group.

"Standard" relative BW curves for the first 120 days in lactation for the first, second and older parity cows are also constructed.