

Dairy Cow Lactation Curve Comparison of Pre 1960 and Post 2005 Daily Milk Yields Based on the Wood's Model

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Holstein dairy cow milk yields have increased in Canada from 4,600kg in 1960 to 9,790kg in 2009. Has this increase resulted in changes in lactation pattern such as days in milk to peak yield or persistency of lactation? A number of equations, such as the 1967 Wood's model, have been developed to describe lactation curve shape. The University of Saskatchewan has maintained individual cow milk yield records on all cows since 1950. Complete lactation daily milk yield records were used to determine if Wood's a, b and c lactation curve coefficients have changed over an approximately 50 year period (designated Early or Recent). Days in milk to peak lactation and persistency were also calculated. Only second and later lactations were included. Twenty two Early lactations (1951 to 1957) and 15 Recent lactations (2006 to 2007) were analyzed.

Peak production in the Early group occurred at 35.7 days in milk while the Recent cow group peaked at 55.7 days ($P < 0.01$).

The scaling factor, a, that represents yield was increased 1.75 fold in the Recent group ($P < 0.001$); b representing the early lactation ascending curve was higher in the Recent cows ($P < 0.01$); and c, representing the descending curve after peak yield, tended to be lower in Recent cows ($P = 0.14$). Persistency of lactation in Recent cows was increased by 8% ($P < 0.01$).

Three times daily milking (3X) was initiated in 2008. To determine the effect of 3X milking 14 full lactations were compared to 15 lactations in 2006-07 using the Wood's model. No differences in a, b or c coefficients were found, nor in persistency. Peak lactation was delayed by only 2 days ($P > 0.05$) by 3X milking. The effect of 3X milking was to shift the lactation curve upward by an average of 4.86 kg to give a 3X daily average of 40.17 kg milk.

Implications: This analysis shows that selection for increased milk yield has delayed peak milk yield by 20 days, increased peak production and increased persistency of milk yield in the University of Saskatchewan Greenbrae dairy herd. Changing to 3X milking increased daily milk yield by 13.8% without changing lactation curve parameters.