

AN ALTERNATE METHOD OF ASSESSING PRE-PUBERTAL CALF GROWTH

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The object of this study was to determine if an alternate method of assessing calf growth could be made prior to puberty which would give a more reliable basis for selective comparison between animals than that used at present. In beef herds it is common to assess growth rates of young cattle using the absolute average growth rate viz. $(W_2 - W_1)/(t_2 - t_1)$, where W_2 is the weight of the last recorded weighing, W_1 is the weight of the first recorded weighing and $t_2 - t_1$ is the time interval in days. This method implies that growth occurs at a constant (linear) rate. In pre-pubertal animals however, growth occurs through the production of new cells (mitosis) and is exponential in nature, whereas after puberty less new cells are formed and some (e.g. adipocytes) exhibit hypertrophy. Brody (1945) studied the growth curves of many animals and found two distinct segments, a period of acceleration of growth followed by a period of deceleration. The point of inflection in the growth curve corresponded to the onset of puberty.

To assess the relative growth rates of cattle, 25 steer calves were raised at pasture with their dams. The calves were weighed at regular intervals from birth to approximately seven months of age then weaned on a set day irrespective of age. Their growth rate was determined by the "average" method and by another method which takes account of the exponential nature of pre-pubertal growth, namely, the "k" or instantaneous relative growth rate of Brody (1945). In this calculation, $k\% = \{(\ln W_2 - \ln W_1)/(t_2 - t_1)\} \times 100$ where $\ln W_2$ and $\ln W_1$ are the natural logarithms of the weights at time 2 and time 1 referred to above.

The rankings of the instantaneous relative growth rate values and the "average" method proved to be different, although the rank correlation (Kendall 1970) between the methods was found to be 0.50 ($P < 0.05$). This demonstrated understandably, that although a relationship existed between the methods, it was not strong. The "k" method could well provide a better ranking of potential growth, since the "average" method takes no account of the different ages of calves of similar birth weight which are weaned on the same day, nor of the exponential nature of the pre-pubertal growth curve. The "k" value expresses the weight at a certain point in time relative to the initial weight.

Growth is a composite character in that it is affected both by the direct influence of the mother and by the inherited growth capacity of the calf (Rice et al. 1962). The "k" method allows a calf of comparatively low live weight and young age to be compared on a more equitable basis with older, heavier pre-pubertal siblings. The method reported here only considered, pre-pubertal growth. Further research is needed to determine if it is a better basis for the assessment of post-pubertal growth than the common method used at present and is thus a better selection trait,

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