Relationships between Pre and Post Weaning Growth on Estrous Behaviour and Reproductive Parameters of Holstein Heifers

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The relationship between weight gain in the first year of life and age at puberty, ovarian activity, and estrus expression was evaluated. Holstein heifers (n=43) were group housed as calves and raised in a free stall barn in groups of seven to 12 animals from six to 12 months old. Milk allowance was 12 kg/d until weaning, which was done gradually according to the heifer's starter intake. Heifers were weighed weekly and measured (withers height) once/month. Ovarian ultrasonography was performed twice/week from seven months of age onwards. Data loggers attached to one of the hind limbs were used to measure physical activity (i.e. number of steps taken) and lying bouts. Puberty onset was at 9.3 ± 1.1 months of age. Preweaning weight gain had no effect on age and weight at puberty onset, preovulatory follicle size, or estrus behaviour. Postweaning weight gain, however, influenced puberty onset and estrus expression. Age at puberty had negative correlation with weight gain from 3 to 8 mo. The more weight the heifer gained during that period, the earlier the puberty occurred. However, a higher rate of weight gain from 8 to 10 mo old resulted in delayed puberty onset. Number of steps taken increased 3.9 ± 1.6 times during estrus when compared to baseline period. Estrus intensity increased with age. Intensity of first estrus was 3.2 -fold, while for sixth and later episodes it was 4.8 -fold. Estrus episodes lasted on average 14.0 ± 3.7 hours. Estrous cycle length was 19.7 ± 1.8 days, value within the range expected for dairy cattle. Heifers with weight gain of more than 1.0 kg/d from 3 to 8 mo old had greater intensity of estrus expression than heifers with gain under 1.0 kg/d (4.5 vs. 3.9 -fold increase, respectively). Rate of weight gain did not influence duration of estrus. Heifers that were taller at 9 to 10 mo old had estrus episodes of greater intensity than heifers that were shorter at the same age. However, preovulatory follicle was larger for shorter heifers.

Results suggest that rates of weight gain influence not only puberty onset, but also parameters related to estrus expression. There was large variation between and within heifers for all measured variables, evidencing opportunity for selection of animals with better estrus expression and fertility.