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Prediction of water intake in young dairy calves.**

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Availability and consumption of water are critical to ensure adequate ruminal development and to allow early weaning of young calves. However, estimates of water intake, particularly during the first two months of life are unavailable. Therefore, our objective was to predict daily water consumption in calves fed varying combinations of calf milk replacer (CMR) and commercial calf starter (CS) for 42 to 56 d. Calves ($n = 602$) were assigned to six experiments during 1999 and 2000; each experiment used different CMR formulations. Calves were primarily Holstein bull calves, although some heifers and cross-bred calves were used. Calves were typically less than 7 d of age at the start of each trial although birth date was not determined in most cases. The CS was a commercially obtained from one supplier. The CMR were experimental formulations containing 20 to 22% CP and 20 to 22% ether extract and were based on whey protein concentrate and various alternative animal proteins. Calves were fed CMR in fixed or variable amounts to weaning at 28, 42, or 56 d and were fed CS for ad libitum consumption from d 1 or d 29 to d 42 or 56. A total of 29,714 daily observations were used to predict water disappearance. Independent variables included intake of DM from CS and CMR, intake of total DM, CP, ether extract, amount of liquid CMR consumed, BW and plasma IgG concentration on d 0 of each study, daily fecal score, incidence of daily scours and veterinary treatments, day of the study, mean daily high (HDT) and low ambient temperatures, average daily humidity, amount of solar radiation, and selected squared terms. Stepwise regression produced a full model with 23 independent variables and r^2 of 0.74. A limited model ($r^2 = 0.72$) was

water intake (L/d) = 1.075 + 0.00119 x intake of CS (g of DM/d) + 3.75E-7 x CS intake² + 0.023 x HDT (degrees Celsius) + 0.00135 x HDT² - 0.622 x CMR intake (L/d) + 0.0621 x CMR intake².

Starter DM intake accounted for 63% of variation in daily water intake. Increasing maximum environmental temperature increased water intake and greater volume of milk consumption reduced water intake. Daily water intake in young calves can be predicted with reasonable accuracy.

Written by Dr. Jim Quigley (01 November 2000)
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