Effect of Management Systems on Growth Performance of Buffalo (*Bubalus bubalis*) Calves in Winter Season

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Introduction

Buffalo (*Bubalus bubalis*) play an important role as a milk animals in the Indian national economy. India has nearly 57% of the world's buffaloes which contribute 56% of the total milk produced in India, i.e., 86 million tons per annum (FAO 2004). Economic rearing of replacement stock is a prerequisite for successful dairy farming. Buffalo traditionally are considered slow-growing animals, a trait which has a direct effect on early maturity and age of first calving. Low growth rate in young buffalo calves is by far the most important factor contributing to late maturity. The most efficient system of calf rearing is one that gives higher body weight gain and low cost of feeding. Any management package that can induce early maturity without any detrimental effect on subsequent health of the calf will have a profound economic contribution.

Materials and Methods

An experiment was conducted during the coldest part of the winter months on 20 female buffalo (*Bubalus bubalis*) calves three-to-six months of age. Calves were divided into four groups of five calves in each group on the basis of their body weight and age. Each group was randomly assigned to the following treatments, viz: T1, loose housing with 80% of the Indian Council of Agricultural Research (ICAR) feeding standard; T2, loose housing with 100% of the ICAR feeding standard; T3, conventional barn with 80% of the ICAR feeding standard; and T4, conventional barn with 100% of the ICAR feeding standard. A concentrate mixture containing 21% crude protein (CP) and 78% total digestible nutrients (TDN) was prepared and fed in such a way that T1 and T3 calves received 20% less protein than ICAR recommended levels, while T2 and T4 calves got recommended levels each day. An equal and weighed amount of seasonal available green fodder was fed daily to all calves, and the protein content was taken into consideration while mixing and feeding the concentrate mixture for each group. The calves in both houses were fed and cared for individually. The body weight of calves was taken at fortnightly intervals in the morning before offering them feed and water to determine the growth rate and for the computation of ration. Body measurements were recorded at monthly intervals during the study. To determine the cost of rearing, records of feed and fodder fed to the calves and the labor used for various farm operations in each treatment were maintained throughout the experimental period. Data were analyzed using a statistical method recommended by Snedecor and Cochran.

Results

Microclimatic results revealed that the maximum and minimum temperature and the morning temperature humidity index values were significantly (P< 0.01) different for the two housing systems. The average daily dry matter (DM), crude protein (CP) and total digestible nutrient (TDN) intake per 220 lb (100 kg) body weight and per kg $w^{0.75}$ were significant (P< 0.05) between levels of feeding. The differences for these parameters were non-significant between housing systems, except for CP intake per 220 lb body weight and per kg $w^{0.75}$ (P< 0.05). The nutrient intake per lb or kg of body weight gain was better in conventional barn-housed calves compared to loose housing. However, DM and TDN intake were significantly (P< 0.05) higher in loose housing. Average voluntary water intake per lb or kg of DM consumed and per kg $w^{0.75}$ was not different between housing systems. However, daily voluntary water intake and total water intake differed significantly (P<0.05) between levels of feeding. Average daily weight gain was significantly higher in conventional barn-housed calves compared to loose-housed calves. Average daily body weight gain was influenced by both feeding levels and housing systems. The average increase in body measurements (length, height, heart girth, abdominal girth and hip width) was similar for both housing systems and feeding levels. Physiological reaction and morning rectal temperature were similar between housing systems. However, evening rectal temperature and morning and evening respiration rates differed significantly (P< 0.05) between housing systems. Physiological reaction was not influenced by feeding levels. The blood profile hemoglobin level, blood glucose level and plasma protein did not differ between housing systems and feeding levels. The time spent by the labor for various farm operations was similar for both feeding levels and housing systems. The cost per lb or kg of weight gain was lower in conven-

tional barn groups than the loose housing groups. Similarly, the lowest cost for weight gain was in the high level of feeding group as compared to low feeding level.

Significance

Results of the present study clearly indicate that buffalo calves housed in a conventional barn with standard feeding as per ICAR recommendation during winter had better growth and feed conversion as compared to calves kept in loose housing under the same feeding standards. The cost of gain of body weight was also less in a conventional barn. Though cost of raising a calf in a conventional barn was slightly higher, it was compensated by higher body weight gain. Within the limit of the present experiment, it can be concluded that conventional barn housing with standard feeding as per ICAR recommendation was better for young growing calves in the winter season. This speeds early maturity of the animal and reduces the age at first calving for more economical dairy farming.

Use of Bulk Tank Milk to Determine the Herd-level Prevalence of *N. caninum* in Dairy Herds on Prince Edward Island

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Introduction

The apicomplexan protozoan parasite *Neospora caninum* is one of the most frequently diagnosed causes of bovine abortion. Transmission of the parasite occurs vertically from cow to calf with great efficiency, sustaining the infection within cattle herds for many generations. The herd-level prevalence of *N. caninum* on PEI is estimated to be 20.3%. This is relatively high compared to other Canadian provinces and research is needed to aid in the control of this infection on dairy farms. Serology is the only method available to diagnose *N. caninum* infection in live animals, but herd surveillance, using serology, is expensive and time consuming, especially in large dairy herds. The use of milk as a diagnostic tool could be very beneficial to the dairy industry, as it would allow for a fast and inexpensive way to test herds for *N. caninum* exposure. Furthermore, because the majority of dairy herds in PEI collect milk samples monthly (DHI; Dairy Herd Improvement), *Neospora* surveillance using milk would result in less stress on the lactating cow, and no special visits would be required to collect samples.

Materials and Methods

The laboratory sensitivity and specificity of a *Neospora* indirect ELISA (IDEXX, Westbrook, Maine, USA) was evaluated in a Dutch study by the Animal Health Service, and on PEI using 30 bulk milk samples of herds with a known serostatus that we received from the Dutch Animal Health Service. Bulk tank milk samples from all PEI dairy farms that participate in DHI herd testing on a regular basis were used. These samples were tested using the indirect ELISA. After validation of this indirect ELISA using initial bulk milk samples, the variability in results over a six-month period is being assessed by analyzing additional bulk milk samples from the study farms at three-month intervals.

Results

The ELISA that we used had a herd sensitivity of 61% (95% CI: 49-73%) at a cut-off value of 0.6. Herd specificity at this cut-off value was 92% (95% CI: 87-98%). Based on previous studies in The Netherlands, a within-herd *N. caninum* seroprevalence of 15% was as-