



Research Article

Modified Organic Dairy Calf Rearing System and its Impact on Calves Performance in an Organized Farm of Kashmir Valley

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ABSTRACT

A present study was conducted to compare partially modified organic calf rearing system and artificial calf rearing system on body weight gain performance, mortality and morbidity rate of Jersey cross bred calves in an organized exotic farm of Kashmir valley. In artificial calf rearing management practices the new born calves were kept separately from mother after colostrums feeding followed by milk feeding in bucket dosed at 3-4 litre/calf/day in two fractions in morning and evening. After attaining the age of 90 days, the milk was stopped and the calves were sent for grazing. In partially modified organic calf rearing system, the new born calves were kept together with their dam and/or with nursing cows dosed at 3 calves/cow up to the age of 90 days. Same body weight group calves were kept with nursing cows to minimize the competition among the calves during suckling of milk. After attaining the age of 75 days the nursing cows were withdrawn gradually from calves due to their changing of food habit from milk to fodder and concentrate. In modified organic calf rearing system the body weight gain of calf was significantly ($P < 0.05$) higher as compared with the artificial calf rearing system at 90 days of age. The morbidity and mortality rate was also higher in artificial calf rearing system as compared with the organic calf rearing system from birth to weaning. In conclusion the modified organic calf rearing system is highly encouraging for better body weight gain performances, less morbidity and mortality and more economically viable as compared with artificial calf rearing system.

Key words: Organic, Artificial, Calf, Rearing system, Organized farm

INTRODUCTION

The economy and the backbone of dairy farming greatly depend upon the maximum survivability rate of calves and their better health. Organic Dairy farming means raising animals on organic feed (*viz.*, pastures cultivated without the use of fertilizers or pesticides), have access to pasture or outside, along with the restricted usage of antibiotics and hormones (Oruganti, 2011). Products obtained from organic dairy farm are the organic dairy products. Whereas organic fruits, vegetables, grains, and some livestock have long been mainstays of the organic movement, organic dairy is a relative newcomer (Pierce and Tilth, 2014). The organic farming movement is commonly agreed to have begun in the 1940s in England with the writings of Sir Albert Howard, who learned about organic practices in India during the 1920s. The reasons for producing and purchasing organic food

are individual and can be complex. However, most will fall into three categories: health, community, and environment. The organic movement is built on a fundamental principle: healthy soils lead to healthy crops, healthy animals, healthy humans, and a healthy planet (Pierce and Tilth, 2014). Organic crop and livestock production focuses on building soil organic matter and biology to create a sustainable, dynamic environment for producing healthy food and feed. Organic agriculture is also seen as a way to sustain and support family farms in preference to faceless, ever-expanding mega- and corporate farm models. The food production and supply has increased by the use of fertilizers, antibiotics, drugs, agrochemicals and improved feeds but now-a-days, consumers have become quality-conscious and are increasingly seeking environmentally safe, chemical-residue free healthy foods, along with product traceability and a high standard of animal welfare, which organic

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production methods are said to ensure (Chander *et al.*, 2011).

In an organized dairy farming 5-10% calf mortality was recorded up to the age of 90 days and it was considered as normal trends. The death of calves after parturition is directly correlated with the management practices followed like better nourishing, optimum treatment practices and better hygiene inside and the outside of shed. In artificial calf rearing system the calves are separated soon after birth and raised in some form of individual housing only being grouped with others after weaning. In Organic dairy calves are not housed individually over 90 days of age. The pen or hutch have bedding, a minimum size of at least 2.5m x 2m and allow the calf to move freely, and see, smell and hear other calves. In natural conditions calves have a strong motivation to suck; they form strong bonds with their mother and seek out social contact with other calves which provides the opportunity for play and the development of social skills. To adopt the better calf management practices a study was conducted between partially modified organic calf rearing and artificial calf rearing to reduce the mortality and morbidity rate and better body weight gain performance of Jersey cross bred calves in an organized farm. This study provides guidance for better management practices to overcome potential problems with the systems.

MATERIALS AND METHODS

This study was conducted in an organized farm at Mountain Livestock Research Institute, Manasbal, Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir, Jammu and Kashmir- 190025, India. One hundred twenty Jersey calves were taken to compare the artificial and partially modified organic rearing system for four consecutive years. Only calves born in winter and spring season every year were selected. Maximum and minimum temperature and relative humidity during winter and spring season were 10°C, -7°C, 70%, 65% and 18°C, 3°C, 60%, 60% respectively. During first year of study period artificial calf rearing system was followed and for next two years modified organic calf rearing system was followed.

In artificial calf rearing system, the new born calves were provided colostrums during day time and at night hours the calves were separated from mother. After three days the new born calves were separated from mother and kept individual pen and fed milk in bucket dosed at 3-4 liter/calf/day in two equal doses in morning and evening up to the age of 3 months. After attaining the age of 3 months, the milk was discontinued and the calves were sent for grazing. But in modified organic calf rearing system, calves were left with mother for a minimum of 3 days then moved to the nurse cow, unless the mother was also to foster other calves. Calves were kept with cows at all times so they were never hungry and the sucking need was fully satisfied. The nursing cows were regularly replaced with fresh calving cows. Nurse cows were selected on the basis of readily nurse to any calf. In general, suckling systems was preferred using nurse cows with two or three calves each over keeping calves with their own mothers. Attention was given that each calf

would get up to 3-5 liter of milk per day, the nurse cow produced enough milk to support the total requirement of her suckling calves. After the age of 4 days, the 3 calves along with nursing cows were kept in individual chamber with a facility of bedding and ambient heating arrangement. After the age of 30 days, the homogenous body weight calves were kept in bigger space of a group of maximum 15 calves with 5 nursing cows to minimize jumbling during suckling of milk. The calves were sent for grazing with nursing cows, and they were also copy the cows feeding patterns and eat more solid food and became less dependent on nursing. The numbers of nursing cows were gradually withdrawn from calves after attaining the age of 75 days. At the age of 3 months the calves were completely weaned from nursing cows.

Housing and all other management practices was similar during the study period. Data on birth weight, fourth night body weight, mortality and morbidity up to the age of 90 days were collected and statistically analyzed by using one way ANOVA (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

In modified organic calf rearing system in both the year (71.49 and 74.31 kg) calves had significant ($P < 0.05$) higher body weight at 90 days of age as compared to artificial calf rearing system (57.90 and 61.00 kg) (Table 1). Suckling systems make better use of growing potential of calves between birth and weaning. Calves learn to eat roughage at an earlier age, provided it is available to them (Wagenaar and Langhout, 2006). There was a significant fortnightly body weight gain in modified organic rearing system in both the year (6.74 and 7.71 kg) as compared to artificial calf rearing system (5.80 and 5.85 kg) at 90 days of age. Delayed separation (after 14 days) induces better weight gain and better calf health and influences the development of the calf's social behavior compared with separation at one day (Flower and Weary, 2001). Increased weight at weaning has a positive impact on milk production at first lactation.

The mortality and morbidity rate was higher in artificial calf rearing system (30.00 and 26.66 %) as compared with the modified organic calf rearing system (13.30 and 10.00 %) from birth to weaning age. In artificial calf rearing system higher mortality rate might be due to excess intake of milk after longer fasting interval which resulting in frequent diarrhea in calves, and the temperature of milk was not properly maintained during winter and spring seasons especially during morning dose. In artificial calf rearing system calf mortality was mainly caused due to diarrhea and respiratory problems. When raising calves artificially, the quantity of milk fed was a key factor in determining the health and well being of the calf (Wagenaar and Langhout, 2006). In organic calf rearing system, there was better disease resistance and absence of illness in calves, young stock and growing bulls (Grondal *et al.*, 2007). In artificial calf management practices the calf mortality rates was high (up to 30% or more) from birth to weaning. In this case diarrhea affected 10-35% of dairy calves and accounted for 14% of deaths. Respiratory problems were found in 8-15% of calves and accounted for 46% of deaths. When raising calves artificially, the quantity of

Table 1: The body weight gain and mortality percentage of calves from birth to weaning in different management practices

| Age of calf (day) | Artificial rearing of Calf Management | | Modified Organic Calf Management | |
|-------------------|---------------------------------------|----------------------------------|----------------------------------|---------------------------------|
| | 1 st year (wt in kg) | 2 nd year (wt in kg) | 1 st year (wt in kg) | 2 nd year (wt in kg) |
| 0 | 25.84±0.46 ^{gB} (N=30) | 27.45±0.72 ^{gAB} (N=30) | 26.76±0.55 ^{gAB} (N=30) | 28.00±0.42 ^{gA} (N=30) |
| 15 | 30.93±0.94 ^{fC} (N=27) | 31.89±0.84 ^{fBC} (N=26) | 33.70±0.60 ^{fAB} (N=30) | 35.43±0.66 ^{fA} (N=29) |
| 30 | 34.87±0.73 ^{eD} (N=25) | 38.13±1.35 ^{eC} (N=24) | 41.69±0.75 ^{eB} (N=28) | 44.88±0.38 ^{eA} (N=29) |
| 45 | 40.20±0.93 ^{dD} (N=24) | 43.00±1.26 ^{dC} (N=24) | 49.08±1.01 ^{dB} (N=27) | 52.20±0.64 ^{dA} (N=28) |
| 60 | 46.00±0.87 ^{cB} (N=22) | 48.28±1.27 ^{cB} (N=23) | 56.49±0.86 ^{cA} (N=26) | 58.60±0.77 ^{cA} (N=28) |
| 75 | 52.10±1.07 ^{bC} (N=22) | 55.15±1.16 ^{bB} (N=22) | 64.75±0.62 ^{bA} (N=26) | 66.60±0.57 ^{bA} (N=27) |
| 90 | 57.90±1.49 ^{aD} (N=21) | 61.00±1.06 ^{aC} (N=22) | 71.49±0.65 ^{aB} (N=26) | 74.31±0.62 ^{aA} (N=27) |
| % of mortality | 30.00 | 26.66 | 13.33 | 10.00 |

Values with superscript A, B, C, D differ significantly (P< 0.05) in a row; Values with superscript a, b, c, d, e, f, g differ significantly (P<0.05) in a column.

milk fed was a key factor in determining the health and well being of the calf. In artificial rearing of calf management practices the calves were approximately fed 10% of their body wt of milk in two divided doses using bucket. There are benefits of feeding calves larger amounts of milk than the tradition 10-12% of body weight per day, such as increasing growth, improved mammary development, accelerated age at first calving, and increasing milk production during first lactation, whereas there is evidence that calves suffer from hunger with a restrictive diet (De Paula Viera *et al.*, 2008; Borderas *et al.*, 2009). Bucket fed calves are unable to perform their natural sucking behavior, but teat-based milk feeding systems provide such an opportunity (Vasseur *et al.*, 2010). Research has shown short term sucking has more advantages than disadvantages on production, health and behavior of both cow and calf compared with immediate separation after birth (Krohn, 2001). In modified organic calf, the calf was allowed to suck for several days with nursing cows and there were health benefits for the cow with reduced incidence of mastitis and placental retention.

In conclusion the partially modified organic calf rearing system produced calves having better body weight gain performance at weaning, less morbidity and mortality rates. This system of calf rearing also needs less attention, encouraging result and more economically viable as compared to artificial calf rearing system.

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