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Original Research

Behaviours, Health Status and Growth Performance of Crossbred Jersey Calves Reared Under Different Weaning System

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Abstract

Weaning age of the dairy calf is a matter of considerable ongoing debate. The present study was undertaken to know the outcome of day-old weaning and weaning at 6-8 weeks of age in crossbred Jersey calves maintained at Veterinary College and Research Institute, Orathanadu, Tamil Nadu, India. In the day-old weaning system, collection of higher milk yield, better control of calf milk intake and faster return to oestrus of the dam were observed as merits. However, in this system, the higher incidence of calf mortality, reduced growth rate and abnormal behavioural responses were also observed. The weaning of calves at 6-8 weeks of age has the advantage of better daily weight gain, improvement in health condition and loss of abnormal behavioural responses were noticed. The preliminary results of this study revealed that weaning the calves at 6-8 weeks of the age had a beneficial effect on the calf's growth, health, and behaviour. Hence, the weaning of calves at 6-8 weeks of age is highly suitable for the intensive dairy farming system in India.

Keywords: Behaviours, Weaning System, Growth Performance, Health Status, Crossbred Calves

Introduction

Dairy farming is becoming popular among the farmers of Tamil Nadu. A major contribution to the state milk production is mainly from Crossbred Jersey cattle cows (Anon, 2019). Making the calf independent of its mother is known as weaning. The rearing of calf during the milk feeding period is a laborious management practice and critical to maintaining the optimal cows' and calves' performances (Kamboj and Kumar, 2013).

Over the past decade, several studies have explored different methods of weaning systems and examined possible merits and demerits of this weaning system. However, no study is conducted in India for a suitable weaning system in an organized dairy farming system. Hence, the current research was focused to know the suitable weaning system required for an organized dairy farm in Indian condition. In this study, we presented and discussed the advantages and disadvantages of the day-old weaning and weaning at 6-8 weeks after calving. We examined the health, behaviour, and growth performance of calves under these two weaning systems were observed. The preliminary outcome of this study results undoubtedly opened the new way to how to improve cow and calf welfare and performances on modern organized dairy farms. Our results indicate that weaning of calves at 6-8 weeks is a suitable weaning system that may be adopted in an organized dairy farm in Indian condition.

Materials and Methods

Herd Structure

The present study was carried out at Cow unit of Livestock Farm Complex, Veterinary College and Research Institute, Orathanadu, Tamil Nadu, India. The Cow Unit was established under the National Agriculture Development Programme (NADP) sponsored scheme on 'Establishing Nucleus Jersey Crossbred Bull-Mother Farm'. Crossbred Jersey cows were purchased based on phenotypic characters and production record (personal recording of milk yield during peak lactation) from milk shed areas in Vellore, Thiruvannamalai, Namakkal, Madurai, Erode and Theni districts of Tamil Nadu. The exact genetic composition (inheritance level of Jersey/non-descript) of these crossbred cows are unknown. This population consists of various inheritance levels of Jersey and non-descript cross.

Farm Management Practices

All crossbred Jersey animals were kept in the same environment with similar management practices. All animals were kept under an intensive system of management. The newborn calves were weaned on day-old. The adult animals were fed with 20-30 kg of green fodder and 5-7 kg of dry fodder daily. The concentrate feed of 2 kg was provided for maintenance and additional feed was given at the rate of 400 g for every kg of milk production. Milking was carried out twice a day at 12 hrs interval. Periodical disease screening for Tuberculosis, Johne's disease and Brucellosis was carried out. Animals were vaccinated against Foot-and-mouth disease and Hemorrhagic Septicemia.

Animals Groups and Collection of Data

In this study, 10 numbers of calves were separated from their dam immediately after birth and 10 calves were kept along with their dam for the period of 6- 8 weeks. In the latter case, the initial 5 days after calving the calf and dam were kept together with free contact. After that calves could suckle its dam only during milking hours even though the dam and calves remain in the same shed (Figure 1). Under the day-old weaning system, immediately after birth, the calves were fed with colostrum through pail feeding at four to five times in a day for up to 4 days. The calves were given whole milk twice a day @ 10 per cent of its body weight (Figure 2). In both groups, calves were offered the calf starter feed contained 22 per cent protein after 2 weeks of calving. Besides, calves were fed a high-quality green fodders ad-lib. The experimental animals were recorded monthly body weight, body condition and behaviours.

Figure 1: Dam suckling their calve in 6-8 weeks of age weaning system

Figure 2: Feeding of whole milk and calf starter for calves under day old weaning system

Result and Discussion

Weaning is common practice in the dairy industry, but these weaning practices are disputed because of animal welfare concerns. In the modern intensive dairy farming system day old weaning is commonly practised. In the day-old weaning system, the calves are separated from the dam shortly after birth (Passillé *et al.*, 2008). Under this weaning system, the cow is not allowed to suckle its calf. Instead, the cow is completely milked out and required quantities of whole milk or skim milk are fed to the calf. This is carried out for the perceived benefits of economic gain by collecting a higher milk yield; better control of calf milk intake; faster return to oestrus cycle of the dam; improved milk let-down in the milking parlour and reduced distress by removing the calf before the cow-calf bond forms (Flower and Weary, 2003; Wagenaar and Langhout, 2006).

Effect of Weaning System on the Calf's Health

In the day-old weaning system, the calves were shown rough coat, dry hair, patchy hair loss, and potbelly, even though they were regularly dewormed and supplemented with the mineral mixture (Figure 3). Some calves were reluctant to suck milk from the pail and not adapted to solid feed after several months lead to emaciation. The calves weaned at 6-8 weeks of age, the skin and hair coat condition of the calves were much improved compared to day-old weaned calves (Figure 4). The calves with dam were nipple the tender leaves of green fodder within two weeks period and started taking concentrate feed after two weeks. Further, dermatitis and patchy hair loss was not a problem in this case. Smijisha and Kamboj (2010) reported that the incidence of total illnesses was higher in buffalo calves fed milk using a nipple with the bottle.

Figure 3: Crossbred Jersey calves reared under a day-old weaning system

Figure 4: Crossbred Jersey calves which are weaned at 6-8 weeks of age

The day-old weaned calves were more prone to infection and lead to high calf mortality. The calves were more frequently affected with enteritis and pneumonia. The calves weaned after 6-8 weeks less frequently affected with enteritis and pneumonia. The disease occurrence was comparably reduced when dams allowed suckling their calves and ultimately the mortality of young calves was reduced. A similar result was reported by Mejia *et al.* (1998) that there was very low calf mortality in suckled calves as compared to artificially reared calves. Further, the incidence of faecal scours and other illnesses were higher in calves reared by pail feeding compared to naturally sucking calves (Ugarte and Preston, 1973; Smijisha and Kamboj, 2010). The overall health condition and appearance of the calves was much improved when they were weaned after two months.

Effect of Weaning System on the Calf's Growth

The reduction in weight gain and stunted growth were observed in day-old weaned calves. The calves weaned at 6-8 weeks age attained higher weight gain (Table 1). Previous studies also revealed that the suckled calves gained more weight as compared to artificially pail/hand feeding calves (Khan and Preston, 1992; Sanh *et al.*, 1997; Boonbrahm *et al.*, 2004; Roth *et al.*, 2009). The attainment of higher weight gain was possible mainly through suckling of higher fat content in the residual milk and related to differences in milk intake (Yilma *et al.*, 2006, Sanh *et al.*, 1997, Mejia *et al.*, 1998).

Table 1: Comparison of growth performance of day-old weaned, and 6-8 weeks weaned crossbred Jersey calves ($^{NS-}$ Non-significant)

Animal No	Birth weight		4th weeks body weight		8th weeks body weight	
	Control	Treatment	Control	Treatment	Control	Treatment
1	24	26	34	40	38	45
2	22	22	31	33	34	37
3	23	29	32	34	35	38.5
4	20	26	28.5	38	32	43.5
5	22.5	27	31	40	34	45.5
6	25	20	34.5	28	39	31.5
7	18	20	25	27.5	29.5	30.5
8	23	26	30	38.5	34	44
9	26	20	35	29	40	33
10	22	22	30	32	33.5	36.5
Mean	**22.55**	**23.8**	**31.1**	**34**	**34.9**	**38.5**
Standard deviation	**2.3148**	**3.359894**	**3.025815**	**4.904646**	**3.238655**	**5.734884**
Standard error	**0.7716**	**1.119965**	**1.0086**	**1.634882**	**1.079552**	**1.911628**
P-value	**0.418519^{NS}**		**0.188789 ^{NS}**		**0.153395 ^{NS}**	

Effect of Weaning System on the Calf's Behaviour

We observed that the day-old weaned calf had shown abnormal behavioural symptoms like inter licking and suckling of counter mate's ear, scrotum, and tail. These symptoms were not reduced even after supplementation of the mineral mixture through the salt lick. These abnormal behaviours arise due to unfulfilled suckling of calf's need can lead to inter-sucking where calves suck the ears, tail, navel, prepuce and scrotum of other calves, and the equipment in the pen (Kamboj and Kumar, 2013). When calves were weaned at a later stage after calving not displayed any more cross sucking, licking objects, and licking of other counter mates. Similarly, it reported that calves fed milk from artificial feeders showed significantly more abnormal behaviours (cross-suckling) than naturally sucking calves (Froberg *et al.*, 2008; Roth *et al.*, 2009).

Effect of Weaning System on Cows

Separation of calves after prolonged suckling has a profound effect on the behaviour of cows. After separation dam shows frequent bellowing (Vocalization) and less frequent intake of feed and water, continuous walking in search of calves and rarely lying down/resting. Some of the primiparous animals tend to let down little quantities of milk by withholding milk for their calves. Whereas some animals show a complete stoppage of milk production after the separation of calves.

Conclusion

In the organized dairy farming system, weaning of calves at age of 6-8 weeks after calving is preferable to compare day old weaning systems in Indian conditions. The weaning of calves at 6-8 weeks of age had several advantages like improved general body condition and health, low calf mortality, and absence of abnormal behaviour problems. Hence, this system weaning is more opt for Indian organized dairy farms to get optimal performances in both calves and dams.

Conflict of Interests

There is no conflict of interest.

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