



Original Research

Pathology and Effect of Soil Nutrient Management in *Berseem* Var. *BL-10* and Vit. A, Vit. D3 and Vit. E Supplementation on Calf Growth and Calf Survival Rate

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Abstract

Future of dairy farmers depends on the successful raising of the young calves. Main objective of this trial is the doubling farmer income by dairy farming, by using test groups of calves, T₁ feeded with concentrate and multivitamin and T₂ feeded with concentrate multivitamin and green fodder (balance soil) Berseem. On the basis of statistical analysis, found that there is significant variation in all the tested parameters. The mortality percent determined for calf during the study period was 6.66 percent. In the present study the calf mortality recorded at unorganized dairy farm was relatively low perhaps can be attributed to both good management, feeding practices. It is important that the calf is given nutritious feed in the form of balance ration, multivitamin and fodder from its initial stage of rumen development. This will ensure good milk yield when it becomes a cow or produce better germplasm as a bull.

Key words: Body Weight, Calf, Double Income, Mortality, Unorganized Dairy Farm

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Introduction

Calf plays an important role in the development and profitability of farmers, as future and main income of dairy farmers solely depends on the successful raising of the young calves. Scientific rearing strategy of calves is the basis of efficient cattle breeding. According to Shivarudrappa (2013) healthy calves are not only play important role for livelihood of dairy farm but also necessity for preserving the good quality germplasm. Survival of neonatal calves is inevitable for livestock propagation; however, a large number of calves die during the first year of their life causing heavy loss on the economics of livestock production. Mortality of neonatal calves was attributed to conditions like diarrhoea and pneumonia Shrivastava *et al.*



(2015). Calf mortality was associated with the type of housing, feeding, soil nutrient management, weather conditions, external and internal parasitic infestation and bacterial infections especially those causing septicaemia and enteritis.

Mortality in neonatal calves of both cow and buffalo is due to infectious agents causing diarrhoea that is rotavirus, corona virus, enteropathogenic *Escherichia coli*, *Salmonella species* and *Cryptosporidium* along with these malnutrition is the major cause of neonatal calf mortality among the unorganized farms of different villages. Malnutrition is comparatively more common cause of neonatal mortality than the infectious agent. Afzal *et al.* (1983) described the mortality in cattle and buffalo calves ranged from 29.1 per cent to 39.8 per cent. According to Martin and Wiggins (1973), 20 per cent calf mortality resulted in reduction of 38 per cent profit of a livestock farm. Furthermore, 25 per cent average early calf mortality hardly provides any chance for regular replacement of low production animals. A minimum mortality rate of 5 per cent is usually acceptable to dairy farm having standard managerial conditions.

In this paper, the existing on farm practices of calves rearing among the villagers is compared with calves feeding with green fodder and multivitamin along with concentrate ration on the different parameter of calf such as body weight gain and change in length, girth, height of calves and mortality incidence in different groups of calves is reported. Main objective of this experiment is the doubling farmer income by dairy farming, reduce the calf mortality, improvement in breed and to reduce the age at first calving.

Materials and Methods

The work was conducted in Naisara village of Devkali block by Krishi Vigyan Kendra PG College, Ghazipur, Uttar Pradesh, India. The study was conducted for a period of three months from 30 October 2016 to 30 January 2017.

Table 1: Selected animal at start of trial

Animal Parameter/Selected Calf	Age(Month)	Length(L) Inch	Girth(G) Inch	Height(H) Inch	Body wt. (Bt) Kg
Calf-1	1.29	24	34.9	29	44.29
Calf-2	2	25	31	29	36.4
Calf-3	2	26	35	31	48.25
Calf-4	2.1	25	35	29	46.4
Calf-5	2	23.5	36	26.5	46.14
Calf-6	1.28	23	31	26	33.48
Calf-7	1.28	24	34.9	30	44.29
Calf-8	2	23	30	27	31.36
Calf-9	2.2	23.8	30	27	32.45
Calf-10	2	25	33	28	41.25
Calf-11	2	24	33.5	29	40.8
Calf-12	2.1	25	32	28	38.78
Calf-13	2.1	26	32	27	40.33
Calf-14	2.25	25.5	31.8	26.8	39.07
Calf-15	2.2	25	32	29	38.78

Cross bred cow calves, of both sexes upto one and half to two and half month of age, of Naisara Ghazipur were included in the study as shown in Table 1. These selected calves divided into three groups of five each one group as a control in which farmers follow their traditional practice simply feeding of available green fodder and second group of calf feeded with concentrate as per body weight (follows thumb rule of nutrient management) and multivitamin and third group feeded with balance amount of concentrate multivitamin and green fodder berseem after balancing soil nutrient on the basis of soil sample tested presented in figure (Fig. 2).



Fig. 2: Measurement of various parameter in calf

Testing of soil sample of selected farmer is done in soil testing lab of KVK Ghazipur and nutrients management is done as per soil testing results of respective farmers shown in Table 3 (Soil testing result of single farmer).

Table 3: Calf herd composition of unorganized farm during the period October 2016- April 2017

S. No.	Animal	Number
1	Initial number of Male cow calves	6
2	Initial number of Female cow calves	9
3	Female cow calves died during the period	1
4	Male Cow calves died during the period	0

Data were collected based on farm records of all calves deaths and post-mortem conducted over a period of three month on the Naisara Village of Ghazipur district. Information on the date of birth, length, girth, height, sex, breed, date of death, and causes of death were collected from the farm at the individual animal level (Fig. 2). Initially all data were recorded on a day-to-day basis and then tabulated on a master sheet on week-by week and month-by-month basis for study. Data on the causes of mortality were obtained from

death reports routinely prepared. Most of the diagnoses were based on clinical backgrounds and post-mortem findings. Before the trial during last one year, among these farmers on the basis of history mortality is comparatively more in buffalo calf compare to cow calf. According to history of these farmers average mortality is 30% during 2015-16 and most of mortality due to malnutrition and diarrhoea.

Statistical Analysis

Association between various parameter such as length, girth, height and body weight between groups and within groups was determined and data is statistically analyzed with the help of Analysis of Variance (One way ANOVA).

Result and Discussion

Calf management plays an important role in the development of dairy sector of the country. Calf management and survival is also essential for preserving and maintaining our good quality germplasm. The increased mortality in young calves during early days of life, adversely affects the profitability of most of the livestock farming systems. Environment, management and presence of pathogenic agents are critical factor involved in bovine neonatal mortality. Present study was undertaken to determine the incidence of calf mortality up to 5 months of age of either sex or different breeds, from unorganised farm of Naisara Ghazipur included in study conducted for a period of 3 months. Mortality of neonatal calves is largely due to enteric infections and malnutrition causing diarrhoea. Timely prevention and control of calf diarrhoea and provide balance diet along with multivitamin is important to reduce economic losses to producers and improve animal welfare.

Herd Composition and Calf Management Practices

However, the details of herd composition were taken during the distribution of berseem seed in Naisara village. At the start of study period in the month of October 2016, the farm comprised 6 male cow calves (taken two in each group) and 9 female cow calves (three in each group). During the study period, 1 female cow calves and zero male cow calves died (Table 4).

As in usual practice weaning is done during the last stage of lactation, during the study period farmers are convinced to wean there calf during the second month of lactation. Farmers are suggested to give expected milk initially 1/10th of body weight till 5-30 days, 1/15th of body weight, 1/20th of body weight, 30-45 days and 45-60 days respectively. Regular monitoring for parasitic infections is done and when required the calves are given albendazole above 21 days of age for deworming. Deworming is done at the end of every month. No vaccination is done till 6 months of age. The history provided and available data revealed similar managerial practices followed by the dairy owners. In most of the unorganised dairy farms weaning was done immediately after birth and colostrums was hand fed for initial 0-5 days.

Table 4: ANOVA Table showing significant variation between and within the groups

Parameter		Sum of Squares	df	Mean Square	F	Sig.
Length	Between Groups	38.596	2	19.298	43.694	0
	Within Groups	5.3	12	0.442		
	Total	43.896	14			
Girth	Between Groups	64.876	2	32.438	29.223	0
	Within Groups	13.32	12	1.11		
	Total	78.196	14			
Height	Between Groups	13.225	2	6.613	15.132	0.001
	Within Groups	5.244	12	0.437		
	Total	18.469	14			
Body weight	Between Groups	4481.761	2	2240.881	47.405	0
	Within Groups	567.256	12	47.271		
	Total	5049.017	14			

Calf Mortality

The number of calves dying at during the study period (October 2016 - April 2017) is shown in Table 3. The mortality percent determined for calf during the study period was 6.66 per cent. Average age of calf mortality was determine 20 days. The mortality percent for male and female calves was calculated as zero per cent and 6.66 per cent respectively. Literature reveals variable reports on calf mortality incidence from different geographical locations. Moran (2011) opined that a range of 15 to 25 per cent pre-weaning calf mortality is typical on many tropical dairy farms. If the mortality goes as high as 50 per cent, it is indicative of very poor calf management. Shrivastava *et al.* (2015) determine mortality percent for male and female calves at organized farm was 55.26 per cent and 44.73 per cent respectively.

In the present study the calf mortality recorded at farm was relatively low due to better management of few number of animals in unorganized farm and perhaps can be attributed to green fodder multivitamin along with balance ration and proper soil nutrient management. Moreover in the present study there was appreciable difference in the mortality per cent in male and female calves.

Calf Health

During the study period average weight gain by calf within 3 month of duration in different group are different and varies significantly due to feeding of berseem multivitamin and balanced ration mortality is reduced up to 6.66 per cent. Its indicate berseem, multivitamin and balanced ration play a significant role in reducing calf mortality. During the start of experiment average length of calf is 24.52 inch which is significantly varies in each group (Table 5). In control group average variation in length, Mean \pm SE is 40.24 \pm 0.34293, in T₁ group Mean \pm SE is 40.58 \pm 0.28705 and in T₂ group Mean \pm SE is 43.8 \pm 0.25495 is found at the end of experiment.

Table 5: Detailed of ANOVA showing significant variation

Parameter		N	Mean \pm SE
Length	Control	5	40.2400 \pm 0.34293
	T ₁ Group	5	40.5800 \pm 0.28705
	T ₂ Group	5	43.8000 \pm 0.25495
	Total	15	41.5400 \pm 0.45720
Girth	Control	5	43.7000 \pm 0.76811
	T ₁ Group	5	45.7200 \pm 0.11576
	T ₂ Group	5	48.7600 \pm 0.25020
	Total	15	46.0600 \pm 0.61021
Height	Control	5	37.700 \pm 0.44045
	T ₁ Group	5	38.4600 \pm 0.20396
	T ₂ Group	5	39.9600 \pm 0.16310
	Total	15	38.706 \pm 0.29656
Body weight	Control	5	116.6400 \pm 4.89516
	T ₁ Group	5	128.4600 \pm 0.67052
	T ₂ Group	5	157.7600 \pm 1.98761
	Total	15	134.2867 \pm 4.90336

While average variation in girth is also significantly varies between the groups, at the start of experiment average girth of animal is 32.8 inch but at the end of experiment in control group it varies significantly, mean \pm SE is 43.7 \pm 0.76811 and in T₁ group mean \pm SE is 45.72 \pm 0.11576 and in T₂ group mean \pm SE is 48.76 \pm 0.25020. Height variation between the group is also found significant. In control group, mean \pm SE is 37.7 \pm 0.44045 while in T₁ group mean \pm SE is 38.46 \pm 0.20396 and in T₂ group Mean \pm SE is 39.96 \pm 0.16310 found at last stage of experiment. Body weight of calf also varies significantly between the group and within the groups.

During the start of experiment average body weight of calf is 40.13 Kg, at the end of experiment it varies significantly, in control group mean \pm SE is 116.64 \pm 4.89516 and average body weight gain is 840 gram per day, in T₁ group mean \pm SE is 128.46 \pm 0.67052, average body weight gain is 960 gram per day and in T₂ group mean \pm SE is 134.2867 \pm 1.98761 and average body weight gain is 1307 gram per day. All parameter means length, girth, height and body weight varies significantly within the groups and between the groups represented in graphical farm. Similar way daily body weight gain is also reported by Kretz *et al.* (1987) that is 830 to 930 gram. But in Present study in T₂ group daily body weight gain is 1370 gram which is higher comparison to other reports its might be due to use of feeding of multivitamin along with berseem after balancing soil nutrient and concentrate ration.

Postmortem Findings

Died calf during research period having history of diarrhoea with profuse watery yellowish faeces and inappetance from last two days. In small intestine all parts were highly congested and haemorrhagic. The

gross observations of calves comprised dehydrated carcass, perianal soiling congested intestine with yellow watery contents or excessive mucous, ballooning, thickening and erosions. The intestinal mucosa was covered with yellow blood tinged mucoid exudates. The major findings in animals with enteritis comprised dehydrated carcass, congested intestine with watery contents or excessive mucous, sometimes severe haemorrhage in the entire intestine or part of the intestine, ulcerations, ballooning, thickening and erosions. In some cases the spiral and distal colon contained bloody pseudo membranous casts. A green, mucoid faecal cast was also infrequently seen in the colon. In three cases the spiral and distal colon contained bloody pseudo membranous casts. Abomasal haemorrhages and distension were observed in few cases. Mesenteric lymph nodes (Fig. 3) were invariably enlarged and hepatomegaly or necrotic foci on liver with distended gall bladder were also observed.

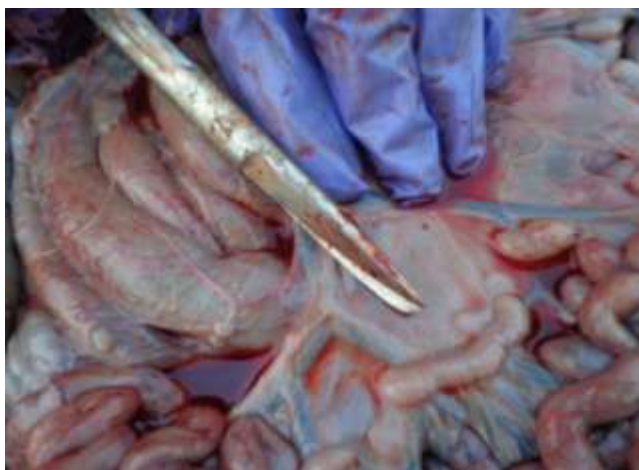


Fig. 3: Postmortem examination of calf showing enlarge and Hemorrhagic intestinal lymph node.

Shrivastava (2014) also reported similar finding during post-mortem examination of calf at organized dairy farm surrounding to Jabalpur area.

Conclusion

In the present study the calf mortality recorded at unorganised dairy farm was relatively low perhaps can be attributed to both good management and feeding practices. Feeding the dairy calf can be likened to a double-edged sword; we want to feed balance and nutritious feed along with multivitamin and green fodder to the calves as per requirement of body to get rapid growth so that they begin lactating early in life. Feeding and management of calves in initial stage also reduces calf mortality. Growth phase of the cows is confined to the first two years of its life. It is important that the calf is given nutritious feed in the form of balance ration, multivitamin and fodder right from its initial stage of rumen development. This will ensure good milk yield when the calf becomes a cow or produce better germplasm when it becomes a bull.



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References

1. Shivarudrappa B, Gopal Reddy S, Jyoti S and Bhagat RL. 2013 Assessment of Buffalo Calves Mortality in West Godavari District of Andhra Pradesh, India. 2: 704 doi:10.4172/scientificreports.704.
2. Shrivastava DP, Swamy M, Dubey A and Upadhyay AK. 2015. Incidence of calf diarrhea and mortality in organized dairy farm, Veterinary Practitioner. 17:61-62.
3. Afzal M, Javid MH and Anjum AD. 1983. Calf mortality: Season Pattern, age distribution and causes of calf Mortality. Pakistan Veterinary Journal. 3: 30-33.
4. Martin SW and Wiggin. 1973. Perinatal diseases. American Journal of Veterinary Research 34, 1027. Quoted by Blood, D. C. 1994. Vet. Medicine, Eight Ed., ELBS, London. pp. 107-112.
5. Moran J. 2011. Factors affecting high mortality rates of dairy replacement calves and heifers in the tropics and strategies for their reduction. Asian Australasian Journal of Animal Science. 24 (9): 1318-1328.
6. Kertz AF, Prewitt LR and Ballam JM. 1987 Increased weight gain and effects on growth parameters of Holstein heifer calves from 3 to 12 months of age. Journal of Dairy Sci. 70(8):1612-22.
7. Shrivastava DP. 2014. Pathology of enteric bovine corona virus infection associated with calf mortality, M.V.Sc Thesis. Nanaji Deshmukh Veterinary Science University, Jabalpur.

