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Mortality Pattern in Crossbred Calves of Dairy Cattle

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ABSTRACT

The study was conducted at Cattle Breeding Farm, Nagpur Veterinary College, Nagpur. A record of 64 crossbred calves died during 2000-2015 was used for the study. The period-wise distribution of calf mortality showed that highest mortality rate was recorded in period P1 and the lowest in period P2. Age-wise distribution revealed that calf mortality was highest in 0 to 1 month age group in both sexes and lowest was in 1 to 3 months of age group. Sex-wise it was 19.05 per cent for male calves and 11.00 per cent in female calves. Season-wise distribution showed that the highest calf mortality (40.30%) was found in calves borne during the winter season. The overall mortality rate due to parity of dam was 39.34, 16.67, 33.33 and 31.94 per cent, respectively for first, second, third and fourth calving. The highest mortality in crossbred calves was recorded due to gastroenteritis followed by pneumonia.

Key Words: Causes, Calf mortality, Calving, Mortality rate, Pneumonia.

INTRODUCTION

Calf plays an important role in the development and profitability of a dairy farm, as future of dairy herd solely depends on the successful raising of the young calves. Healthy calves are not only essential for sustenance of dairy farm but also necessary for preserving the good quality germplasm. According to Sreedhar *et al* (2010) high survival rate in a dairy farm helps to increase the selection pressure which is one of the main factors controlling genetic gain and profitable returns. Calf care is not only essential for sustenance of the dairy herd, but also essential in the wake of preserving and maintaining proven germplasm. Tiwari *et al* (2007) noted that the growth performance of calves in rural dairies revealed poor health condition, which indicated lack of awareness among farmers on scientific management. Verma and Thakur (2013) reported that production efficiency traits can be utilized for the selection of future dairy cows for both production and reproduction potential and profitability. Hence there is a need to study the commercial dairy farms in terms of calf mortality with emphasis on calf management practices being adopted by the dairy farmers.

Mortality among dairy cattle results in financial loss, including the value of the lost cattle, cost of replacement, loss of milk production, and extra labour. Several herd-level risk factors for mortality have been identified, such as herd size, herd management, and milk yield. Mortality patterns in organized dairy herds serve as a useful indicator for assessing the status of herd health and the efficacy of management programs. A rise in mortality among a group of cattle can indicate suboptimal health and welfare. Calf mortality in every dairy and breeding farm results in financial and genetic loss. Therefore, reductions in morbidity and mortality rate are the first and foremost targets of dairy farm management. Identification of factors that are responsible for the death of cattle is an important prerequisite for avoiding excessive mortality.

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Table 1. Calf mortality according to period of the year.

Period	Male			Female			Overall mortality		
	No. of Birth	Total no. of death	Mortality Per cent	No. of Birth	Total no. of death	Mortality Per cent	No. of Birth	Total no. of death	Mortality Per cent
P1	16	11	68.75	23	10	43.48	39	21	53.85
P2	17	4	23.53	17	1	5.88	34	5	14.71
P3	44	18	40.91	32	8	25.00	76	26	34.21
P4	28	6	21.43	28	6	21.43	56	12	21.43
Chi-square value	4.89NS			4.65NS			8.33*		

*Significant at P<0.05; NS= non significant

Therefore, the present study was conducted to investigate the calf mortality with special reference to better management practices in a dairy farm.

MATERIALS AND METHODS

Collection of Data

The data of present study were collected from the records of Sahiwal x Jersey crossbred cattle herd, maintained at Cattle Breeding Farm, Nagpur Veterinary college, Nagpur, Maharashtra, covering a period of 16 years from 2000-2015. Information on the date of birth, sex, breed, date of death, parity of dam and causes of death were collected from the farm records at the individual animal level. The collected data were analyzed to study mortality pattern in different age groups.

Data classification

The total period of the calf mortality was divided

Table 2. Calf mortality according to age and sex in crossbred calf.

Age (Month)	Male			Female			Overall mortality		
	No. of Birth	Total no. of death	Mortality Per cent	No. of Birth	Total no. of death	Mortality Per cent	No. of Birth	Total no. of death	Mortality Per cent
0-1	105	20	19.05	100	11	11.00	205	31	15.12
1-3	85	6	7.06	89	4	4.49	174	10	5.75
3-6	79	4	5.06	85	6	7.06	164	10	6.10
6-9	75	9	12.00	79	4	5.06	154	13	8.44
Overall	37.14			25			31.22		
Chi-square value	8.54*			3.19NS			10.64*		

*Significant at P<0.05; NS= non significant

Table 3. Calf mortality according to season of birth.

Period	Male			Female			Overall mortality		
	No. of Birth	Total no. of death	Mortality Per cent	No. of Birth	Total no. of death	Mortality Per cent	No. of Birth	Total no. of death	Mortality Per cent
Summer	29	5	17.24	24	1	4.17	53	6	11.32
Monsoon	43	15	34.88	42	16	38.10	85	31	36.47
Winter	33	19	57.58	34	8	23.53	67	27	40.30
Chi-square value	5.04NS			6.11*			6.99*		

*Significant at P<0.05; NS= non significant

into four groups (P1=2000 to 2003; P2=2004 to 2007; P3=2008 to 2011; P4=2012 to 2015). The year was divided into three seasons (summer = March-June; monsoon=July-October; winter=November-February). The parity of dam was determined as first (Pty-1), second (Pty-2), third (Pty-3) and fourth onwards (Pty-4).Calf mortality records kept at the farm were used for the study.Number of calves born in this period was 205 of which 64 died (31.22%). The percent of animal disposed from the herd due to different reasons was calculated by proportion using descriptive statistics.

Table 4. Calf mortality according to season of death.

Season	Number of calves died	Percentage
Summer	6	9.38
Monsoon	31	48.44
Winter	27	42.18
Total	64	100

Table 5. Calf mortality according to parity of dam in crossbred cattle.

Period	Male			Female			Overall mortality		
	No. of Birth	Total no. of death	Mortality Per cent	No. of Birth	Total no. of death	Mortality Per cent	No. of Birth	Total no. of death	Mortality Per cent
Pty-1	33	16	48.48	28	8	28.57	61	24	39.34
Pty-2	21	3	14.29	21	4	19.05	42	7	16.67
Pty-3	16	7	43.75	14	3	21.43	30	10	33.33
Pty-4	35	13	37.14	37	10	27.03	72	23	31.94
Chi-square value	3.49NS			0.47NS			3.41NS		

*Significant at P<0.05; NS= non significant

RESULTS AND DISCUSSION

Mortality rate during different period of the year

The pattern of calf mortality showed that the highest mortality rate (53.85%) was recorded in P1 (2000 to 2003), which included 68.75 and 43.48 per cent in male and female calves respectively, whereas, the lowest (14.71%) was determined in P2 (2004 to 2007), which included 23.53 and 5.88 per cent in male and female calves, respectively (Table1). Mishra *et al* (2015) observed highest mortality rate in P4 and lowest in P2. The lowest percentage of calf mortality in second phase of establishment of herd might be due to small number of population in the dairy herd. The period had significant effect ($P<0.05$) on the overall mortality rate in calves. Rawal and Tomar (1994) showed significant effect of period on mortality rate in Sahiwal female whereas, Gupta *et al* (2016) found the effect of period on mortality as non significant ($P>0.05$) in murrah buffaloes. The highest mortality rate in P1 might be a combined effect of season, parity and herd size.

Table 6. Calf mortality rate (%) according to causes of disease.

Cause	Number of calves died	Percentage
Pneumonia	12	18.75
Gastroenteritis	21	32.81
Septicemia	8	12.50
Cold Shock	7	10.94
Hydrocephalus	1	1.55
uremia	2	3.13
Pasturellosis	3	4.69
Other	10	15.63
Total	64	100

Mortality rate according to age and sex

The maximum percentage (15.12%) of calves died at the first month of age observed in the study (Table 2) was in agreement with the findings of Islam *et al* (2005) who found comparatively larger percentage of calf mortality (84.0% and 35.2% respectively) during first month of age. Mortality was decreased with the increase in age of calves. These results revealed that first 30d are more sensitive for calves rearing and special care and management should be maintained during this period. The overall mortality percentage in 1 to 3m of age group was 5.75 per cent (7.06% in male and 4.49 % in female). Mishra *et al* (2015) in Gir calves reported lower estimates than the present findings. The overall mortality rate in 3 to 6m of age group was 6.10 per cent. The percentages of mortality in male and female calves were calculated to be 5.06 and 7.06 per cent. However, lower estimates than present finding was recorded by Kumar *et al* (2002a) in organized dairy farms of Andhra Pradesh.

The mortality rates from 6 to 12m of age were also calculated and the values were 8.44 per cent (12.00% in male and 5.06% female calves, respectively). Kambaj *et al* (2006) in buffalo calves had reported an overall mortality rate of 14.59 per cent which is higher than that of our present finding. Sex-wise distribution of calf mortality indicates that out of a total 105 male calves, 39 calves (37.14%) died, whereas, out of 100 female calves, a total of 25 calves (25.00%) were reported to be dead. The reason for higher percentage of death in male calves than in females, might be due to want of milk, better care and management practices adopted for raising of females, whereas, male calves might have ignored. In the present study, the overall mortality in cross-bred calves was found to be 31.22 per cent, however, Sreedhar *et al* (2010), Mishra *et al* (2015) found a lower mortality rate (19.5%) in buffaloes and (15.09%) in Gir calves, respectively.

Mortality rate according to season of birth

Season-wise distribution showed that the highest calf mortality rate (40.30%) was determined in those calves born in the winter season (November to February). The percentage of mortality in male calves was recorded as 57.58 per cent whereas, that of female calves was 23.53 per cent during winter season. The lowest (11.32%) percentage

of mortality was recorded during summer season (March to June). The higher percentage of mortality during winter season was also recorded by Kumar *et al* (2002b) and Mishra *et al* (2015) in Ongole and Gir calves, respectively. The effect of season had significant effect ($P < 0.05$) on the overall mortality and in female calves.

Mortality rate according to season of death

Greater percentage of calves was died in monsoon. Data presented in table 4 showed that out of 64 died calves, 31 were died in monsoon (48.44%), 27 in winter (42.19%) and 6 in summer season (9.38%). Mortality rate was higher during monsoon (48.44%), which revealed that monsoon was most susceptible season to calf disease and mortality. Moist and humid conditions along with heavy rainfall may be suitable for growth and proliferation of disease causal agents. Similar pattern of mortality have been reported by other workers (Islam *et al* (2005). However, Shahi and Kumar (2014), Mishra *et al* (2015) reported higher mortality rate in winter for crossbred and Gir calves respectively.

Mortality rate according to different parity of dam

The overall mortality rate due to parity was found to be 39.34, 16.67, 33.33 and 31.94 per cent in Pty-1, Pty-2, Pty-3 and Pty-4 and onwards parities, respectively (Table 5).Highest mortality (39.34%) was observed in first parity and least (16.67%) mortality was observed in second parity. The highest mortality in first parity was observed by Mishra *et al* (2015) and Gupta *et al* (2016) in Gir calves and Murrah buffalo calves, respectively. The effect of parity on mortality was established to be non-significant ($P > 0.05$) in cross-bred calves. Similar findings were reported by Gupta *et al* (2016) in murrah buffalo calves whereas, Mishra *et al* (2015) reported that the parity of dam had significant effect on the mortality rate in Gir female calves.

Mortality rate according to cause of diseases

The highest mortality in crossbred calves was recorded due to gastroenteritis (32.81%) followed by pneumonia (18.75%), other (15.63%) and septicemia (12.50%). The highest mortality rate in crossbred calves was recorded due to delayed feeding of colostrums to the calves (Table 6). Similar findings were reported by Mishra *et al* (2015), Shrivastava *et al* (2013), Sreedhar and Sreenivas (2015). In our study, pneumonia was found to be the second important cause of calf mortality with 18.75 per cent. Similar findings were observed by Mishra *et al* (2015) in Gir calves. High incidence of mortality due to gastroenteritis in calves might be due to bacterial and/or viral infection or due to delayed feeding of colostrum to the calves.

CONCLUSION

Intensive health care and management is the prerequisite for young calves especially in winter and monsoon season to minimize mortality due to gastroenteritis and pneumonia problems which will facilitate maximizing intensity of selection among calves born out of elite mating. Thus, the availability of male and females with high genetic merit for future production can be increased.

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