

Full Length Research Paper

Studies on the calf mortality pattern in Gir breed

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This study aims to investigate calf mortality pattern in Gir breed. Research data were collected from the records of Gir herd, maintained at Kasturba Gandhi National Memorial Trust, Dairy Farm Kasturbagram Khandwa Road, Indore M.P., covering a period of 16 years (from 1994 to 2009). The period-wise distribution of calf mortality showed that highest mortality rate (18.9%) was recorded in period P₄ (2006 to 2009) and the lowest (9.8%) in period P₂ (1998 to 2001). Age-wise distribution of calf mortality showed that it was highest (5.4%) in 0 to 1 month age group in both sex. The lowest mortality was observed in 3 to 6 months of age group, which might be due to better management practices given to this age group. The mortality rate from 1 to 3 months and 6 to 12 months age group was also calculated and the values of mortality rate as 3.6 and 4.4% respectively. Sex-wise distribution of calf mortality indicates that out of total 208 male calves, 34 calves (15.9%) died, whereas, out of 196 female calves, a total of 27 calves (14.3%) were reported to be dead. Season-wise distribution showed that the highest calf mortality (5.7%) was determined in those calves born in the winter season. The overall mortality rates due to parity of the dam were 7.2, 4.5, 1.4 and 2.8% respectively for first, second, third and fourth calving. The highest mortality in Gir calves was recorded due to gastroenteritis (6.2%) followed by pneumonia (3.2%), insufficient or delayed colostrums feeding, handling causes and worm infestation (3.6%). Gastroenteritis as the prime cause of mortality could be synchronized with the results of high mortality rate in Gir calves during winter season in this investigation.

Key words: Mortality rate, calf mortality, gastroenteritis, pneumonia.

INTRODUCTION

Mortality of calf is an important trait both for breeding and economic point of view in dairy enterprise. A high survival rate in a dairy herd helps increase the selection difference which is one of the main factors controlling genetic gain and more economic returns. When Kankrej cattle were studied, it was observed that calf mortality below one month of age was 19.17%, while 53.6% of death occurred before two months of age. Mortality was higher in male than female calves and was lower in

summer than in winter or monsoon season. The aim of the present study was to evaluate the Gir cattle in respect of survivability of young stock and suckling behavior of different sex up to 15 days of their life for bringing about improvement in overall efficiency. Gir is one of the well described dairy breeds of India with a good survival and reproductive performance. The home tract of this breed is Gir forests of South Saurashtra in Gujarat. It is found in more or less pure form all over Saurashtra and in the

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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 (%)	No. of birth	No. of death	Mortality (%)	No. of birth	No. of death	Mortality (%)
P1	56	8	14.28	40	7	17.5	96	15	15.62
P2	49	8	16.32	63	3	4.76	112	11	9.82
P3	47	7	14.89	33	6	18.18	80	13	16.25
P4	56	13	23.21	60	9	16	116	22	18.9
Chi-square value		1.97 ^{NS}			4.96 ^{NS}			4.43 ^{NS}	

NS=non significant.

Table 2. Calf mortality according to age and sex in Gir.

Age (Month)	Male			Female			Overall mortality		
	No. of birth	No. of death	Mortality (%)	No. of birth	No. of death	Mortality (%)	No. of birth	No. of death	Mortality (%)
0-1	208	12	5.76	196	10	5.10	404	22	5.44
1-3	196	8	4.02	188	6	3.19	387	14	3.61
3-6	188	6	3.14	182	3	1.64	373	9	2.41
6-12	182	7	3.78	179	9	5.02	364	16	4.39
Overall		15.86			14.28			15.09	
Chi-square value		2.05 ^{NS}			9.29*			5.97 ^{NS}	

* Significant at P<0.05.

adjoining areas of Maharashtra, Rajasthan and Madhya Pradesh.

establishment of herd might be due to small number of population in the dairy herd.

MATERIALS AND METHODS

The data of present study were collected from the records of Gir herd, maintained at Kasturba Gandhi National Memorial Trust, Dairy Farm Kasturbagram Khandwa Road, Indore M.P., covering a period of 16 years from 1994 to 2009.

The total period of the calf mortality was divided into four (P1 = 1994 to 1997; P2 = 1998 to 2001; P3 = 2002 to 2005 and P4 = 2006 to 2009). The year was divided into four seasons (Winter = October to January; Summer = April to June; Rainy = July to September and Spring = February to March). The parity of dam was determined as first (Pty-1), second (Pty-2), third (Pty-3) and fourth onwards (Pty-4).

RESULTS AND DISCUSSION

Mortality rate according to different period of the year

The calf mortality showed that the highest mortality rate (18.9) was recorded in P4 (2006 to 2009), which included 23.21 and 16.00% in male and female calves respectively, whereas, the lowest (9.82%) was determined in P2 (1998 to 2001), which included 16.32 and 4.76% in male and female calves, respectively (Table 1). The lowest percentage of calf mortality in second phase of

Mortality rate according to age and sex

The mortality rate in the first month of life was highest (5.44%) in both sexes (Table 2). In other words, the calves were more susceptible to the diseases and other environmental stresses in this group. This 0 to 1 month period is the most crucial stage of the calf life and it is seen that after this period the chances of survival of calves get maximized. The overall mortality percentage in 1 to 3 months of age group was 3.61% (4.02% in male and 3.19% in female). The overall mortality rate in 3 to 6 months age group was 2.41%. The percentages of mortality in male and female calves were calculated to be 3.14 and 1.64%. 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 12 months of age were also calculated and the values were 4.39% (3.78 and 5.02% in male and female calves, respectively). The Kambaj et al. (2006) in buffalo calves was reported to have an overall mortality rate of 14.59% which is higher than that of our present finding. The results indicate that the mortality in the first half was almost double than that recorded in second half of a year of calf's life. Sex-wise distribution of calf

Table 3. Calf mortality according to season of birth.

Season	Male			Female			Overall mortality		
	No. of birth	No. of death	Mortality (%)	No. of birth	No. of death	Mortality (%)	No. of birth	No. of death	Mortality (%)
Winter	208	14	6.73	196	10	4.59	404	24	5.69
Summer	194	12	6.18	187	7	3.74	381	19	4.98
Rainy	182	5	2.74	180	5	2.77	362	10	2.68
Spring	177	5	2.82	175	4	2.28	352	8	2.55
Chi-square value		5.55 ^{NS}			4.19 ^{NS}			9.19 [*]	

* Significant at P<0.05; NS= Non significant.

Table 4. Calf mortality according to season of death of calf.

Season	Male			Female			Overall mortality %		
	No. of birth	No. of death	Mortality (%)	No. of birth	No. of death	Mortality (%)	No. of birth	No. of death	Mortality (%)
Winter	208	13	6.25	196	6	2.55	404	19	4.45
Summer	195	11	5.64	190	7	3.66	385	18	4.66
Rainy	184	8	4.34	183	7	3.80	367	15	4.07
Spring	176	5	2.84	176	5	2.82	352	9	2.83
Chi-square value		2.88 ^{NS}			0.419 ^{NS}			4.19 ^{NS}	

^{NS}=non significant.

mortality indicates that out of a total 208 male calves, 33 calves (15.86%) died, whereas, out of 196 female calves, a total of 28 calves (14.28%) were reported to be dead. The reason for higher percentage of death in male calves than in females, might be due to the fact that for the want of milk, better care and management practices would have been adopted for raising of females, whereas, male calves might be ignored. In the present study, the overall average mortality in Gir calves were found to be 15.09%, however, Sreedhar et al. (2010) found a higher mortality rate (19.5%) in buffaloes.

Mortality rate according to season of birth

Season-wise distribution showed that the highest calf mortality rate (5.69.0%) was determined in those calves born in the winter season (October to January). The percentage of mortality in male was recorded as 6.73%, whereas, that of female calves was 4.59% during winter season. The lowest percentage of mortality was recorded during Rainy (July to September) and Spring (February to March) (Table 3). Similar findings were reported in calves by Kumar et al. (2002b) in Ongole calves.

Mortality rate according to season of death

The overall mortality was found to be highest in summer

(4.66%), probably due to excessive ambient temperature and scarcity of green feed and fodder. Ghosh et al. (1996), in different breeds and their crosses reported similar lethal effect of the summer on calves mortality rate. In the present study, a higher mortality rate in male (5.6%) than female (3.7%) was determined (Table 4).

Mortality rate according to different parity of dam

The sequence of lactation play important role in the mortality of Gir calves. The parity of dams had significant effect ($p<0.01$) on the mortality rate in female calves. The overall mortality rate due to parity was found to be 7.17, 4.54, 1.40, 2.84% in pty-1, pty-2, pty-3 and pty-4 onwards parities respectively. The decreasing trend of calf mortality with the subsequent deliveries reveals that as the dam have more calving, it becomes experienced in rearing the calves (Table 5).

Mortality rate according to causes of diseases

The highest mortality in Gir calves was recorded due to gastroenteritis (6.18%), which was due to bacterial or viral infections, or due to delayed feeding of colostrums to the calves (Table 6). Balvir et al. (2009) observed gastroenteritis (7.30%) as major causes of mortality followed by pneumonia and others. In our study, pneumonia

Table 5. Calf mortality according to parity of dam in Gir.

Parity	Male			Female			Overall mortality		
	No. of birth	No. of death	Mortality (%)	No. of birth	No. of death	Mortality (%)	No. of birth	No. of death	Mortality (%)
Pty-1	208	14	6.25	196	15	7.65	404	29	7.17
Pty-2	194	11	5.64	181	6	3.35	375	17	4.54
Pty-3	183	3	1.63	175	2	1.15	358	5	1.40
Pty-4	180	7	3.86	173	3	1.75	353	10	2.84
Overall		6.25			7.65			7.67	
Chi-square value		7.0 ^{NS}			15.18 ^{**}			19.18 ^{**}	

^{**}Significant ($p < 0.01$), NS=non significant.

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

Period	Male			Female			Overall mortality %		
	No. of birth	No. of death	Mortality (%)	No. of birth	No. of death	Mortality (%)	No. of birth	No. of death	Mortality (%)
Gastroenteritis	208	12	5.79	196	13	6.63	404	25	6.18
Pneumonia	196	9	4.59	183	3	1.63	379	12	3.16
Tympany	187	3	1.86	180	2	1.11	367	5	1.36
Septicaemia	182	3	1.64	177	0	-	359	3	.83
Others	179	7	3.91	177	5	2.80	356	13	3.65
Chi-square value		12.06 [*]			27.66 ^{**}			31.96 ^{**}	

^{*}Significant ($p < 0.05$); ^{**}significant ($p < 0.01$).

was found to be the second important cause of calf mortality with 3.16%. Similar findings were observed by Patgiri et al. (1987) in Kankrej x Jersey calves, whereas, Islam et al. (2005) observed pneumonia as major cause of calf mortality in Bangladesh. Insufficient or delayed colostrum feeding, handling causes, worm infestation, snake bites etc. were found to be the third reason of calf mortality, which resulted in 3.65%. Handling causes includes unhygienic condition of shed, incorrect knowledge about care and management of new born calf, improper protection against unfavorable condition and defective management practices. Verma et al. (1996) also observed that timely and required amount of colostrum feeding to neonatal calves resulted into lower incidences of death. The percentages of mortality due to tympany, hepatitis and septicemia were found to be 1.36, 0.80 and 0.83 respectively, with similar mortality rate in new born calves.

Conclusion

The influences of period, age, sex, season of birth, season of death, parity of dam, causes of diseases and sires on mortality rate of Gir calves have been investigated. The sex and season of death do not have any significant influence on the calf mortality rates. However, the age, season of birth, parity of dam and

diseases has highly significant effect on the mortality rates in Gir calves.

Conflict of Interest

The authors have not declared any conflict of interest.

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