Effect of year,-season and sex of calf on pre-weaning calf mortality in Butana dairy cattle

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SUMMARY

A total of 938 Butana calves born during the years 1979 to 1989 at Atbara Research Station were used to study the effect of year, season and sex of calf on incidences of calf mortality. Weighted least square methodology was used to analyse these data. The overall average of calf mortality was 33% indicating poor level of management year-season-sex of calf interaction was highly significant (p < 0.005). Future research should investigate the influence of sire of calf and age of dam on the incidence of calf mortality.

INTRODUCTION

Percent calf crop is the most important factor **influencing gross income in any beef operation. Calf survival is a complex trait that positively** affects the percent of calf crop. Calf mortality on the other hand, results in decreased farm gross income and loss of potential breeding males and replacement heifers.

In a herd of Hereford, Fagerlin et. al. (1968) reported an average death loss from birth to weaning of 9.2%. Ensminger (1977) reported an average estimate of 6.0% for the same trait. Cundiff et. al. (1982) and Bellows (1983) reported similar average of 8.0% and 9.6% respec-

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Lively. Although these are moderate pre-weaning death rates, higher percentages of up to 14.7% were found in the literature (Morris et. al., 1986). Recently, Ray et. al. (1989), in a study on unsupplemented Hereford range cows, reported an overall average death rate of only 3%.

Calf mortality is influenced by both genetic and non-genetic factors. The most important genetic factor is the sire of the calf (Ray et. al., 1989). On the other hand, the most important non-genetic factors are year of calving (Ray et. al., 1989) and age of dam (Cundiff et. al., 1982; Bellows, 1983; Morris et. al., 1986; and Ray et. al., 1989). Poor calf rearing practices and inadequate pre-weaning nutrition play a role in increasing the incidence of calf mortaltiy. Morris et. al. (1986) reported significant sex differences within a 2-year-old group of dams. Specifically, the death rates were 9.1% for males versus 3.2% female calves.

The purpose of this study was to determine the effect of year, season and sex of calf on the incidence of pre-weaning calf mortality.

MATERIAL AND METHODS

The data in this study consisted of 938 Butana calves covering 1979 to 1989 inclusive. Each record contained dam identification number (ID), ID of the calf, calf date of birth and calf sex. Age of dam and sire of calf were not recrorded. In addition a note was made on whether or not the calf had died during the pre-weaning period. Out of the 938 calves, there were 309 calf losses. Three seasons were early summer (March to June), late summer (July to October) and winter (November to February). This resulted in 66 year-season-sex subclasses. Distribution of records by subclasses is shown in table 1.

The data were analysed using weighted least squares with year-season-sex interaction in the model (Steel and Torrie, 1980). The weights were the reciprocals of the number of observations in each year-season-sex subclasses.

Calf pre-weaning mortality in Butana cattle

*Table 1: Total number of calves born (No.) and percent of calf mortality (%)
by year-season-sex of calf subclass.*

Year	Sex	Early summer No.	Early summer %	Late summer No.	Late summer %	Winter No.	Winter %
1979	M	22	4.55	22	13.64	14	21.43
	F	18	22.22	23	17.39	11	9.09
1980	M	14	7.14	21	9.52	13	61.54
	F	20	10.00	21	33.33	12	75.00
1981	M	15	13.33	12	41.67	14	21.43
	F	22	31.82	5	40.00	9	33.33
1982	M	28	64.29	6	16.67	17	11.76
	F	17	23.53	15	40.00	14	14.29
1983	M	22	9.09	8	12.50	13	7.69
	F	19	31.58	11	9.09	11	54.55
1984	M	20	15.00	6	66.67	10	50.00
	F	20	30.00	12	50.00	9	11.11
1985	M	16	31.25	8	12.50	7	28.57
	F	14	57.14	9	55.56	10	20.00
1986	M	19	15.79	7	14.29	11	36.36
	F	15	13.33	7	28.57	21	19.05
1987	M	17	41.18	6	16.67	16	43.75
	F	10	30.00	16	18.75	17	35.29
1988	M	14	85.71	10	100.00	14	64.29
	F	20	65.00	12	83.33	15	46.67
1989	M	9	66.67	12	16.67	14	50.00
	F	18	50.00	14	71.43	14	42.86

M= Male.
F= Female.

RESULTS AND DISCUSSION

Year-season-sex interaction..
 The results of the analysis of variance (ANOVA) for the effect of year-season-sex interaction on number of calf are shown in table 2. The year-season-sex interaction was highly significant (p < 0.005). The main effects of year, season and sex on calf were not tested since the interaction effect was significant.

Table 2: Analysis of variance for the effect of year-season-sex of calf interaction on number of calf losses.

Source	df	Sum of square	Mean square	
Total	938	3089979.00		
Mean	1	1017907.27		
Year-season-sex	65	457820.68	7043.40	3.80 ***
Error	872	1614251.05	1851.21	

*** indicates significant difference p < 0.005.

 Percent calf mortality by year-season of calving are shown in figure 1 and 2 for male and female calves, respectively. Figure 1 indicates that, during the early years, percent mortality was lower for early and late summer than for the winter season in male calves. During recent years however, late summer and winter seasons had lower mortality rates than early summer. The results for the female calves show a slightly different picture. During the earlier years percent of calf mortality was lower for early and late summer, than for the winter season, but during recent years however, both early summer and winter had lower rates than the late summer season. Also the difference in mortality rates between early and late summer slightly increased with years. The expla-

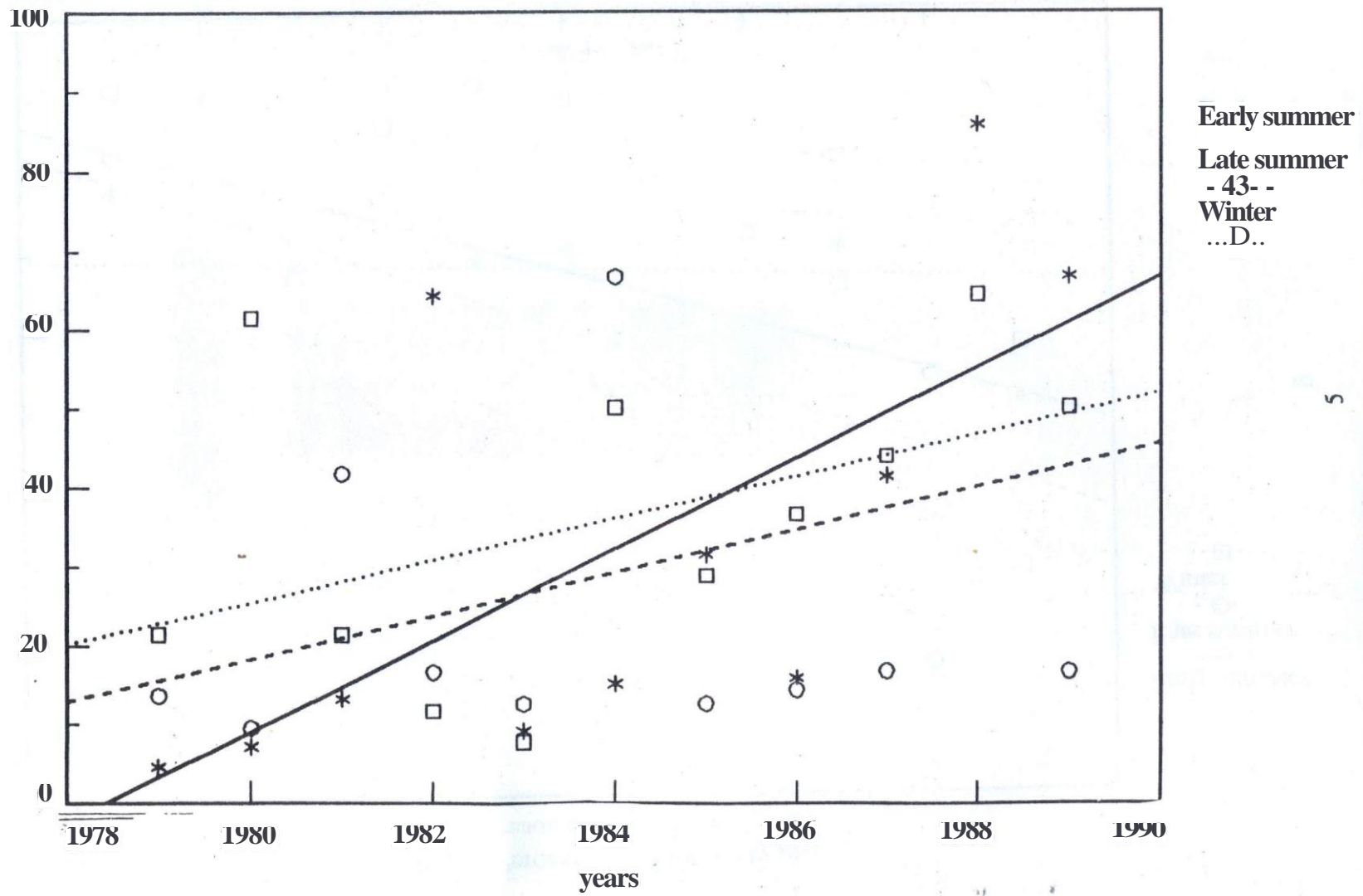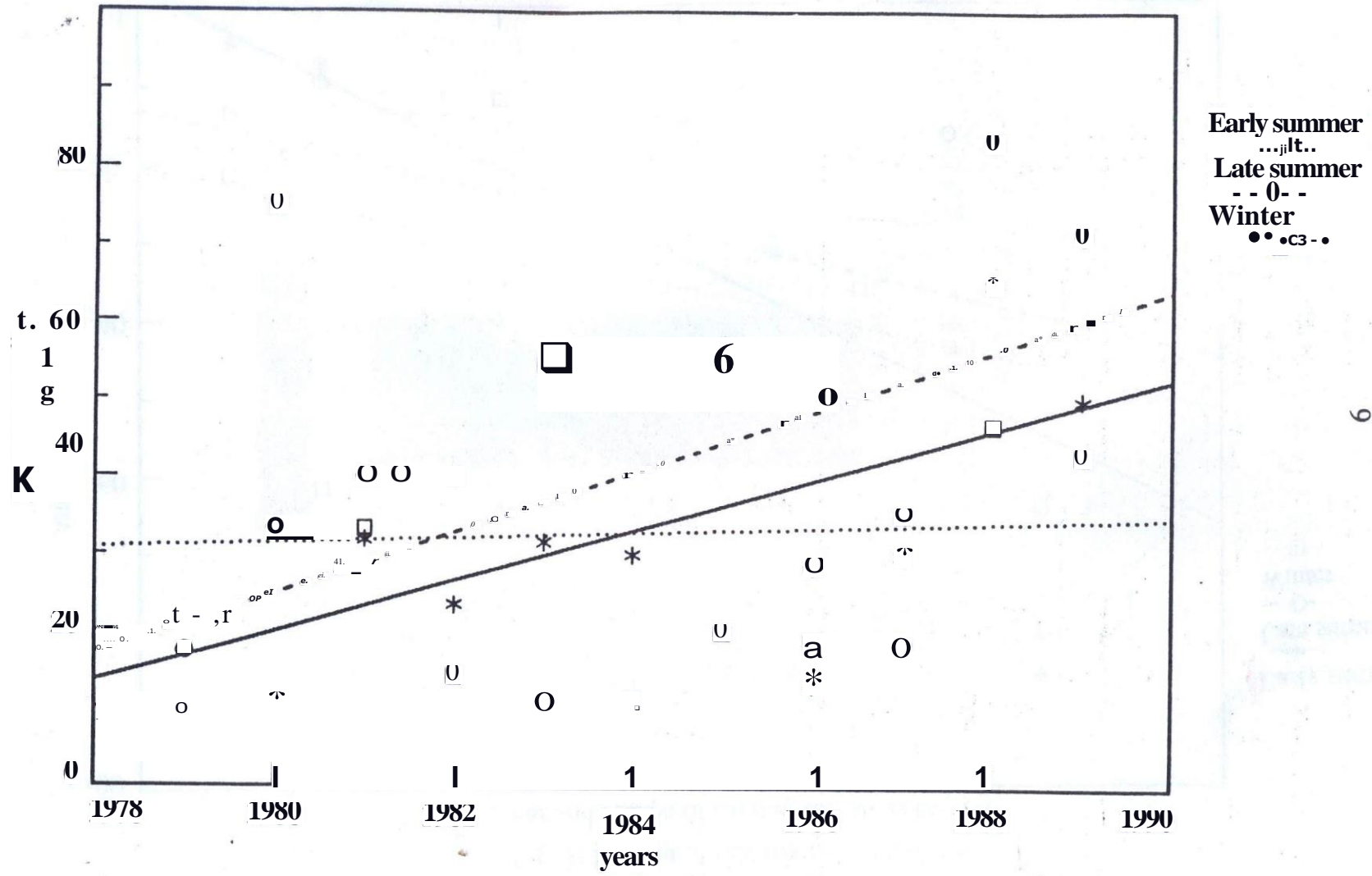Fig. 1: Percent of calf mortality related to year and season of calving fot male calves.

Fig. 2: Percent of calf mortality related
to year and season of calving for female calves.

nation of this interaction is difficult. However, a general observation to be noticed is that irrespective of sex of calf, there has been a yearly increase in percent calf mortality for early and late summer calvings. This increasing trend indicates a yearly deterioration in calf rearing practices, general management of the herd, as well as variation in climatic condition and fodder supply. The overall average calf mortality was 33%, a figure considered to be too high for any commercial or research operation. The values found in the literature ranged from 3% (Ray et. al., 1989) to 14.7% (Morris et. al., 1986).

The interaction of year-season-sex of calf was highly significant (p < 0.005) on calf mortality. Since the overall average calf mortality was 33%, efforts should be made to raise the level of calf rearing, as well as general management practices. It is also recommended that future research should further investigate causes of calf mortality.

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