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Factors Affecting Calf Mortality Rate in Elneshasheba Dairy Farm in Wad Medani, Gezira State, Sudan

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ABSTRACT--- ***Calves mortality rate and factors affecting it were studied in Elneshasheba Dairy Farm in the Gezira (Sudan) from 1986 to 1988. There were variations in calf mortality rate between years. It increased with increasing birth weight to a peak between 20 and 30kg (60-71%) and then declined. Mortality rate was generally higher in males (50.69%) than females (31-50%). It was generally higher before calves were 42 days old (23-59%) and then declined. It was generally higher in the first parity (19-30%) and then declined and was almost zero in the 10th parity. Mortality rate was higher for calves born in January (48-68%) followed by February (21-30%) and then March (0.0-13%) and then declined. Most calves died from more than one disease with variations among years in diseases leading to death. The most important diseases causing mortality were pneumonia, theileriosis, diarrheas and coccidiosis.***

Keywords--- Calves, mortality rate, parity, dairy farm, Sudan

1. INTRODUCTION

The demand for dairy products increased substantially in the Sudan in the last decades due to increased human population, urbanization, improved living standards and education and nutritional awareness. Dairy products demands exceeded endogenous production and imports are required at very high costs. It is important to attain self-sufficiency in dairy products for food security, saving foreign currency, creating jobs and exploiting natural resources. Dairy production is an important sector in the Gezira State due to high demands; available markets, reputed breeds and available feeds, but there are many obstacles. Calf mortality is an important trait affecting the number of calves available as replacers or for meat production and hence affecting profits. It is generally high in the tropics and may reach 50% [1], and is considered one of the main constraints for genetic improvement [2]. It was 3- 10% in developed countries [3] and may reach 14-18% [4]. Variations among farms in calf mortality rate were high (3.7- 32.1%) in California [5]. In Sudan it was 16.9% up to 1 year old in Kenana calves in Um Banein research station [6] and 33% in pre-weaned Butana calves in Atbara research station [7]. Roy [8] reported that the reasons for mortality vary with age. According to Payne [1] the main mortality reasons in the tropics are diarrhoea, pneumonia and internal parasites. In Atbara, the interactions of year ×season, sex on calf mortality was significant ($P \leq 0.05$), but their main effects were not tested [7]. Information on calf mortality in the Gezira is not available. Consequently, data on calf mortality was collected and analyzed to study mortality rate and factors affecting it in calves in Elneshasheba dairy farm in Wad Medani in the Gezira State, Sudan.

2. MATERIALS AND METHODS

Elneshasheba dairy farm is located in Wad Medani in the Cezira State, Sudan. It was established in 1957 to produce milk for military camps and was then a research station to improve the performance of local Sudanese cattle mainly Kenana and Butana by selection and improving nutrition and management. It is the property of University of Gezira from 1975. The improved Sudanese breeds were then crossed with reputed international breeds, mainly Friesians.

The animals were usually well managed and fed. The cows were housed in open corrals partially shaded with corrugated iron sheets. The animals were grazed in the morning and afternoons. They were offered roughages *ad libitum* in the corrals and concentrates were fed according to milk yield and body condition. The cows were milked in the morning and afternoons in a milking parlour. Calves were weighed, ear tagged and left with dams to suckle colostrums

for three days and then offered fresh milk by pail. They were group housed and offered water, good quality forages and a calf starter in the first week and weaned at 3-4 month old. The farm has excellent records.

Data was collected for 243 male and 266 female calves in 1986-1988. The data included calves birth weight, sex, mortality. Mortality causes, dam parity and month of calving. The data was then transformed, means and standard errors were calculated and data was statistically analyzed as described by Snedecor [9].

3. RESULTS AND DISCUSSION

Table 1 shows the effects of birth weight and sex on calves' mortality rate. Mortality rate increased with increasing calves birth weight to a peak between 20 and 30 kg and then declined in all years. This was probably because most calves were born within this birth weight range. There were variations between years in the number of calves born and mortality rate. Similar variations in calf mortality rate were reported in Kenana calves in Um Banana [6] and in central Mali [2]. Pre- weaning mortality rate in Egypt was higher in light calves (69.23%) followed by heavy ones (27.27%) and was least for intermediate birth weights (14.10%) [10].

The mortality rate was generally higher in males compared to females in 1986 and 1987 and was similar in 1988. It was also significantly higher in males in Um Banein [6] and central Mali [2]. Pre-weaning calves mortality rate was relatively higher in females (10.95%) than males (8.56%) in Egypt [10]. The higher mortality rate in males was probably associated with heavier birth weight and more birth difficulties than in females.

Table 2 depicts the effects of age on calf mortality rate. Mortality rate was higher before 42 days old and then declined. There were variations between years in mortality rate at different ages. Saeed *et al.* [6] reported that mortality rate of Kenana calves in Um Banein was higher in the first week of age and declined up to weaning at four month old and then increased again from 91- 270 days old. In central Mali calf mortality was higher in the first month of age and low between weaning and one year old and was increased in the second year of age [2].

Calf mortality rate was generally higher in the first calving and then declined (Table 3). There were variations between years in mortality rate and could be associated with variations in management, nutrition and health. Similar results were reported in Kenana calves in Um Banein [6]. Pre-weaning calf mortality in Egypt was higher in the first calving (17.58%) than later calving (6.25- 9.09%) [10].The mortality rate was higher in the first calving because cows were immature with low birth weights and milk yields. However, Wilson [2] reported that mortality rate was lowest in the first calving in central Mali, and this could be because cows calved at higher ages. Therefore, it is recommended to service cows at reasonable ages and weights to reduce calf mortality.

Table 4 shows the effects of calving month on calf mortality rate. It was generally higher in January followed by February and March and then declined. Mortality rate was higher in the cold month of the year due to environmental stress. It was found that October had the highest mortality rate in Calfornia [5].Saeed *et al.* [6] found that season of birth significantly affected calf mortality rate in Um Banein. Calves mortality rate was higher in winter than summer in California [5]. Pre-weaning calf mortality in Egypt was higher in summer (11.40%) than winter (7.78%) [10]. In Iran calf mortality was higher in calves born in summer than autumn [12]. In central Mali calf mortality was higher in the dry season (41.7%) and in autumn (Wilson, 1986) and was associated with environmental stress. The effects of month and seasons of mortality rates could be alleviated by improving housing, hygiene and management and avoiding calving in periods of serious environmental stress.

Most calves died from more than one cause and there were variations between years in diseases causing mortality (Table 5). The most important diseases causing calf mortality were pneumonia, theileriosis, diarrhoeas and coccidiosis. According to Payne [1] scouring, pneumonia and parasites are the main causes of calf mortality in the tropics. Bath *et al.* [11] stated that persistent diarrhoea lowers calf resistance to other diseases, and pneumonia is a major disease in young calves. The main reasons for calf mortality in Iran were digestive tract disorders (58%) followed by respiratory diseases (13%) and diarrhoes was the main disorder[12].

4. CONCLUSION

The results showed that different factors affected calf mortality and confirmed that pneumonia, diarrhoeas and internal parasites are the main causes of calf mortality. More efforts are required to reduce calf mortality in the Gezira State.

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Table 1. Effects of birth weight on calves mortality rate in Elneshasheba dairy farm in Wad Medani, Gezira State, Sudan.

Parameters/ years	1986	1987	1988	Mean	SE(±)
Birth weight (kg): 05-09	01.54	03.40	00.00	07.28	1.87
10-19	03.08	13.60	15.20	18.24	4.07
20-29	70.77	60.20	66.30	54.23	1.35
30-39	20.00	13.60	18.50	24.56	1.49
40-49	01.54	06.80	00.00	08.78	3.28
50-60	00.00	02.30	00.00	05.59	1.58
Mean	18.707	21.440	19.242		
SE (±)	08.381	06.287	05.690		
Sex: Males	51.600	69.00	50.00	49.033	3.58
Females	48.400	31.00	50.00	40.970	3.58
Both sexes	45.200	55.90	53.40	45.863	1.85
Mean	44.083	46.13	46.65		
SE (±)	01.05	06.55	00.065		

Table 2. The effect of age on calves mortality rate (%) in Elneshasheba dairy farm in Wad Medani, Gezira State, Sudan.

Age (days)/ years	1986	1987	1988	Mean	SE(±)
< 22	29.2	33.3	25.8	32.83	1.36
22-41	23.1	59.4	39.8	39.42	6.27
42-61	13.9	04.2	12.9	18.26	3.22
62-81	09.2	00.0	09.7	12.40	5.51
82-101	03.1	00.0	03.2	07.28	2.95
102-121	01.5	00.0	02.2	05.65	2.18
122-141	00.0	01.04	00.0	02.93	1.54
142-161	00.0	00.0	00.0	1.39	0.00
162-181	00.0	01.04	01.1	1.48	1.54
182-201	03.1	00.0	02.2	6.68	2.69
202-221	01.5	00.0	00.0	3.27	1.88
222-241	00.0	00.0	01.1	2.93	1.54
242-261	01.5	00.0	00.0	3.27	1.88
262-281	00.0	00.0	00.0	7.39	0.00
282-301	00.0	01.4	01.1	4.74	1.69
302-321	03.1	00.0	01.1	5.85	2.53
322-341	01.5	00.0	00.0	3.27	1.88
342-362	01.5	00.0	00.0	3.27	1.88
Mean	09.72	7.39	9.45		
SE (±)	02.25	3.17	2.58		

Table 3. Effects of parity on the mortality rate of calves (%) at Elneshasheba dairy farm in Wad Medani, Gezira State, Sudan.

Parity/ years	1986	1987	1988	Mean	SE (±)
1	25.0	29.8	18.5	29.52	2.21
2	16.1	08.5	23.9	23.29	3.55
3	14.3	19.2	13.0	23.11	1.47
4	12.5	11.7	13.0	20.61	0.33
5	10.17	05.3	08.7	16.37	1.57
6	16.1	10.6	04.4	18.26	3.35
7	08.9	07.5	04.4	15.12	1.56
8	05.4	03.2	06.5	12.84	1.32
9	00.0	02.1	06.5	08.26	3.78
10	00.0	00.0	01.1	03.12	1.45
11	00.0	00.0	00.0	01.67	0.00
12	00.0	01.1	00.0	03.12	1.45
13	00.0	01.1	00.0	03.12	1.45
14	00.0	00.0	00.0	01.67	00.0
15	00.0	00.0	00.0	01.67	00.0
Mean	12.09	12.11	12.15		
SE (±)	2.76	2.50	2.45		

Table 4. Effects of calving month on the calves mortality rate in Elneshasheba dairy farm in Wad Medani, Gezira State, Sudan.

Calving month	1986	1987	1988	Mean	SE (±)
1	52.5	67.7	48.4	48.63	3.44
2	21.3	29.2	30.1	31.16	1.84
3	13.1	00.0	10.8	14.16	6.07
4	03.3	00.0	04.3	08.17	3.08
5	00.0	01.4	00.0	03.30	1.22
6	00.0	01.4	01.1	04.61	1.30
7	03.3	00.0	02.2	07.03	2.54
8	00.0	00.0	01.1	03.39	1.31
9	01.6	00.0	00.0	03.31	1.73
10	00.0	01.4	01.1	04.61	1.27
11	04.9	00.0	01.1	06.95	3.13
12	00.0	00.0	00.0	02.08	0.00
Mean	12021	9.99	12.28		
SE (±)	3.92	4.82	3.88		

Table 5. The effects of different diseases on calves mortality rate in Elneshasheba dairy farm in Wad Medani, Gezira State, Sudan.

Diseases	1986	1987	1988	Mean	SE (±)
Pneumonia	29.0	28.0	21.6	30.71	1.52
Theileriosis	10.8	26.0	21.6	25.85	3.44
Diarrhoeas	26.2	19.0	13.7	26.12	2.62
Coccidiosis	00.0	10.0	21.6	16.07	7.49
Weakness and emaciation	16.9	03.0	10.8	17.81	4.18
Tick fever	18.5	01.0	00.0	11.10	7.27
Babesiosis	04.6	06.0	00.0	09.55	3.77
Foot and mouth	00.0	06.0	00.0	06.11	4.03
Bloat	03.0	08.0	01.9	11.44	2.56
Abortion	03.0	02.0	14.7	13.55	4.53
Other diseases	26.1	11.0	08.8	22.45	4.18
Non specific	18.5	12.0	11.8	21.95	1.77
Mean	18.75	17.92	16.50		
SE (±)	03.20	02.41	2.96		