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Effect of Birth Weight On Mortality, Culling And Replacement Rate Among Frieswal Female Calves

Abstract

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The Mortality rate among Frieswal female calves was highest 38.46% in calves having birth weight ≤ 16 Kg. and lowest 3.03% in female calves having birth weight of 35-36 kg. The observed differences in female calf mortality rates among different birth weight groups were found to be significant. The culling rate among female calves was highest 40% in calves having birth weight of 17-18 kg. and lowest 5.26% in having birth weight of ≥ 37kg. The average culling rats among different birth weight groups also indicated that the culling rates was generally higher in the female groups under 22kg. birth weight. The differences in culling rate in different birth weight groups was highly significant (P≤0.01). The replacement rate based on female calves born was highest 79.39% in calves having birth weight 29-30 kg. and lowest 34.62% in calves having birth weight of ≤16kg. These estimates of replacement rate were exactly in accordance of the different components of replacement rate. The effect of birth weight on replacement rate on female calf basis was highly significant.
Key Words :- Mortality, Culling, Replacement rate, Frieswal female calves.

Introduction

Replacement rate is taken as the probability of a cow from the population having an offspring in a given year which subsequently enters the milking population and is a strong determinant factor in culling the animals with poor production to achieve higher genetic gain. A female calf either died, culled or may enter in the milking herd as a replacement stock. Hence, heifer replacement rate fully depends upon female calf mortality and culling from birth to age at first calving.

Objective of the study

To bring the genetic improvement in a dairy herd, selection is a long and expensive process, which becomes futile if the genetically superior germplasm fails to replace itself and its replacement rate at specific time is not optimum. Moreover, intra-population selection is a slow process to bring genetic improvement in the dairy herd. The present study was undertaken to investigate the effect of different birth weight groups on mortality, culling and replacement rate among Frieswal female calves.

Review of Literature

Effect of Birth weight on female calves mortality

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The studies of Lathwal (1989) and Mukherjee (1993) have revealed non-significant effects of calf birth weight on mortality rates in Red Sindhi and Karan Swiss female calves.

Rawal (1991) observed significantly higher mortality among calves having birth weights below 19 kg in Tharparkar breed and below 17 kg in Sahiwal breed.

Kumar (1999) in Hariana calves and Singh (2001) in Karan Fries calves have observed significant effects of calf birth weight on female calf mortality.

Effect of birth weight on culling rate among female calves

The birth weight of calf did not affect the culling rates in female calves of Red Sindhi (Lathwal *et al.,* 1993), Sahiwal and Tharparkar breeds (Rawal, 1991) and Karan Fries calves (Singh 2001) **The effect of birth weight were found to be significant in Karan Swiss and Hariana female calves as reported by Mukherjee (1993) and Kumar 1999.

Joslyn K Beard et.al., (2019) observed that heifer calves born to young cows had lighter birth body weight and 205d than heifer calves born to moderate and old cows.

A. Sakthivel Selvan et.al., (2020) observed that effect of sires on birth weight

of calves was found to be highly significant (P≤0.01). Season of birth had highly significant (P≤0.01) on birth weight in Zebu and crossbred cattle.

Effect of Birth weight on replacement rate on female calf basis

Kumar (1999) observed in Hariana cattle that birth weight of female calf had highly significant effect on replacement rate computed on female calf basis. Whereas Singh (2001) in Karan Fries cattle reported non-significant effect of birth weight on replacement rate on female calf basis.

Material and Methods

The relevant data for the investigation on 1175 Frieswal female calves distributed over a period of 14 years (1987-2000) were collected from history sheets, pedigree sheets and disposal records at military dairy farm Meerut.

The study was conducted to examine the effect of birth weight of female calves on their mortality, culling and survival in the herd up to their age at first calving. The birth weight groups were made taking a class interval of 2 kg. and in all 12 groups were made. The first group was made for the female calves having 16kg. and less. Second group of calves having 17-18 kg. and so on, and last group was for those with birth weight of 37 kg. or more.

The mortality, culling and replacement rate (Survival upto age at first calving) are the threshold characters and do not follow the normal distribution on phenotypic scale. The analysis of variance was conducted according to Tomar (2000).

Result and Discussion

The average mortality, culling and replacement rates among total female calves born in different birth weight groups have been given in Table 1 and their analysis of variance is given in Table 2.

(i) Mortality rate

The mortality rate among female calves (Table 1) was highest (38.46%) in calves having birth weight equal or less than 16 kg and lowest (3.03%) in female calves having birth weight of 35-36 kg. Further, these mortality averages indicated that in Frieswal cattle the chances of lossing a heifer calf is higher if the birth weight is under 20 kg. The observed differences in female calf mortality rates among different birth weight groups were found to be significant (Table 2). This finding was in conformity with the reports of Rawal (1991) in Tharparkar and Sahiwal, Kumar (1999) in Hariana and Singh (2001) in Karan Fries cattle. Whereas, no effect of birth weight on mortality rates in Red Sindhi and Karan Swiss female calves was observed by Lathwal (1989) and Mukherjee (1993). These differences in the observations may be attributed to the differences in management practices followed in the herds studied by different workers.

(ii) Culling rate

The culling rate among female calves (Table 1) was highest (40.00%) in calves having birth weight of 17-18 kg and lowest (5.26%) in calves having birth weight of ≥37 kg. Analysis of variance (Table 2) showed that the differences in culling rate in different birth weight groups was highly significant (P≤0.01)). The average culling rates among different birth weight groups also indicated that the culling rate was generally higher in the female groups under 22 kg birth weight. It was perhaps because of the relatively poor growth of such calves and not fulfilling the minimum standards of the growth at specified age fixed by the farm. This finding was supported by Mukherjee (1993) in Karan Swiss and Kumar (1999) in Hariana female calves. However, the birth weight of calf did not affect the culling rate in female calves of Red Sindhi (Lathwal *et al.*, 1993), Sahiwal and Tharparkar breeds (Rawal, 1991) and Karan Fries Female calves (Singh, 2001).

(iii) Replacement rate among female calves

The replacement rate based on female calves born was highest (79.39%) in calves having birth weight of 29-30 kg and lowest (34.62%) in calves having birth weight of ≤16 kg. These estimates of replacement rate were exactly in accordance of the different components of replacement rate. The effect of birth weight on replacement rate on female calf basis was highly significant (P≤0.01). Similar results were reported by Kumar (1999) in Hariana cattle but Singh (2001) in Karan Fries cattle observed non-significant effect of birth weight

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on replacement rate on female calf basis.

Table 1 : Average incidence of mortality, culling and replacement rate in different birth weight groups

Birth weight (kg)	Total female born (No.)	Female calves					
		Mortality		Culled		Survived upto AFC (replacement rate)	
		Number	Percent	Number	Percent	Number	Percent
Total	1175	161	13.70	136	11.57	878	74.72
≤16	26	10	38.46	7	26.92	9	34.62
17-18	30	6	20.00	12	40.00	12	40.00
19-20	44	9	20.45	9	20.45	26	59.09
21-22	60	7	11.67	14	23.33	39	65.00
23-24	108	14	12.96	10	9.26	84	77.78
25-26	217	25	11.52	20	9.22	172	79.26
27-28	341	43	12.61	31	9.09	267	78.30
29-30	165	24	14.55	10	6.06	131	79.39
31-32	86	14	16.28	9	10.47	63	73.26
33-34	46	5	10.87	5	10.87	36	78.26
35-36	33	1	3.03	8	24.24	24	72.73
≥37	19	3	15.79	1	5.26	15	78.95

Table 2 : Analysis of variance showing the effect of birth weight on mortality, culling and replacement rate (M.S. values)

Source of variation	d.f.	Mortality	Culling	Replacement rate
Birth weight	11	0.2343*	0.5202**	0.9918**
Error	1163	0.1172	0.0985	0.1814

Conclusion

These mortality averages indicated that in Frieswal cattle the chances of lossing a heifer calf is higher if the birth weight is under 20 Kg.

The observed differences in female calf mortality rates among different birth weight groups was found to be significant (P≤0.05). The culling rate among female calves was highest (40.00%) in calves having birth weight of 17-18 kg and lowest (5.26%) in calves having birth weight of 37 kg. and effect of birth weight on culling rate and replacement rate on female calf basis was highly significant (P≤0.01).

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