STUDIES ON EFFECT OF NON-GENETIC PARAMETERS ON MORTALITY PATTERN IN MURRAH BUFFALOES

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ABSTRACT

The theme of investigation was the herd of 1230 Murrah breed buffaloes at the dairy farm of Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana. The study was conducted for the episode of forty years 1971 to 2010, to make out the mortality pattern at this organized herd. The reasons for mortality were the affections of Digestive and Respiratory systems, also circulatory disturbances and the Unclassified reasons. The share of mortality of buffaloes with circulatory disturbances was principal i.e. 44.55%, followed by affections of digestive system 26.61%, unclassified condition were on the tune of 17.95% and the least was accounted at the affections of respiratory system with only 10.89%. The seasonal effect, period and parity have not any concern on the mortality pattern of animal and also it was non-significant too.

Keywords: buffalo, mortality, parity, period, season

INTRODUCTION

The main endeavour of the animal breeder is to boost the genetic improvement in important economic traits of animals. Disposal of large number of animals from any herd due to various reasons greatly affects its economy. While watching at future genetic gain of the herd the intensive selection to decide an element of disposing off animals remains to be the tough job. Intensive selection remains directly proportional to the quantum of selection differential in large sized herd. The number of born female calves during a year and when they reach at puberty it becomes replacement stock. It is immense necessity to rear the progeny of proven parents to encompass the healthy and high yielding animals and it is the fundamental of any dairy animal improvement programme. Every farm has compulsorily replacements due to the death and culling on performance ground. The calf disposal plays the important role in maintaining the herd strength and farm standards (Reddy and Nagarcenkar, 1989). The present investigation was undertaken in Murrah buffaloes with the objective to know the major cause of mortality and effect of season, period and parity on it.

MATERIALS AND METHODS

The statistics pertaining to ancestry,

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production and reproduction for the present exploration were collected from the history-cum-pedigree sheets, growth, production and reproduction records respectively maintained at the dairy farm of GADVASU, Ludhiana. The data with respect to these vital traits were composed over an episode of 40 years, i.e. from 1971 onwards to 2010 and pertained to 1230 animals that were born throughout the period of 1965 to 2010.

Statistical analysis

The statistics on mortality for the present revision pertained to animals which died during different parity, season and period. The effect of various factors viz. parity, season and period were studied on mortality to appraise relative involvement of each factor. For estimating the effect of these factors, data on mortality of only females were taken, so as to keep away the biasness in results, as males were transferred/ auctioned at early age.

Since the frame of collected data follows discrete allotment, for that reason it was required to get transformed by means of Arcsine transformation and transformed data including sum of squares for various factors incorporated in the statistical model were analyzed by Least-squares analysis as explained by Harvey (1968).

The following statistical model was used to study the variation in mortality (data from 1971 to 2010) due to parity, season and period.

$$Y_{ijkl} = \mu + R_i + S_j + P_k + e_{ijkl}$$

Where,

Yijkl is the lth observation on mortality of animals belonging to ith parity, died in jth season and kth period.

μ is the overall average of mortality percentage.

R_i is the effect common to all animals belonging to ith parity (i=1,2,3,4,5,6,7,8,9 and 10 & above parities).

S_j is the effect common to all animals died in jth season (j=1, 2, 3, 4, 5) and summer = 1, rainy = 2, autumn = 3, winter = 4 and spring= 5.

P_k is the effect common to all animals died in kth period (k=1, 2, ……,8).

e_{ijkl} is the random error, assumed to be NID (0, $\sigma^2 e$).

RESULTS AND DISCUSSION

Causes of mortality

The foremost causes for mortality were acknowledged as disturbances in circulatory system, which accounted for 44.55 percent of entire mortality followed by affections of digestive system (26.93%) and affections of respiratory system (10.89%) while unclassified condition accounted for 17.63% of total mortality. Similar percentage (25.81%) of casualty due to affection of digestive system was reported by Malhotra (2003) in the herd of crossbred cattle.

Unclassified conditions accounted for 17.63 percent of whole mortality which includes NAD (Nothing Abnormality Detected) cases, be deficient in of proper diagnosis and putrefied carcasses ensuing from overdue post mortem of animals.

Season wise incidence of mortality

Each year was alienated into five season's viz. summer, rainy, autumn, winter and spring (Table 2). Uppermost mortality was observed in winter (25%) followed by summer (24.03%) and rainy season (23.4%) whereas, highest occurrence of mortality of 38.29% was observed by Patil *et al.* (1992) during winter in Surti buffaloes. Parallel result was reported by Mourad and Rashwan

(2001) and Rana *et al.* (2010) in winter in Murrah buffaloes. Pooled percentage of these three seasons constitutes round about three forth (72.43%) of total season wise mortality. Towering mortality during summer season may be owing to the less efficient thermo-regulatory mechanism in buffaloes. The black colour of buffalo absorbs supplementary heat during sunny days, as a result it directs to the state of heat stress, which may be compensated by providing better managemental conditions. On the other hand, higher frequency of fatality during rainy season may be owing to increased dampness and underprivileged sanitary environment due to heavy rainfall over tiny period of time. Smallest amount of mortality was evidenced in autumn (11.22%) followed by spring season (16.35%), which is possibly due to temperature which is neither too high nor too low in these seasons. The effect of season on mortality was found to be non significant (P>0.05); this is in agreement with the findings of Khan *et al.* (2007).

Period wise incidence of mortality

The mortality accounts were taken from post-mortem records between 1971 to 2010. These years were alienated into 8 periods of five year each (Table 3). The leader percentage of mortality of 26.28 percent was stuck between the period of 1975 to 1980, which alone constitutes round about one fourth of total period wise occurrence of mortality and the slightest of 6.74 percent of mortality accounted between the periods of 1981 to 1985. The effect of period on mortality was found to be insignificant (P>0.05).

Parity/Lactation wise incidence of mortality

Parity wise mortality was calculated in ten categories viz. first parity to tenth and above parities underneath four disease situation. There were 312 lactating animals (females) died out of 1230 dead animals which constitutes about 25.36 percent of whole mortality (Table 4). Greatest mortality was observed in first parity or lactation (22.44%), which accounted for one fourth of total mortality, followed by third (16.35%), fourth (14.42) and second parity (13.14%). Least mortality was observed in 10^{th} parity and above, this may be due to the reason that a very few animals can reach up to this parity as most of the animals died due to different diseases prior to reaching up to 10^{th} and above parities. Out of all the diseases, bulk of the animals died owing to affections of circulatory trouble (44.55%) followed next to affection of digestive system (26.9%), unclassified condition constitutes (17.6%) and least mortality was due to affections of respiratory system which contributes (10.89%) of entire mortality. The effect of parity on mortality was established to be non significant (P>0.05).

CONCLUSION

The results of in hand study sketches the attention headed for circulatory disturbances and affections of the digestive system which accounts for more or less three fourth of full amount of mortality. Roughly one fourth of the whole mortality had been occurred all through in initial parity. All these factors designate the call for the improved management and anticipatory measures to be followed for dropping the mortality, so as additional number of animals will be available for future replacements, which will greatly enhance selection intensity, selection differential and moreover genetic gain at the farm.

Table 1. Reasons for mortality in buffaloes.

Disease code	Causes of mortality	Total number of animals died in 40 years	Average number of animal died per year	Percentage of animals died
A	Affections of Digestive system	331	8.27	26.93[a]
B	Affections of Respiratory system	134	3.35	10.89[bc]
C	Circulatory disturbances	548	13.7	44.55[a]
D	Unclassified	217	5.42	17.63[ac]
Total		1230	30.75	100.00

Table 2. Season wise incidence of mortality in buffaloes.

Season	Total number of animal died	Average number of animal died per year	Mortality (%)
Summer	75	1.875	24.03[a]
Rainy	73	1.825	23.40[a]
Autumn	35	0.875	11.22[bc]
Winter	78	1.95	25.00[a]
Spring	51	1.275	16.35[bc]
Total	312	7.8	100.00

Table 3. Period wise mortality in buffaloes.

Period	Total number of animal died	Average number of animal died per year	Mortality (%)
1971-1975	29	0.725	9.29[ab]
1976-1980	82	2.05	26.28[a]
1981-1985	21	0.525	6.74[ac]
1986-1990	28	0.70	8.98[ac]
1991-1995	48	1.20	15.38[bc]
1996-2000	37	0.925	11.86[a]
2001-2005	38	0.95	12.18[a]
2006-2010	29	0.725	9.29[ab]
Total	312	7.8	100.00

Table 4. Parity wise incidence of mortality in Murrah buffaloes.

Parity/ Lactation	Mortality Code				No. of animals died	% of total died
	A	B	C	D		
1	15	8	35	12	70	22.44[a]
2	12	3	15	11	41	13.14[bc]
3	16	3	24	8	51	16.35[bc]
4	14	5	21	5	45	14.42[bc]
5	11	7	13	5	36	11.54[bc]
6	9	3	11	1	24	7.70[ac]
7	4	3	9	3	19	6.10[ac]
8	1	0	4	6	11	3.53[acd]
9	2	2	3	1	8	2.54[cd]
10 & above	0	0	4	3	7	2.24[cd]
Total died	84	34	139	55	312	100.00

A-Affections of Digestive system, B- Affections of Respiratory system, C-Circulatory disturbances, D- Unclassified condition

Note: The means with at least one common alphabet as superscript do not differ significantly from each other.

Table 5. Analysis of Variance for factors affecting mortality in Murrah buffalo.

Source	Degree of freedom	Mean squares	F value
Sire	99	57.51	15.55*
Period	7	4.78	1.29[NS]
Season	4	8.29	2.24[NS]
Parity	9	6.35	1.71[NS]
Residual	594	3.69	
Total	713		

* $P < 0.05$, NS = Non-significant

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