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Effect of Non-Genetic Factors on Persistency and Milk Production Traits in Murrah Buffaloes

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ABSTRACT

The present investigation was undertaken to study the effect of different non-genetic factors viz. year, season and parity on various production traits. The 1177 lactation records of 272 Murrah buffaloes, progeny of 53 bulls that were maintained at GADVASU dairy farm, calved during 1981-2011 were studied. The overall least squares mean for persistency, 305-days milk yield and peak yield were 0.826±0.003, 2173.54±21.14 Kg and 12.65±0.09 kg, respectively. The effect of period of calving and parity was highly significant (P<0.01) on persistency, 305-days milk yield and peak yield. Peak yield also significantly affected by season of calving while the effect of season on persistency and 305-days was non-significant. The study concluded that the production traits were mainly affected by the non genetic environmental factors such as managerial changes during years, seasonal variations and parity of Murrah.

Keywords: 305-days milk yield, Murrah buffaloes, Peak yield, Persistency

Buffaloes occupy an important place in the dairy set up of the country. The success of dairy industry is much depends on level of production traits of the animals. Lactation milk yield is most important trait of buffalo. Higher milk production increases the profit and decreases the input cost of the dairy animals. A way to reduce costs is to distribute the same total yield more equally over the whole lactation.

The distribution of lactation yield is known under the name of persistency of lactation yield. In buffaloes, economy of milk production depends mainly on milk produced in different lactations. Milk yield in a lactation depends mainly on persistency, peak yield and lactation length because more persistent animals produced relatively higher milk and had longer productive life (Narain *et al.,* 1981; Ramachandraiah *et al.,* 1990). Persistency of milk yield is an economically important trait and mathematically, it is expressed as the average percentage or degree of decrease in production each month to that of the previous month. found that More persistent cow has lesser feed cost and contribute to more economic returns from animal by increasing the lactation milk yield, resulting in increases the profitability (Solkner and Fuchs, 1987). Hence, the present investigation was, therefore, undertaken to study the persistency of milk yield and determine the effect of different non-genetic factors on persistency and milk production traits in Murrah buffaloes.

MATERIALS AND METHODS

Animals and experimental design

The data on 1176 lactation records of 272 Murrah buffaloes sired by 53 sires maintained at Dairy farm of Guru Angad Dev Veterinary and Animal Science University, Ludhiana over a period of 31 years from 1981-2011 were included in the present study. Data of abnormal lactation like abortion, mastitis and below 150 days milk yield were excluded from the study. The years were divided into six periods; of each have five years while the months were divided into

four season viz. winter (December to February), spring (March to May), summer (June to August) and autumn (September to November).

Calculation of Persistency and Statistical analyses

Persistency index for milk yield was calculated by the method given by Ludwick and Peterson (1943).

The effect of period, season of calving and parity on persistency and milk yield was estimated by using Mixed Model Least-Squares and Maximum Likelihood (LSMLMW) computer programme developed by Harvey (1987). The following mixed model was used to take the effect of different non-genetic factors on milk production traits:

$Y_{ijkl} = \mu + S_i + P_j + L_k + e_{ijkl}$

Where,

Y_{ijkl}= observation of the traits made in l^{th} individual recorded in the k^{th}lactation of j^{th} period and i^{th} season.

μ = population mean

S_i = Fixed effect of i^{th} season, i= 1…..4 (season)

P_j = Fixed effect of j^{th} period, j= 1…..6 (period)

L_k= Fixed effect of k^{th}lactation, k= 1…..6 (lactation)

e_{ijkl} = Random effect of residual error, NID (0,)

RESULTS AND DISCUSSION

Least square means of milk production traits

The overall least square mean for persistency, 305-days milk yield and peak yield were 0.826±0.003, 2173.54±21.14 and 12.65±0.09 respectively.

Effect of period

The least squares analysis of variance revealed that period of calving had significant (P<0.01) effect on persistency, 305-days milk yield and peak yield (Table 1). Similar significant effect of period of calving on persistency were reported by Garcha and Tiwana (1980), Zakariyya *et al.* (1995), Tekerli *et al.* (2001), Kumar and Singh (2006) and Das *et al.* (2007). Zakariyya *et al.* (1995), Paliwal *et a.l* (2000), Kundu *et al.* (2003) and Shubha Lakshmi *et al.* (2009) reported significant effect of period on peak yields. Garcha and Tiwana (1980), Dass and Sadana (2000), Zafar *et al.* (2008) and Shubha Lakshmi *et al.* (2009) reported similar significant effect of period on 305-days milk yield.

Table 1. Least squares analysis of variance affecting persistency, 305-days milk yield

Source of variance	Degree of freedom	Mean sum of squares		
		Persis-tency	305-days milk yield	Peak yield
Period	5	0.0287**	2784320.956**	77.566**
Season	3	0.0108	164422.173	42.130**
Parity	5	0.0636**	3676361**	235.030**
Error	1162	0.0057	219892.886	4.742

** P<0.01

Effect of Season

Peak yield was significantly affected (P<0.01) by season of calving. Similar significant effect of season of calving on peak yield was reported by Zakariyya *et al.* (1995), Chhikara *et al.* (1998) and Shubha Lakshmi *et al.* (2009). The effect of season of calving was non-significant on persistency and 305-days milk yield. Similar non-significant effect of season of calving on persistency were reported by Garcha and Tiwana (1980) and Gupta and Johar (1982). Non-significant of season of calving on 305-days milk yield were also reported by Dutt and Yadav (1986) and Ghaffar *et al.* (1991).

Effect of Parity

Persistency, 305-days milk yield and peak yield was significantly (P<0.01) affected by parity. Maximum 305-days milk yield (2297.66±46.55 kg) and peak yield (13.63±0.22 kg) was obtained in fifth parity while maximum persistency (0.860±0.005) was obtained in first parity. Similar significant effect of parity on milk yield was reported by Tekerli *et al.* (2001), Afzal *et al.* (2007) and Shubha Lakshmi *et al.* (2009). Garcha and Tiwana (1980), Kundu *et al.* (2003) and Shubha Lakshmi *et al* (2009) reported significant effect of parity on peak yield. Garcha and Tiwana (1980) and Dhaka and Chaudhary (1994) reported significant effect of parity on persistency.

CONCLUSION

The Significant effects (P<0.01) concluded that these traits were affected by the environmental factors such as changes during periods, seasonal variations and parity of buffaloes. Therefore, the effects of environmental variables must be taken into consideration when adjusting data to provide the best estimates of genetic values and parameters in the Murrah buffaloes evaluation.

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