NON-GENETIC FACTORS INFLUENCING MONTHLY TEST DAY MILK YIELD RECORDS IN MURRAH BUFFALOES

Abhishek Kumar, Jay Prakash Gupta , Sandeep Kaswan and S. S. Lathwal

Livestock Production and Management,

National Dairy Research Institute, Karnal (Haryana) 132001

(Received 29/11/2011, Accepted 19/05/2012)

ABSTRACT

Records for 10 Monthly test day milk yield (MTDMY) i.e. Test day milk yields (TDMY) at monthly interval (6th, 35th, 65th, 95th, 125th, 155th, 185th, 215th, 245th and 275th days) were collected from Murrah buffaloes maintained at cattle farm, National Dairy Research Institute, Karnal. These buffaloes were calved between the years 1996 to 2004 and completed three lactations. A total of 4,914 MTDMY records of 533 Murrah buffaloes were analyzed to study the effect of non-genetic factors (seasons and year of calving). The year of calving was having highly significant ($P<0.01$) influence on all MTDMYs (except 9th MTDMY), while season was having significant ($P<0.05$) effect only on 2nd MTDMY.

KEY WORDS: MTDMY, Murrah, Non-genetic factors, Least Squares mean

INTRODUCTION

The genetic improvement of Murrah buffaloes is of great importance in the large ruminant industry in India, since buffaloes contribute 52.6% of total milk and 21.2% of the total meat production (BAHS, 2010). So far buffaloes have been evaluated for milk yield on the basis of 305-day lactation yield, but under field conditions, it is difficult to record the complete lactation of animal. Therefore, now-a-days recording of milk yields in various test day intervals is receiving more importance. Several studies had confirmed the advantages of using monthly test day yields to estimate breeding value with greater precision as early as possible and also to reduce substantially the cost of milk recording for the farmer (Ptak and Schaeffer, 1993; Swalve, 1995). However, challenges in developing test day model includes adjustment of environmental effects affecting test day yields and then estimation of genetic parameters required for implementing proper evaluation system (Jamrozik and Schaeffer, 1997; Veerkamp and Goddard, 1998; Tijani et al., 1999). Therefore, taken into consideration the importance of TDMY in evaluation of dairy animals, the present investigation was undertaken with the objective to know the effect of these non-genetic factors on the monthly test day milk yields (MTDMY).

MATERIALS AND METHODS

Murrah buffaloes maintained at National Dairy Research Institute, Karnal, India were used for study of MTDMY records. A total of 4,914 MTDMY records of 533 Murrah buffaloes calved during 1996 to 2004 and completed three lactations were used in present study. Data on monthly test day milk yield (MTDMY) were collected only from those animals which were in normal physiological condition and have completed more than 90 days of lactation length. The data were edited to remove records of lactations following abortions, lactation with missing test day yields and lactations with inconsistent date of birth, calving and drying. Further edits involved removal of records of milk yield sampled earlier than the 5th day post partum in which case the subsequent milk sample was considered to be the first test day sample. Outlier were removed to make the data normally distributed and data in the range of mean ± 2SD were only included. Data were analyzed by least squares analysis of variance procedures for unequal subclasses (Harvey, 1975).

Wherever, the effects were significant, the difference between pairs of levels of effects was tested for significance by Duncan's Multiple Range Test as modified by Kramer (1957). The data were adjusted for significant non-genetic factors. These included season of birth (4 seasons, December-March (Winter) April-June (Summer) July-August (Rainy) and September-November (Autumn season) and year of birth (9 classes: 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003 and 2004).

RESULTS AND DISCUSSION

The average number of monthly test day records for buffaloes in first, second and third lactations were 9.23, 9.13 and 9.31, respectively at NDRI farm. The least square analysis of variance and the season and year wise least square means along with standard errors for MTDMY in buffaloes are presented in Table 1. Average MTDMY was 6.77 ± 0.13 kg. The present estimate of least squares mean of the MTDMY was lower than those estimated by Kumar, (2007). Perusal of Table 1 also reveals that the average MTDMY increased from 7.74 kg/day on first test day to a peak yield of 8.56 kg/day on second test day and subsequently declined to 4.60 kg/day in 11th test day. Similar observation was also reported by Penchev et al. (2011) and Kumar (2007).

Table 1. Least squares means along with standard errors for MTDMY of Murrah buffaloes

	TD1	TD2	TD3	TD4	TD5	TD6	TD7	TD8	TD9	TD10
Overall mean	7.74± 0.14	8.56± 0.14	8.24± 0.13	7.81± 0.13	7.42± 0.12	6.91± 0.11	6.33± 0.11	5.75± 0.11	5.31± 0.12	4.60± 0.11
Season										
Winter	6.82± 0.24	9.11± 0.24	8.66± 0.23	8.29± 0.21	7.70± 0.21	6.93± 0.19	6.27± 0.19	5.68± 0.19	5.26± 0.19	4.86± 0.19
Summer	6.71± 0.35	8.25± 0.35	8.03± 0.34	7.34± 0.32	7.05± 0.31	6.65± 0.28	5.99± 0.27	5.52± 0.28	5.59± 0.30	4.13± 0.27
Rainy	6.75± 0.24	8.27± 0.24	8.03± 0.23	7.72± 0.22	7.32± 0.22	6.97± 0.20	6.54± 0.20	5.87± 0.20	5.27± 0.20	4.88± 0.21
Autumn	6.69± 0.23	8.62± 0.23	8.25± 0.23	7.90± 0.21	7.60± 0.21	7.08± 0.19	6.54± 0.20	5.93± 0.20	5.12± 0.20	4.53± 0.19

Table 2. Least squares analysis of variance (Mean squares only) for individual MTDMY (kg) in Murrah Buffaloes

Source of variation	d.f	TD1	TD2	TD3	TD4	TD5	TD6	TD7	TD8	TD9	TD10
Year	8	35.50**	31.45**	35.07**	49.91**	38.95**	24.35**	20.03**	11.78*	29.96	9.39**
Season	3	0.43	20.26*	11.23	15.86	8.20	2.73	6.03	3.01	2.48	7.15
Error		493	499	500	496	486	477	458	434	384	310

(**indicates 1% level of significance while *indicates 5% level of significance) * TD = Test Day

Only second MTDMY was significantly ($p<0.05$) affected by season of calving. This result was in accordance with that of Kumar (2007) and Geetha (2005) in same herd and Mourad et al. (1990) and Madalena et al. (1979) in Egyptian buffalo and cattle respectively. Variation in second MTDMY between winter and summer may be attributed to changes of climate conditions and also due to changes in availability of feed and fodder during this period. However, all MTDMY's were significantly ($p<0.01$) affected by year of calving except 9th MTDMY as presented in Table 2. 8th MTDMY was

having less significant ($p<0.05$) effect of the year of calving. These findings are in agreement with those obtained by Kumar (2007), Geetha (2005) and Catillo et al. (2002). Significant effect of year of calving on the MTDMY indicates that there is continuous effort and scope to improve the management of the farm.

CONCLUSIONS

The study revealed that the non-genetic factors such as season of calving in general and year of calving of the buffalo calves in particular, might be considered when performing an evaluation of Murrah calves based on MTDMY performance. The differences in different MTDMY over the periods and seasons may be attributed to the differential culling levels on the basis of production and difference in feeding and management practices besides the changing population dynamics and so, test day milk records must be adjusted for all these environmental effects before use in the actual genetic evaluation system with MTDMY model.

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