J Krishi Vigyan 2015, 3(2) : 66-68 DOI: 10.5958/2349-4433.2015.00014.8

Measure of Central Tendency and Dispersion of Test Day Milk Yield in Murrah Buffaloes

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ABSTRACT

This study utilized the information of 13,991, 10,890 and 7,001 weekly test day milk yield (WTDMY) and 3,518, 2,523 and 1,943 monthly test day milk yield (MTDMY) records of 342, 255 and 192 Murrah buffaloes calved and completed first three lactations during the period from 1990 to 2004 in the herd. The information used in the present study was collected from the history sheets and daily milk yield registers of Murrah buffaloes maintained at the Dairy Cattle Breeding Division and Livestock Farm, National Dairy Research Institute, Karnal (Haryana). The mean WTDMY varied from 6.61 ± 0.04 kg in first lactation to 8.53 ± 0.07 kg in third lactation. The mean MTDMY varied from 6.85 ± 0.02 kg in first lactation to 8.68 ± 0.04 kg in third lactation.

Key Words: Coefficient of Variation, Mean, Murrah, Test Day Milk Record.

INTRODUCTION

The genetic evaluation of buffaloes for milk production based on weekly/monthly test-day record instead of 305-day lactation yield has generated a considerable interest during recent years. Due to variability in lactation days of dairy animals, the use of test-day models (TDM) instead of lactation model (LM) is of more interest in genetic evaluation. The main advantages of using test-day records for genetic evaluations of animals are, number of test day records per animal and the interval between records can be accounted for, allow frequent genetic evaluations with the latest records there by reducing the generation interval, assumption about the length of lactation is not made in the models using test-day records and to account for individual differences in the shape of lactation curves of animals. Very less work has been done on test day milk yield in buffalo in India. Geetha *et al* (2007) estimated genetic parameters using random regression test day model for first lactation milk yield in Murrah buffaloes. Katneni (2007) studied genetic persistency of milk production in Murrah buffaloes using test day milk yield records. Chakraborty *et al* (2010) studied 305 days and test day milk yield records in Murrah buffaloes. However, the information on estimates of test day was lacking and therefore, the present study was undertaken to measure central tendency and dispersion of test day milk yield in Murrah buffaloes.

MATERIALS AND METHODS

The information used in the present study was collected from history sheets and daily milk yield register of Murrah buffaloes maintained at the Dairy Cattle Breeding Division and Livestock Farm, National Dairy Research Institute, Karnal (Haryana). The data comprised of buffaloes calved and completed first three lactations from 1990 to 2004 in the herd.

Each test day milk yield was the sum of two times milking (morning and evening) recorded in a particular test date and expressed as kg/day. Milk recording of buffaloes started from sixth day onwards after calving till the date of drying. The weekly test day milk yield (WTDMY) of animals were noted on 6^{th} , 13^{th} , 20^{th} , 27^{th} , 34^{th} …,300^{th} day resulting in total 43 weekly test day records in each lactation. Similarly, the monthly test day milk yield (MTDMY) of buffaloes was noted on 6^{th} , 36^{th} , 66^{th} , 96^{th} , 126^{th} , 156^{th} , 186^{th} , 216^{th} , 246^{th} , 276^{th} and 305^{th} day resulting in total 11 monthly test day records in each lactation. The total number of weekly and monthly test day milk

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yield generated for Murrah buffaloes which have completed first three lactations and used in the present study is presented in the Table 1.

Table 1. Data structure used for developing the models.

Lactation	No. of Animals	Weekly test Day records	Monthly test Day records
First	342	13,991	3,518
Second	255	10,890	2,523
Third	192	7,001	1,943
Pooled (First and Second)	202	8,516	2,149
Pooled (First, second and Third)	133	5,674	1,444

The means, standard errors and coefficient of variation for weekly and monthly test day milk yields were estimated using statistical procedures as suggested by Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

The data (Table 2) revealed that mean WTDMY varied from 6.61 ± 0.04 kg in first lactation to 8.53 ± 0.07 kg in third lactation with the maximum variability in third lactation (C.V.= 37.05%) whereas the average MTDMY varied from 6.85 ± 0.02 kg in first lactation to 8.68 ± 0.04 kg in third lactation with maximum variability (C.V.= 35.60%).

Kumar *et al* (2014) found that the minimum least-squares mean for first lactation monthly test day milk yield (TDMY) in Murrah buffalo was 4.69 ± 0.14 kg on test day 11 while maximum first lactation monthly test day milk yield (TDMY) was 7.66 ± 0.13 kg on test day 3. These estimates were in conformity with the results obtained by Geetha (2005) and Katneni (2007) .Kumar *et al* (2014) has reported significant effect ($p < 0.01$) of farm on monthly test day first lactation milk yield. Significant effect ($p < 0.01$) of season of calving on monthly test day milk yield was found in TD2MY, TD3MY and TD11MY while TD1MY, TD3MY, TD4MY, TD5MY, TD8MY and TD11MY were significantly influenced by the year of calving.

Patil *et al* (2012) observed that minimum first lactation monthly test day milk yield (FLMTDMY) was 4.18±0.09 kg on Test day 11 while maximum FLMTDMY was found to be 8.06±0.09 kg on test day 3. The coefficients of variation of first lactation monthly test day milk yield varied from 29.67 per cent to 43.31 per cent. Minimum first lactation monthly test day milk yield (FLMTDMY) was reported to be 3.91 ± 0.17 kg and 4.58 ± 0.11 kg . on test day 11 while maximum first lactation monthly test day milk yield (FLMTDMY) was found to be 7.15 ± 0.15 kg (Geetha, 2005) and 8.05 ± 0.11 kg (Katneni, 2007) on test day 3. Similarly, Catillo *et al* (2002) reported maximum first lactation monthly test day milk yield .

Gupta *et al* (2013) estimated least squares mean of monthly test day milk yields ranging between 3.14± 0.12 to 7.21± 0.18 kg. Season had no significant effect on the MTDMY in Murrah buffalo in the present study, which was similar to the finding of Penchev *et al* (2011) in Bulgarian murrah buffalo cows. The effect of year of calving on all the MTDMY was highly significant ($p< 0.01$) which was in agreement with Penchev *et al* (2011).

CONCLUSION

Maximum weekly and monthly test day milk yields were found in third lactation with highest coefficient of variation that means third lactation may be vastly influenced by various environmental factors. In India, bulls are evaluated based on their daughters 305 days or less milk yield without taking into account variation in

Table 2. Average, standard error and coefficient of variation in WTDMY and MTDMY in Murrah buffaloes.

Lactation	Number of	Weekly test day milk yield			Monthly test day milk yield		
	Animals	N	Mean ± S.E.(kg)	C.V. (%)	N	Mean ± S.E.(kg)	C.V. (%)
First	342	13991	6.61 ± 0.04	34.34	3518	6.85 ± 0.02	31.68
Second	255	10890	8.05 ± 0.06	36.15	2523	8.25 ± 0.03	34.18
Third	192	7001	8.53 ± 0.07	37.05	1943	8.68 ± 0.04	35.60
Pooled, first and second	202	8516	7.30 ± 0.05	31.51	2149	7.51 ± 0.02	29.83
Pooled, first, second and third	133	5674	7.71 ± 0.06	31.39	1444	7.96 ± 0.03	29.40

lactation days ,however, the variation in lactation length is reflected in persistency. Genetic evaluation of dairy bulls for milk production based on individual monthly test-day yields rather than 305-days or less milk yield has a number of benefits (Jamrozik and Schaeffer, 1997). Therefore, due to variability of lactation days in dairy animals, the use of test-day model (TDM) instead of lactation model (LM) may be of immense help in the genetic evaluation of dairy animals.

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Received on 23/11/2014 Accepted on 26/12/2014