The Journal of Animal & Plant Sciences 19(1): 2009, Pages: 10-12
ISSN: 1018-7081

PERFORMANCE OF BUFFALO POPULATION USING TEST DAY MILK YIELD IN PROGENY TESTING PROGRAM AREAS OF DISTRICT GUJRANWALA

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ABSTRACT

Data on performance records of 1132 Nili-Ravi buffaloes varied from parity 1 to 6 in the progeny testing program (PTP) areas of district Gujranwala, under Buffalo Research Institute, (BRI) Pattoki District Kasur, Punjab, Pakistan during the period 2006 to 2007 were utilized in this study to identify the high yielding elite buffaloes/bull mothers (dams) for the on going progeny testing program in the country. The pedigree information of all the animals could not be traced back because these animals registred/taged for the first time from the field area. Their breeding values could not be estimated. However, their GLS solutions for 305 day milk yield were obtained for ranking of these animals according to their merit/ production potential. The data were analysed by test day model using Statistical Analysis System (SAS), 1998 for fixed effects. The GLS solutions were estimated by using Derivative Free Restricted Maximum Likelihood (DFREML) Procedure. The mean 305-day lactation milk yield was 1152.35±18.17 Kg. The number of test days ranged from 2 to 10. The GLS solutions values varied from -14.56 to 27.08 kg. Out of 1132 buffaloes, 227 were declared as bull dams (elite). The over all phenotypic trend of 305 day lactation milk yield depicted a positive trend. The improvement in milk production could be achieved through efficient breeding strategy and improvement in nutrition and other management practices.

Key words: Individual Animal model, test day milk yield, 305 day milk yield, buffaloes.

INTRODUCTION

In Pakistan there are 28.4 million heads of buffaloes, which play a key role in the rural economy of the country. Buffaloes provide more than seventy percent of milk consumed in the country (Anonymous, 2006)**.** The Nili-Ravi is well known for her superior dairy qualities among the world buffalo breeds (Ahmad, 2007). For the genetic improvement the Buffalo Research Institute has launched the world's largest buffalo progeny testing program (PTP), encompassing three Buffalo Farms (LES, Bhunikey, Haroonabad, and Chak Katora), 2 Military Buffalo Farms (Khayber & Punjnad) and in registered buffaloes of the farmers & breeders in 10 districts; Kasur, Gujrat, Gujranwala, M. B. Din, Hafizabad, Faisalabad, T.T. Singh, Pakpattan, Vehari and Bahawalnagar. It is the only way to guaranty the desired genetic transmission in the progeny in terms of milk or beef (Anonymous, 2007).

The present study was planned for evaluation of Nili Ravi buffaloes of PTP area District Gujranwala, which is an important component of progeny testing program (PTP) of Buffalo Research Institute (BRI) Pattoki District Kasur, having six active focal points. The main objective of this study was to rank the animals according to their merit/production performance for identifying elite animals/bull dams (mothers) from the field area. The information so generated will be used in formulating the future breeding program for the genetic improvement of the said buffalo population.

MATERIALS AND METHODS

The data set varied from 1st to 6th parity on performance records of 1132 Nili-Ravi buffaloes calved during 2006 to 2007 of PTP area District Gujranwala under Buffalo Research Institute, Pattoki District Kasur were utilized. The pedigree information of all the animals could not be traced back because these animals were registred/taged for the first time from the field area. Their breeding values could not be estimated. However, their GLS solutions were obtained for ranking of these animals according to their merit/ production potential. Incomplete lactations for any recorded reason or lactations showing any abnormality were not utilized in the analysis. Lactations having less than two test days (60 days) were also excluded. Data were checked for other unrealistic entries and any out liers. Records out side a range of 3 standard deviations (±3SD) from the phenotypic mean were also removed (Ahmad, 2007). The total number of records eliminated due to editing was 33, which was less than 3 percent of the total. The year was divided in five seasons after Javed *et al*. (1994).

The test day (TD) information was stored in the data file containing buffalo identification number, dates of birth, registration, calving, drying, lactation number (parity), number of test days (months) and 305 day lactation milk yield. Only first ten test days were included in the analysis. The data were then analyzed by test day model (Bilal, 2007) to estimate the fixed effects for 305 day lactation milk yield. General Liner Mixed Model of

statistical Analysis System (SAS, 1998) was used to study the factors affecting 305 day lactation milk yield. The fixed effects, year of calving 2; (2006 and 2007), season of calving 5; (winter, spring, hot dry, hot humid & autumn) and lactation no. / Parity (1 to 6) were included in the model. The random animal effects and permanent environmental effects were also included in the model.

The GLS solutions of animals for 305 day lactation milk yield were estimated by Best Liner Unbiased Predictions (BLUP) procedure, as outlined by Henderson (1973). Model used for this purpose was an animal model. The additive genetic effects were estimated by using Derivative Free Restricted Maximum Likelihood (DFREML) computer program (Meyer, 2000) using following model:-

For predicting the phenotypic trend for 305-day milk production per lactation thus estimated were fitted in a fixed effect model (SAS, 1998) having year of birth as the only fixed effect. The birth years ranged from 1995 to 2003. The least squares means of milk production per lactation of these animals were drawn against year of birth to predict the phenotypic trend.

RESULTS AND DISCUSSION

The least square analysis of variance (Table-1) showed the effects of year, season of calving and lactation number (parity) on 305 day lactation milk yield, which indicated significant (P<0.01) variation for the said trait. The results of the present study are in line with the results reported by Ahmad *et al*. (1993), Ahmad *et al*. (1995) and Javed *et al*. (2001). On the other hand findings of some other workers are not in line with the results of present study; Garcha and Dev (1994); Ahmad *et al*. (2001). The variation might be due to the difference in the breeds, herds, size of data sets, methods of estimation, the level of productivity and even the periods of time for this particular trait.

The overall mean for 305 day lactation milk yield was 1152.35±18.17 kg (Table-2). The estimates were lower than some earlier reports (Ahmad, 2007; Ahmad *et al*., 2008), the reason being that in the present study only the available single parity lactation records are included in the analysis, while the previous studies were based on lactation records of all parities.

Table-1: Least squares analysis of variance (F-Ratio) for factors affecting 305 day milk yield in Nili Ravi buffaloes.

Source of variation	D.F.	Mean squares	F. ratio
Year of calving	1	30407245	101.34**
Season of calving	4	5490349	18.30**
Lactation number (Parity)	5	989785	3.30**
Remainder	1121	300060	

**= significant (P<0.01)

The calving trend in Nili Ravi buffaloes was observed to be 31.9 percent during winter season being maximum, followed by 24.4, 16.0, 13.9 and 13.8 percent during hot humid, autumn, spring and dry hot seasons, respectively. The findings of the present study are partially in agreement with the results reported by Thevamanoharan *et al*. (2001) and Ahmad *et.al*. (2003) who studied calving trend in Nili Ravi buffaloes.

Table-2: Least square means (LSM) and standard error (SE) for 305 day milk yield in Nili Ravi buffaloes.

Particulars	No. of Obs.	LSM (kg)	SE
Overall mean	1132	1152.35	18.17
Year of calving			
2006	521	993.98	30.45
2007	611	1351.74	30.40
Season of calving			
Winter (31.9 %)	361	1252.10	34.19
Spring (13.9 %)	157	1386.35	48.40
Hot Dry (13.8 %)	156	1256.41	47.13
Hot Humid (24.4%)	276	991.99	37.04
Autumn (16.0%)	182	977.45	45.62
Lactation No.			
1	181	1282.05	41.28
2	409	1126.86	28.42
3	292	1106.37	32.70
4	165	1090.99	43.44
5	49	1167.71	78.39
≥6	36	1263.18	92.06

The animals were ranked according to their values of GLS Solutions derived by DFREML program. The GLS solutions for milk yield varied widely from -14.56 to 27.08 kg for the Nili-Ravi buffaloes maintained under the period of study. Out of 1132 buffaloes 543 have positive GLS solution values while 589 buffaloes have negative GLS solution values. Within the 543 buffaloes (GLS^{+}), 227 were declared as elite buffaloes / bull mothers. The elite buffaloes / bull mothers are being served with the semen of proven bulls while the rest of buffalo population declared as test herd and is being served with the semen of test bulls under PTP.

The phenotypic trend for 305 day lactation milk yield although depicted a positive trend (Figure-I) but the improvement in milk production potential of these animals as expected could not attained, which could be achieved by better feeding as well as improvement in management practices and breeding strategy etc.

It is pointed out that further improvement in production potential of the said population could be attained by making selection of these animals in the proper direction. The selection of young bulls could be made by considering their breeding values and selection

on the basis of milk yield of their dams only should be avoided. More over, the genetic improvement could only be possible in a broader genetic base and in the larger buffalo herds. In addition to this the improvement through effective selection could be made by avoiding inbreeding and ensuring accuracy in performance recording etc. in future.

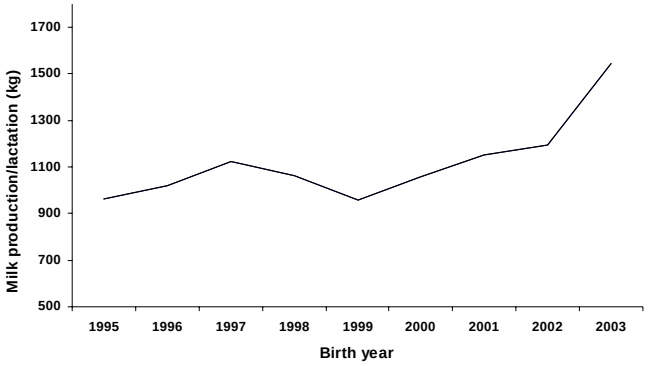

Fig. 1. Phenotypic trend for 305 day lactation milk yield in Nili-Ravi buffaloes

REFERENCES

Ahmad, M. (2007). Estimated breeding values and genetic trend for milk yield in Nili Ravi buffaloes. Italian J. Anim. Sci., 2(6): 393-396.

Ahmad, M., A. Parveen, A. Ghaffar and M. M. Aziz (2008). Estimated breeding values and genetic trend for 305-day milk yield in buffalo herd at LES Chak Katora. Pakistan J. Agri. Sci., 45(2): 212-214.

Ahmad, M., M. Ahmad N. A. Naz (2003). Environmental and genetic factors affecting first lactation milk yield, peak milk yield and persistency of lactation in Nili-Ravi buffaloes. Pakistan J. Vet, Res., 1(2): 20-24.

Ahmad, M., M. Shafiq., M. A. Khan and K. Bashir (1995). Environmental factors affecting peak milk yield and persistency of lactation in Sahiwal cows. The J. Anim. Pl. Sci., 5(2): 7-8.

Ahmad, M., R. Hussain and K. Javed (2001). Effect of some environmental factors on lactation curve, total milk yield, peak yield and persistency of lactation in crossbred cows. The J. Anim. Pl. Sci., 11(4): 147-149.

Ahmad, S. S., M. A. Khan, A. Ali and M. S. Muhammad (1993). Effect of some environmental factors on lactation curve, 305-day milk yield and persistency in Nili-Ravi buffaloes. The J. Anim. Pl. Sci., (3): 110-112.

Anonymous (2006). Economic Survey, Economic Affairs Division, Govt. of Pakistan, Islamabad.

Anonymous (2007). First Annual Report, 2005-06 to 2006-07. Buffalo Research Institute, Pattoki District Kasur. pp-29.

Bilal, G. (2007). Estimation of breeding values for Sahiwal cattle by using test day milk yield. M.Sc. Thesis (unpublished). Deptt. of Anim. Breed. & Genetics, Univ. Agri., Faisalabad.

Garcha, D. S. and D. S. Dev (1994). Effect of genetic and non genetic factors on first laction milk yield in Holstein-Friesien crossbreds. J. Dairying Foods Home Sci., 13(3):205-209.

Henderson, C. R. (1973). Sire evaluation and genetic trends. In Anim. Breed. Genetics. Am. Soc. Anim. Sci., / Am. Dairy Sci., Assoc., Champion. Illinois.

Javed, K., M. Afzal, M. Ahmad and R. Hussain (2001). Genetic studies on Cholistani cows: I. Production traits. The J. Anim. Pl. Sci., 11(2): 48-52.

Meyer, K. (2000). User's notes of DFREML. Set of computer programmes Version 3.0 a UNE, NSW, Australia.

SAS. (1998). User's Guide: b 6.12. Cary, NC, USA.

Thevamanoharan, K., W. Vandepitte, G. Mohiuddin, M. A. Choudary and M. Shafique (2001). Environmental factors affecting various production traits in Nili Ravi Buffaloes. J. Anim. Pl. Sci., 11(2): 34-40.

Javed, k.G. Ahmad, R.B. Ali and M.A. Khan (1994). Some environmental and genetic sources of variation in first calving interval in Nili Ravi buffaloes. The J. Anim. Pl. Sci. 4(3-4): 61-63.