Production Characteristics of Nili-Ravi Buffaloes

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ABSTRACT : Production and reproduction data of 47 Nili-Ravi buffaloes (162 records) were analyzed with regression techniques. Average lactation milk yield was 2,020.04 ± 44.59 liters, lactation length 277.42 ± 5.70 d and calving interval 467.10 ± 11.58 d. The ranges for these parameters respectively were : 609-3591 lit, 122-614 d and 228-982 d. Year of calving and lactation length had significant effect on total milk yield ($p < 0.01$), whereas other factors such as month of calving, lactation number and calving interval had no effect on total lactation milk yield. Year of calving had influenced significantly other traits ($p < .01$) such as calving interval and lactations completed. This indicated considerable environment role in buffalo productivity. Effect of month of calving on total lactation milk yield and other traits was however, found to be non-significant. Nili-Ravi buffaloes produced maximum milk during their first three lactations as compared to subsequent lactations. Regression model explained 40 percent variation in total lactation milk yield due to factors analyzed : animal (dam), year and month of calving, lactation length and calving interval.
(**Key Words** : Buffaloes, Milk Yield, Lactation Length, Calving Interval)

INTRODUCTION

The buffaloes hold strategic place in the overall livestock economy of Pakistan and serve three impotant purposes viz, milk production, meat and drought power (Ghaffar et al., 1991). Nili-Ravi buffaloes were of riverain type and have their home tract in the canal irrigated areas of central Punjab (Shah, 1991).

Reproductive efficiency of dairy animals is the output of the interactions among environmental conditions, physiology of the animal and managemental factors such as estrus detection, natural mating proccdures or inseminating techniques, fertility of the bull or the semen and herd health policies (Shah et al., 1989).

Many workers have reported environment effects on milk yield and other production and reproduction traits in Nili-Ravi buffaloes under different conditions. The information on these buffaloes under Barani (arid) Pothohar region are scanty. This study was, therefore designed to explore the magnitude of environment effects, such as year of calving and month of calving on different traits of economic importance in Nili-Ravi buffaloes.

MATERIALS AND METHODS

Data were obtained from 162 records of 47 Nili-Ravi buffaloes maintained at Livestock Research Station, (LRS), National Agricultural Research Centre, Islamabad from 1984 to 1995. The data consisted of dams' identification number, year of calving (YC), month of calving (MC), lactation number (LN), lactation length (LL), calving interval (CI) and total lactation milk yield (TMY), of buffaloes.

The climatic conditions of the centre, where these buffaloes were maintained, are quitc different to their home tract, in central Punjab. There is shortage of green fodder during November-December and May-June. Average monthly rain fall of Islamabad is 200 mm in summer and 44 mm in winter. The winter is cold (minimum temperature range : −3 to +5 C).

The management practices included :

i) Buffaloes were bred through artificial insemination technique.

ii) The calves were weaned at 180 d.

iii) Buffaloes were fed seasonal green fodder mainly berseem, maize and oat, supplemented with concentrate ration @ 5 kg/head/day.

iv) Buffaloes were grazed twice a day for about four-five hours.

v) The calves suckled the dam before hand milking to stimulate let down of milk.

Data were analyzed using "MSTAT" programmes for

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general linear models. The analyses of variation were conducted to observe the effect of different sources of variation on TMY and among each other.

Multiple regression and correlation analyses were also conducted to quantify the effect of different variations among each others.

RESULTS AND DISCUSSION

The means (± residual standard deviation) for total lactation milk yield (TMY), lactation length (LL) and calving interval (CI) are given in table 1. These parameters respectively were : 2,020.04 ± 44.59 lit, 277.42 ± 5.70 d and 467.98 ± 11.58 d. The coefficient of variations for these traits ranged from 18 to 28 percent. Table 2 presents proportion of the total variation in TMY, LL and CI accounted for by year of calving (YR), month of calving (MC) and lactation number (LN). The analyses indicated that LL had highly significantly influenced TMY and CI. These factor were positively correlated as well. YC had significant influence on TMY, CI and LL. This could be due to change in management and non-availability of green fodder in required quantity in later years. In 1994 the area was hit by severe drought. Bugetory constraints hampered green fodder cultivation upto the required quantity. This probably played major role in significantly affecting TMY from 1986 to 1994. Other workers have reported average lactation milk yield to be 1,641.10 ± 32.1 kg in Nili-Ravi buffaloes, in India (Bhaluri and Dhillon, 1987), and 1,916.99 ± kg in China (Huang and Wu, 1987).

Year of calving

Table 2 and figure 1 presents the effect of YC on various traits. Year of calving (YC) had a significant effect ($p < 0.05$) on TMY. The proportion of variation accounted for by YC was found to be 27.33 percent. This trait had significantly ($p < 0.001$) affected other parameters such as CI and LN in the buffaloes. The YC effect may be attributed to many factors playing their role in buffalo productivity. Some of these factors were: Weather conditions, availability of green fodder, animal and plant diseases, rainfall and management practices.

Other workers have reported similar results confirming the significant effect of year of calving on various production and reproduction traits of buffaloes (Khan et al., 1989; and Rehman et al., 1988). They reported that YC had highly significant effect on CI in Nili-Ravi buffaloes.

Month of calving

In the present study, month of calving was found to have no effect on the other traits in Nili-Ravi buffaloes (table 2, figure 2). No reference could be found in the

Table 1. Mean, range, standard deviation and standard error for different variables

Trait	No of obser vations	Mean	Range	Standard Deviation	Standard error*
1. Total lact milk yield (lit)	162	2,020.04	609-3591	567.50	44.59
2. lact length (d)	162	277.42	122- 614	72.50	5.70
3. Calving Int (d)	162	468.00	228- 982	147.20	11.58

* After accounting for the effects of year and month of calving, lactation number and calving interval.

Table 2. Analysis of variance: effects of year and month of calving, lactation number, lactation length, and calving interval

Trait	Percentage of total sum of saqures accounted for by:				
	Year	Month	Lact. No	Calving interval	Laction length
Total milk yield (lit)	27.33[2]	27.71[NS]	28.36[NS]	27.69[NS]	18.17[1]
Lact length	25.58[NS]	25.87[NS]	26.33[NS]	19.48[1]	–
Calving interval	27.38[1]	31.72[NS]	31.71[NS]	–	24.74[1]
Laction length	50.22[1]	53.96[NS]	–	31.71[NS]	26.33[NS]

[1] $p < 0.001$. [2] $0.01 > p > 0.001$.
[NS] non-significant, $p > 0.05$. * Proportions of sums of square are accounted for by various effects.

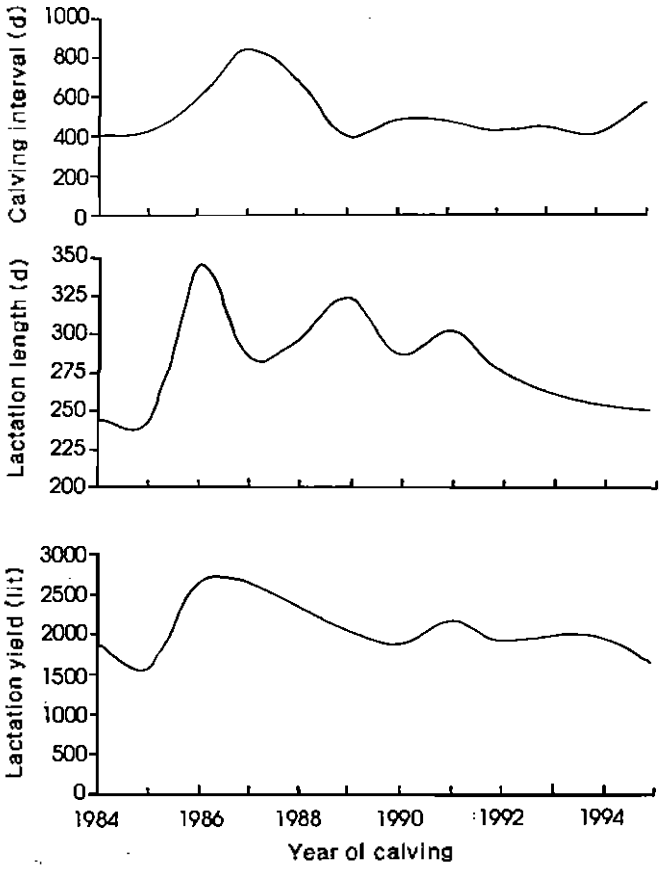

Figure 1. Changes in lactation yield, lactation length and calving interval over years.

literature reviewed showing effect of month of calving on various traits in these buffaloes. Figure 2, however, showed that the buffaloes calving during January-February had highest TMY, LL and CI. Similarly buffaloes during the month of June had shown lower TMY, LL and CI. Table 4 gives the correlation of different traits with each other.

Lactation number:

The effect of LN on other traits such as TMY, LL and CI was found to be non-significant (table 2). Table 3 gives average TMY, LL and CI during different lactations. From this table, it was found that average TMY was highest during first three lactation (2,039 ± 83.56, 2,076 ± 83.56, 2,037 ± 94.18; respectively). The average TMY remained almost constant for another three lactations and then at seventh lactation the TMY average decreased considerably (1,454 ± 572.84) the number of observation in each lactations are small making the above conclusion biased.

Calving interval

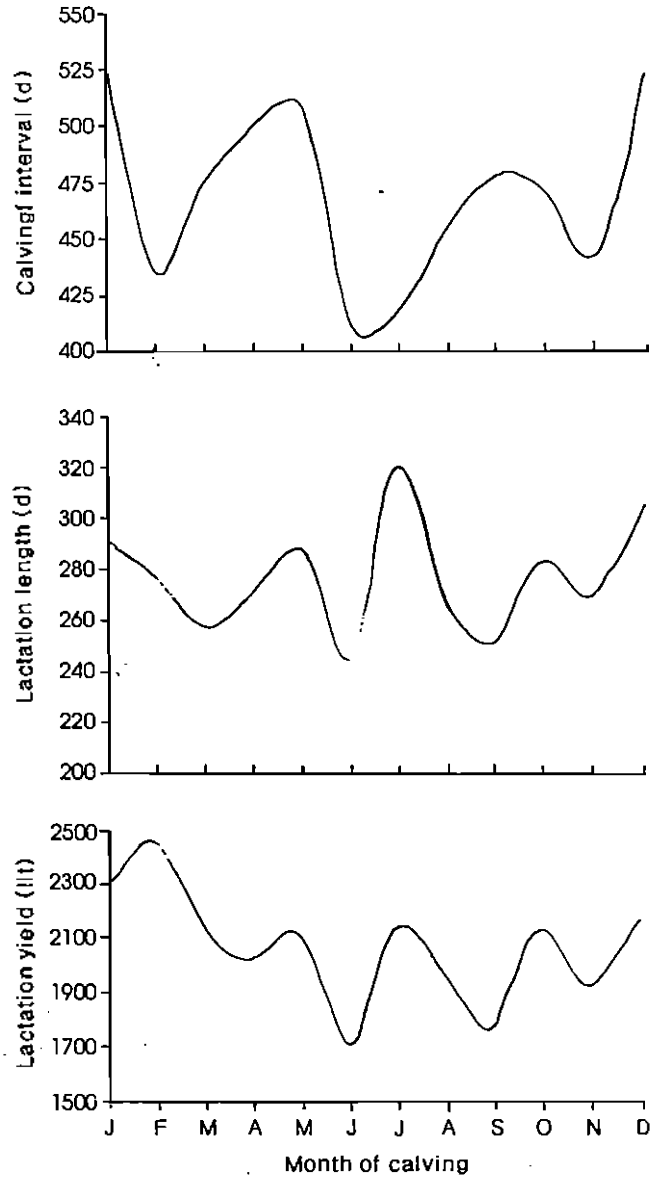

Figure 2. Effect of month of calving on lactation yield, lactation length and calving interval.

The C. I. had highly significant effect on LL ($p < 0.01$) and non-significant effect on TMY and LN (table 2). However, it had positive correlation with TMY ($r = .28$), although the correlation was found to be low (table 4). The average calving interval in the Nili-Ravi buffaloes was found as 467.98 ± 11.58 d. Other workers had reported C. I. of 482.1 ± 6.5 d in the same herd (Shafique and Usmani, 1996), 522.72 ± 2.66 d in Nili-Ravi buffaloes maintained at Livestock Experiment Station, Bahadarnagar, Okara from 1939-1985 (Rehman et al., 1988). and 508.06 ± 2.76 d in the same buffaloes maintained at different Livestock Experiment Stations of

Table 3. Average milk yield in different lactations

Lactation number	Total milk yield (lit)		lactation length		calving interval	
	Mean	Std error	Mean	Std error	Mean	Std error
1	2,039	83.56	284.872	10.65	496.830	21.65
2	2,076	83.56	284.787	10.65	450.617	21.65
3	2,037	94.18	267.270	12.01	471.541	24.40
4	1,871	138.94	272.000	17.71	460.118	35.99
5	1,962	190.95	264.111	24.35	418.778	49.47
6	1,873	286.42	238.500	36.52	431.500	74.20
7	1,454	572.84	324.000	73.04	520.000	148.40

Note: The effect of lactation number for above traits was non significant.

Table 4. Correlation coefficients among traits

	DAM	YR	MC	LN	CI	LL	TMY
DAM	1.00						
YR	0.53	1.00					
MC	−0.09	0.02	1.00				
LN	−0.32	0.31	0.11	1.00			
CI	−0.27	−0.28	0.02	−0.10	1.00		
LL	−0.29	−0.19	0.06	−0.11	0.20	1.00	
TMY	−0.18	−0.13	−0.05	−0.10	0.29	0.64	1.00

Note : YR = Year of Calving. CI = Calving Interval.
MC = Month of Calving. LL = Lactation Length.
LN = Lactation Number. TMY = Total Milk Yield.

Punjab (Chaudhry et al., 1990). Year of calving was found to be significantly affecting C. I in these buffaloes ($p < 0.001$). Similar results were reported by M. A. Chaudhary et al.; indicating YC to have highly significant effect on C. I. Buffaloes calving during May-June had lowest calving interval of around 410 days as compared to buffaloes calving during other months of the year (figure 2). However, statistically MC had non-significant effect on C. I.

Lactation length:

Average LL in Nili-Ravi buffaloes maintained at LRS, Islamabad was found to be 277.42 ± 5.70 d (table 1). Lactation length and C.I were found influencing each other significantly ($p < 0.001$). Other factors had non-significant effect on LL. Lactation length and TMY were highly correlated ($r = 0.64$), and it had significant effect on TMY ($p < 0.001$). Other workers had reported high and significant correlated between LL and TMY (Javed et al., 1990; Chaudhary et al., 1970). They reported average LL of 258 d for Italian buffaloes. However, they reported

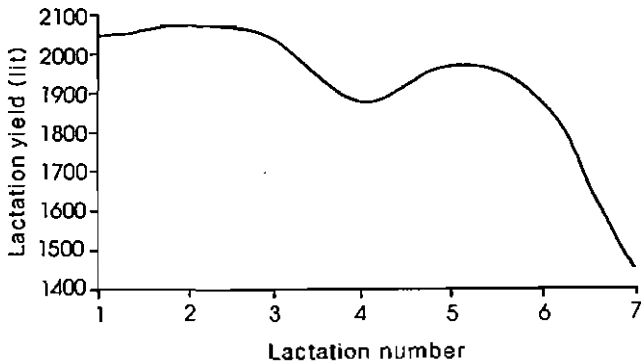

Figure 3. Changes in lactation yield over lactation number.

significant effect of MC and LL unlike present study where MC had no effect on LL. The LL varied in the present study from 122-614 d. This range should be restricted to 300 d making the buffaloes efficient producer (Javed et al., 1990).

CONCLUSION

The study suggests the significant role of environment controlling important economic traits of production and reproduction in Nili-Ravi buffaloes. LL and CI needs to be restricted to 300 d and one year respectively so that buffaloes should calve once a year regularly and be more productive. Year of calving and month of calving are important from standpoint of TMY, LL and CI in Nili-Ravi buffaloes. Much depend on feed and fodder availability during particular year of calving. Other factors include: control of animal diseases, rainfall, and seasonal variation that make the animal comfortable to produce higher quantity of milk in the lactation and reproduce efficiently and vice versa.

REFERENCES

Bhaluri, S. S. and J. S. Dhillon. 1989. Performance of Nili-Ravi buffaloes. Anim. Breed. Abbst. 1989.

Chaudhary, M. A. 1990. Factors affecting the gestation period in Nili-Ravi Primiparous buffaloes. Pakistan Vet. J. 10(2):78.

Ghaffar, A., M. I. Khan, M. A. Mirza and W. H. Pirzada. 1991. Effect of year and calving season on some traits of economic importance in Nili-Ravi buffaloes. Pakistan J. Agri. Res. 12(3):217.

Huang, H. and R. Wu. 1987. Nili-Ravi buffaloes in the south of China. Anim. Breed. Abbst. 1988.

Javed, K., M. A. Khan, G. Mohiuddin and Salah-ud-din. 1990. Genetic parameters of some milk yield efficiency traits in Nili-Ravi buffaloes. Sarhad. J. Agir. 6(6):543.

Khan, M. A., S. Ali and B. B. Khan. 1989. Influence of year and season of calving on length of lactation, dry period and calving interval in Nili-Ravi buffaloes. Pak. J. Agri. Sci. 26 (2):140.

Rehman, A., M. A. Khan and M. D. Ahmad. 1988. Studies on Nili-Ravi buffaloes in Parkistan. Effect of year and season of calving on service period and calving interval. Pakistan J. Agir. Sci. 25(3):169.

Roy Chaudhary, P. N., B. S. Mathur and S. N. Deshmukh. 1970. Some environmental factors affecting calving interval and lactation length in Italian buffaloes. Ind. Vet. J. (1970):7(1).

Shafiq, P. and R. H. Usmani. 1996. Pakistan. Vet. J. 16(4):168.

Shah, S. K. 1991. Buffaloes of Pakistan. Pakistan Agricultural Research Council, Islamabad (1991):1.

Shah, S. N. H., A. H. Wellemse, D. F. M. Van de Wiel and B. Engel. 1989. Influence of season and parity on several reproductive parameters in Nili-Ravi buffaloes in Pakistan. Anim. Rep. Sci. 21(1989):177.