EFFECT OF SOME NON-GENETIC FACTORS ON PEAK YIELD AND DAYS TO ATTAIN PEAK YIELD IN MURRAH BUFFALOES

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SUMMARY

Analysis of 502 records pertaining to 169 Murrah buffaloes maintained at Buffalo Research Centre, CCS HAU, Hisar over a period of 8 years (1985-1992) revealed that peak yield and days to attain peak yield were significantly ($P< 0.01$) influenced by year and season of calving. Winter calvers had significantly higher peak yield than those calving in monsoon. Overall mean values for peak yield and days to attain peak yield was 10.99 ± 0.15 kg and 62.64 ± 2.79 days, respectively. The parity had significant effect ($P< 0.01$) only on peak yield which increased from first parity (9.71 kg) to fifth parity (11.74 kg).
Keywords: Murrah, peak yield, days to attain peak yield.

INTRODUCTION

The lactation milk yield and shape of lactation curve are largely dependent on the peak yield. Thus, the peak yield is an important economic trait of dairy animals which expresses the producing ability of a buffalo in the early period of lactation. Therefore, it is being used as selection criterion particularly under village conditions due to non-availability of total production records and also can be used as an early measure of selection/culling of farm animals. Keeping these points in view, the present investigation was undertaken to determine the effects of year, season of calving and parity on peak yield and days to attain peak yield.

MATERIALS AND METHODS

For this investigation 502 records pertaining to one hundred and sixty nine Murrah buffaloes were collected from the Buffalo Research Centre, Chaudhary Charan Singh Haryana Agricultural University, Hisar for a period of 8 years (1985-1992). Based on the geo-climatic conditions prevailing in the area, the year was further divided into three seasons, viz. winter (November-February), summer (March-June) and monsoon (July-October).

The buffaloes were milked twice a day at 2.00 a.m. in morning and 2.00 p.m. in evening. Weaning of calves was not practised. The milk yield was taken on the test day recording basis where calves were not allowed to suckle their mothers but used only for let down purposes on every Wednesday. Records of the buffaloes with some specific or non-specific diseases, reproduction disorders and physical injuries were excluded from the present investigation. Peak yield was taken as maximum daily production of milk in a lactation.

The effects of year of calving, season of calving and parity on peak yield and days to attain peak yield were analyzed by utilizing the least-squares and maximum likelihood computer programme of Harvey (1987). The model assumed was:

$$Y_{ijkl} = \mu + P_i + S_j + L_k + e_{ijkl}$$

where

Y_{ijkl} is the I^{th} observation in the k^{th} parity belonging to j the season of i^{th} year,
μ is the overall population mean assuming equal sub-class frequencies,
P_i is the effect of i^{th} year of calving (i = 1 to 8),
S_j is the effect of j^{th} season of calving (j = 1 to 3),
L_k is the effect of k^{th} parity (k = 1 to 8), and
e_{ijkl} is the random error associated with each observation and assumed to be NID $(0, \sigma_e^2)$.

Duncan's multiple range test (DMRT) as modified by Kramer (1957) was used for comparison of least-square means.

RESULTS AND DISCUSSION

The least-square analysis of variance is presented in Table 1 and the means with standard errors for peak yield (PY) and days to attain peak yield (DAPY) on sub-class basis along with the test of significance for difference are presented in Table 2. The overall average peak yield of 10.99 ± 0.15 kg was attained in 62.64 ± 2.79 days after freshening. The estimate of peak yield is comparable to that reported by Garcha and Tiwana (1980), while similar estimates for days to attain peak yield has been observed by Gajbhiye and Tripathi (1988) and Neog. *et al.* (1993). However, lower estimates have also been reported by Chowdhary and Chaudhry (1981) and Biradar (1990).

Table 1 Analysis of variance of peak yield and days to attain peak yield

Source of variation	d.f.	PY/ MS	DAPY/ MS
Years	7	13.97**	6691.82**
Seasons	2	66.35**	7321.60**
Parity	7	22.28**	638.51
Error	485	2.42	860.88

d.f. = degree of freedom M.S. = Mean squares ** (P< 0.01)

The effect of year of calving on peak yield and days to attain peak yield was statistically significant (P< 0.01), as is evident from least-squares analysis of variance (Table 1). The

present findings are in unison with those reported by Vij and Tiwana (1986), Gajbhiye and Tripathi (1988) and Rohilla *et al.* (1992). However, the present findings differed from those of Chowdhary and Chaudhry (1981) and Murthy *et al.* (1985), who observed non-significant effect of year of calving on peak yield.

Table 2 :Least-squares means and standard errors for peak yield and days to attain peak yield.

Independent variable	No. Obs	Peak yield Mean	SE	Days to attain peak yield Mean	SE
Overall mean	502	10.99	0.15	62.64	2.79
Years:					
1985	49	11.92^{a}	0.28	45.25^{b}	5.27
1986	81	11.47^{a}	0.23	45.00^{b}	4.44
1987	74	11.15^{ab}	0.23	56.00^{b}	4.48
1988	73	11.04^{ab}	0.23	66.22^{ab}	4.44
1989	69	10.96^{ab}	0.23	67.90^{ab}	4.40
1990	66	11.01^{ab}	0.23	73.11^{a}	4.38
1991	67	10.27^{b}	0.22	66.92^{ab}	4.19
1992	23	10.07^{b}	0.33	80.67^{a}	6.22
Seasons:					
Winter	146	11.54^{a}	0.18	62.94^{ab}	3.51
Summer	117	11.07^{a}	0.19	55.79^{b}	3.36
Monsoon	239	10.35^{b}	0.16	69.20^{a}	3.17
Parity:					
P_1	75	9.71^{b}	0.18	62.94	3.51
P_2	83	11.09^{a}	0.17	59.79	3.36
P_3	100	11.10^{a}	0.16	60.20	3.16
P_4	80	11.39^{a}	0.18	61.30	3.48
P_5	69	11.74^{a}	0.19	54.98	3.74
P_6	50	11.38^{a}	0.23	61.88	4.37
P_7	34	11.18^{a}	0.27	54.48	5.25
P_8	11	10.79^{ab}	0.48	61.11	9.04

Means superscripted by different letters differ significantly among themselvers.

Peak yield was observed to be maximum (11.92 ± 0.28 kg) for the buffaloes calved during year 1985 but did not differ significantly from those calved during year 1986 to 1990, however if differed significantly from those calved during year 1991 and 1992. Peak yield was observed to be minimum (10.07 ± 0.33 kg) for animals calved during year 1992 which did not differ

significantly from those calved during year 1987 to 1991. Moreover, a declining trend was observed for the estimates of peak yield from year 1985 to year 1989. Days to attain peak yield did not differ significantly among themselves for buffaloes calved during year 1988 to 1992, however, buffaloes calved during year 1992 took maximum number of days to attain peak yield (80.67 ± 6.22 days). Buffaloes calved during year 1985 to 1989 and 1991 did not differ significantly among themselves. In addition to this, a increasing trend was observed for the days to attain peak yield from year 1986 to year 1990.

The peak yield and day to attain peak yield were significantly ($P< 0.01$) influenced by season of calving (Table 1). Garcha and Tiwana (1980) and Biradar (1990) reported similar results for PY and DAPY. Seasonwise least-squares means indicated that the buffaloes which calved during winter season had highest peak yield (11.54 ± 0.18 kg) but did not differ significantly from those calved during summer season (11.07 ± 0.19 kg), however, it differed significantly from those calved during monsoon season. Comparison of means indicated that summer calvers took less numbers of days to attain peak yield to that of monsoon calvers. The highest peak yield in winter calvers might be attributable to availability of highly palatable and nutritious leguminous fodders i.e. berseem and oats etc. during December to mid-May in this region.

The effect of parity was found to be statistically significant ($P< 0.01$) only on peak yield. Biradar (1990) also reported similar results for peak yield. The results of Rohilla *et al.* (1992) confirmed the findings of non significant effect of parity on days to attain peak yield. Comparison of means for statistical significance revealed that the peak yield of the buffaloes from 2nd parity to 8th parity did not differ significantly among themselves, the highest (11.74 ± 0.19 kg) being in case of P_5. The buffaloes in first parity had a significantly lower (9.71 ± 0.18 kg) peak yield than the buffaloes from 2nd to 7th parity. In addition to this, a increasing trend in peak yield was observed from P_1 to P_5 and thereafter it started declining. Critical analysis of paritywise means indicated that days to attain peak yield did not follows any definite trend over parities.

REFERENCES

Biradar, U.S. (1990) *Indian J. Dairy Sci.* 43 : 32-34.

Chowdhary, M.S. and Chaudhry, A.L. (1981) *Indian Vet. J.* 58 : 203-207.

Gahbhiye, P.U. and Tripathi, V.N. (1988) Proc. II World Buff. Congr. Dec. 12-16, New Delhi, p. 147 (Abstract).

Garcha, D.S. and Tiwana, M.S. (1980) *Indian J. Anim. Sci.* 50 : 612-615.

Harvey, W.R. (1987) Mixed Model Least - Squares and Maximum Likelihood Computer Program. January, 1987.

Kramer, C.Y. (1957) *Biometrics* 13: 13-38.

Murthy, H.N.N.; Rai, A.V. and Liknath, G.R. (1985) *Indian J. Dairy Sci.* 38 : 335-338.

Neog, P.K.; Das, D. and Goswami, R.N. (1993) *Indian Vet. J.* 70 : 232-235.

Rohilla, P.P., Chaudhary, S.R. and Sharma, R. (1992) *Indian J. Anim. Prod. Mgmt.* 8:235-239.

Vij, P.K. and Tiwana, M.S. (1986) *Indian Vet. J.* 63 : 838-845.