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NON-GENETIC FACTORS AFFECTING LIFETIME PERFORMANCE TRAITS IN MURRAH BUFFALOES

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ABSTRACT

The present investigation was conducted on 301 Murrah buffaloes maintained at Buffalo Research center, Department of Livestock Production and Management, CCS Haryana Agricultural University, Hisar (India) with the main objective to study the effect of non-genetic factors affecting life time production traits in Murrah buffaloes. The overall least-squares means for Life time milk yield (LTMY), herd life [HL], productive life [PL], total number of days in milk [ND] and milk yield per day of productive life [MY/PL] were found to be 6722.43 ± 199.4 kg, 2795.19 ± 34.21 days, 1320.82 ± 31.44 days, 1011.57 ± 40.40 days and 4.66 ± 0.82 kg, respectively. The period of calving affected significantly all the life time performance traits. The weight group also affected significantly all the life time performance traits except number of days in milk (ND).

KEY WORDS : The lifetime production traits, Buffaloes, Non-genetic factors

The overall economics of dairy animals depends not only production in one lactation, but on their performance for a longer period of time. The life time performance of a dairy buffalo is adversely affected by a number of built in biological and environmental constraint[1]. The lifetime production is a reflection of both productive and reproductive efficiency of farm animal and helps in evaluating relative merits and demerits of different animals under same set of condition. Further, longer herd life increases the total calf crop production and lifetime milk production permitting higher intensity of selection. The total milk yield (kg) produced during first five lactation was considered as lifetime milk yield. The buffaloes which cannot complete five lactation were excluded from study. The present investigation was taken up to find out the effect of period of calving, season of calving, weight groups and age groups on lifetime performance traits.

MATERIALS AND METHODS

The data pertaining to the present study were collected from the lactation records of 301 Murrah buffaloes maintained at Buffalo Research Center, Department of Livestock Production and Management, College of Animal Sciences, CCSHAU, Hisar for a period of 20 years from 1989 to 2008.

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The data were classified according to period of calving, season of calving, weight groups and age groups. The whole duration of 20 years were divided into five periods, each comprising of four years. Periods were divided on the basis of year of first calving of animal.

Each year was divided into four seasons i.e. Summer (April to June), Rainy (July to September), Autumn (October to November), Winter (December to March) according to the ambient temperature and relative humidity. Season was made on the basis of month of first calving of the animal. Weight groups i.e. Weight group-1(up to 400 Kg), Weight group-2(401-450 Kg), Weight group-3(451-500 Kg), Weight group-4(501-550 Kg), Weight group-5(above 550), were made according to weight of the animal at first calving. The data were classified in five age groups according to the age of the animal at first calving taking a class interval of 100 days. The data obtained in the study were statistically analyzed by least squares analysis technique [2].

RESULTS AND DISCUSSION

Lifetime milk yield is defined in this study as total amount of milk produced by a buffalo from the initiation of first lactation up to five lactation. The average life time milk yield was 6722.43 ± 199.4 kg (Table 1). The lifetime milk yield reported by previous workers[3] up to fourth lactation in Murrah buffalo is higher than obtained in this study. However, some other workers reported lower LTMY in Murrah buffaloes (up to 4th lactation). This might be partly attributed to the varying number of observations and type of data studied. The analysis of variance for LTMY revealed highly significant (P<0.01) effect of period of calving. The least squares means for LTMY (Table 1) revealed that LTMY was highest in period – 1 (7764.54 ± 646.63 kg) and it was lowest in period – 5 (4132.79 ± 729 kg) (Fig. 1). This might be due to reduction in herd life of the animals because of culling pressure in early age. The present findings are in accordance with previous workers[4]. The analysis of variance revealed non-significant effect of season of calving on LTMY which is in accordance with previous workers[4] in Murrah buffaloes. The analysis of variance for LTMY revealed highly significant (P<0.01) effect of weight at first calving on LTMY. The LTMY was found to be highest in weight group – 5 (>550 kg) and it was lowest in weight group – 1(up to 400 kg). The results indicated that as the weight at first calving of the buffalo increases, the LTMY also increases. The analysis of variance revealed non- significant effect of age group on LTMY which is in accordance with previous workers[7] in Nili-Ravi buffaloes. The least squares means for LTMY (Table 1) indicated that with the increase in age at first calving of the buffalo, the LTMY also increases. These results suggested that a buffalo calving first at a mature age will produce more milk in its lifetime.

The average herd life was found to be 2795.19 ± 34.21 days (Table 1). However, much higher value for HL has been reported by previous workers[7] in Nili-Ravi buffaloes. Contrary to this, lower values were reported by other workers[3] in Murrah buffaloes and some other workers[8] in Red Sindhi Cattle. Analysis of variance revealed highly significant (P<0.01) effect of period of calving on HL. Herd life was found to be lowest in period – 5 (1964.41 ± 88.30) and it was highest in period- 1 (3218.30 ± 144.14days) earlier workers[9] also reported similar results in Surti buffaloes. However, other workers [10] reported non-significant effect of period on herd life in Murrah buffaloes. Analysis of variance revealed non- significant effect of season

of calving on HL. Some other workers [9] also reported the non – significant effect of season of calving on herd life in Surti buffaloes. Previous workers[7] also reported similar results in Nili-Ravi buffaloes. Analysis of variance(Table-2) revealed highly significant (P<0.01) effect of weight group on herd life. Herd life should an increasing trend with the increase in weight at first calving of the buffaloes. Herd life was highest in weight group – 5 (3021.63 ± 149.42 days) and it was lowest in weight group – 1 (2492.53 ± 88.79 days). Analysis of variance revealed highly significant (P<0.01) effect of age group on HL. Previous workers[9] reported that age at first calving had significant on herd life in Surti buffaloes. Similarly, some other workers[7,10] also reported non-significant effect of age group on herd life in Murrah and Surti buffaloes, respectively.

The average productive life was obtained as 1320.82 ± 31.44 days (Table.1). However, much higher values for PL have been reported by previous workers[11] . However, lower values of PL than the present study were reported by previous workers[10] in Murrah buffaloes and in Nili-Ravi buffaloes[7,14]. Analysis of variance revealed highly significant (P<0.01) effect of period of calving on PL. Similar findings were reported by earlier workers[4]. However, non-significant effect of period on PL was reported by other workers[10]. Analysis of variance revealed non-significant effect of season of calving on PL. Similar finding was reported by earlier workers in Murrah buffaloes whereas, some other workers[4] reported significant effect of season of calving on productive life. Analysis of variance(table-2) revealed highly significant (P<0.01) effect of weight group on productive life. Productive life was highest in weight group– 5 and it was lowest in weight group – 1. Productive life showed increasing trend over different weight groups. Analysis of variance revealed non- significant effect of age group on productive life. Some other workers[18] reported similar effect in Murrah buffaloes[10] and in Nili-Ravi buffaloes[7]. Contrary to this, some ther workers[9] reported significant effect of age at first calving on PL in Surti buffaloes.

The average total number of days in milk in this study is 1011.57 ± 40.40 days (Table 1). Analysis of variance revealed highly significant (P<0.01) effect of period of calving on total number of days in milk. The number of days in milk was highest in period – 2 and it was lowest in period – 5. Analysis of variance revealed non-significant effect of season of calving on total number of days in milk. Analysis of variance revealed non-significant effect of weight group on total number of days in milk. Analysis of variance(Table-2) revealed non-significant effect age group on total number of days in milk.

The average milk yield per day of productive life obtained in this study was 4.66 ± 0.82 kg. (Table 1). Sharma *et al.* (1994) (23) got higher estimate in the same breed of MY/PL up to five lactation than the present study. Analysis of variance revealed highly significant (P<0.01) effect of period of calving on MY/PL. Milk yield per day of productive life was highest in period – 4 and it was lowest in period – 2. Analysis of variance revealed non-significant effect of season of calving on MY/PL. Analysis of variance revealed highly significant (P<0.01) effect of weight group on MY/PL. Milk yield per day of productive life was highest in weight group – 4 and it was lowest in weight group – 2. Analysis of variance revealed non-significant effect of age group on milk yield per day of productive life.

Table:-1.Least squares means along with their standard error (SE) for various lifetime traits in Murrah Buffaloes

	Obs	LTMY (kg)	Obs	HL (days)	PL (days)	Obs.	ND (days)	Obs	MY/ PL (kg)
Population	272	6722.43 ± 199.4	299	2795.19 ± 34.21	1320.82 ± 31.44	272	1011.57 ± 40.40	270	4.667 ± 0.82
Period-1	40	7764.54^{a} ± 646.63	40	3218.30^{a} ± 114.14	1752.69^{a} ± 104.88	40	1156.13^{a} ± 130.99	40	4.441^{b} ± 2.64
Period-2	75	7465.31^{a} ± 543.43	74	3118.24^{b} ± 96.89	1658.21^{a} ± 89.02	75	1261.37^{a} ± 110.08	74	4.400^{b} ± 2.24
Period-3	70	7217.86^{a} ± 432.33	70	2785.80^{b} ± 77.17	1323.85^{b} ± 70.91	70	956.53^{a} ± 87.58	70	5.122^{a} ± 1.76
Period-4	64	6781.41^{a} ± 442.51	63	2665.91^{c} ± 79.78	1316.05^{b} ± 73.31	64	915.19^{a} ± 89.64	63	5.180^{a} ± 1.82
Period-5	23	4132.79^{b} ± 729.00	52	1964.41^{d} ± 88.30	1567.83^{c} ± 81.13	23	644.32^{b} ± 147.68	23	4.897^{a} ± 2.98
Season-1	67	6523.27 ± 437.22	79	2692.62 ± 74.72	1307.04 ± 68.65	67	970.10 ±88.57	67	4.818 ± 1.78
Season-2	84	6824.79 ± 437.94	92	2778.83 ± 74.01	1312.67 ± 68.00	84	1089.38 ± 88.71	84	4.928 ± 1.78
Season-3	54	6457.75 ± 524.89	58	2696.50 ± 89.12	1266.96 ± 81.89	54	895.68 ± 106.33	54	4.749 ± 2.12
Season-4	67	6883.70 ± 461.57	70	2834.18 ± 81.06	1408.23 ± 74.48	67	991.68 ± 93.50	65	4.736 ± 1.91
Weight group-1	50	5023.77^{c} ± 508.81	51	2492.53^{b} ± 88.79	1113.82^{c} ± 81.59	50	753.71 ± 103.03	50	4.634^{b} ± 2.07
Weight group-2	84	5673.76^{bc} ± 390.62	95	2573.63^{b} ± 63.06	1230.69^{c} ± 57.94	84	942.93 ± 79.13	83	4.349^{b} ± 1.59
Weight group-3	85	6718.40^{ab} ± 389.30	95	2798.10^{ab} ± 64.83	1356.38^{b} ± 59.56	85	1002.91 ± 78.86	85	4.667^{b} ± 1.58
Weight group-4	34	7536.77^{a} ± 624.78	38	$2866.77a^{b}$ ± 106.59	1369.75^{b} ± 97.94	34	1029.96 ± 126.56	33	5.267^{a} ± 2.58
Weight group-5	19	8419.20^{a} ± 848.18	20	3021.63^{a} ± 149.42	1547.98^{a} ± 137.29	19	1204.04 ± 171.82	19	5.114^{a} ± 3.46
Age group-1	50	6075.22 ± 569.26	52	2484.10^{d} ± 100.75	1296.99 ± 92.57	50	870.06 ± 115.32	49	4.678 ± 2.36
Age group-2	34	6774.46 ± 624.08	43	2578.65^{cd} ± 102.78	1293.85 ± 94.44	34	950.39 ± 126.42	34	4.909 ± 2.54
Age group-3	27	6788.08 ± 694.17	37	2717.14^{bc} ± 110.55	1274.68 ± 101.58	27	967.08 ± 140.62	27	5.020 ± 2.83
Age group-4	48	6689.54 ± 518.96	51	2846.07^{b} ± 88.97	1340.36 ± 81.75	48	1179.55 ± 105.13	47	4.635 ± 2.12
Age group-5	113	7034.59 ± 375.82	116	3126.70^{a} ± 63.20	1415.75 ± 58.07	113	966.47 ± 67.13	113	4.798 ± 1.53

LTMY – Life time milk yield, HL- Herd life, PL – Productive life, ND – Total no of days in milk, MY/PL – Milk yield per day of productive life.

Note – Means with different superscripts differ significantly

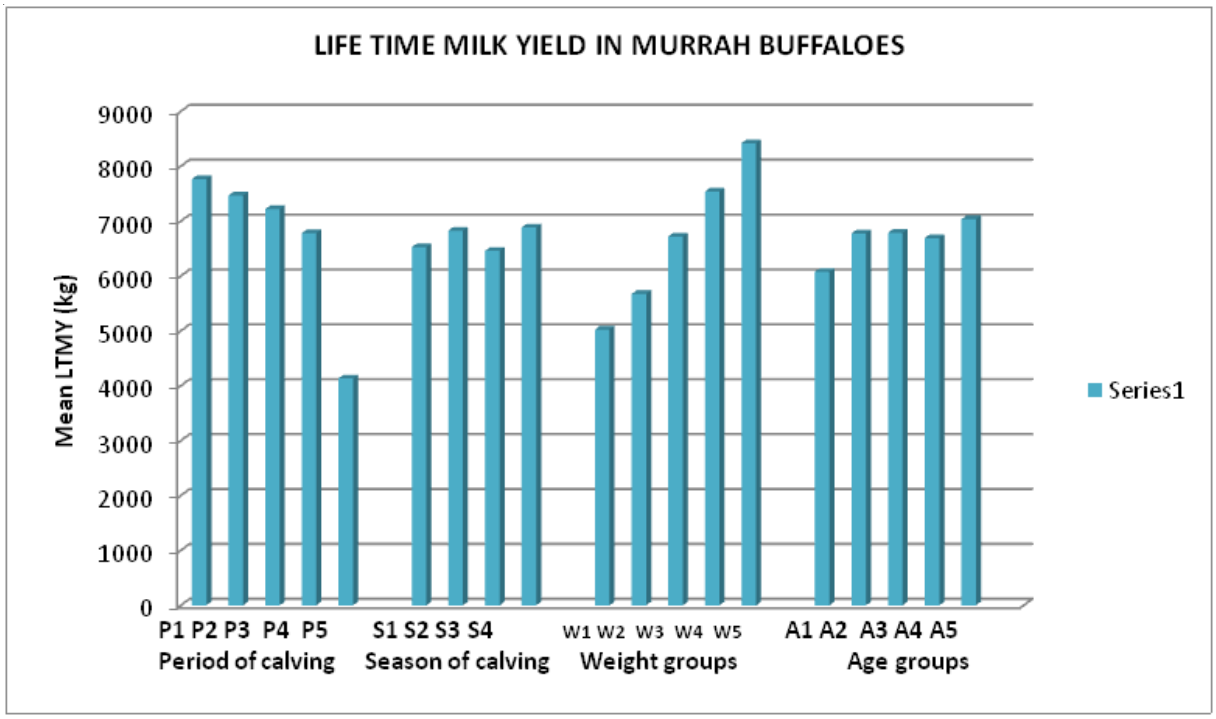

Fig-1 : Diagrammatic representation of least-squares means for life time milk yield in Murrah buffaloes.

Table:- 2. Analysis of variance for lifetime traits in Murrah buffaloes

Source	Mean Squares					
	d.f.	LTMY	HL	PL	ND	MY/PL
Period of calving	4	58527818.4**	19445905.49**	11867300.40**	2086913.25**	1284.87**
Season of calving	3	1670840.4	368997.32	254770.24	308150.33	67.81
Weight group	4	73378953.3**	4458838.54**	1226251.60**	843003.13	571.78**
Age group	4	5312263.9	2862119.17**	154199.87	580119.36	79.29
Error	256	10813866.9	349901.1	295417.72	443786.23	180.10

* Significant at 5 percent level. ** Significant at 1 percent level.

LTMY – Life time milk yield, HL- Herd life, PL – Productive life, ND – Total no of days in milk, MY/PL – Milk yield per day of productive life.
Note: Error d.f. HL and PL = 283, Error d.f. of MY/PL = 254

CONCLUSION

From the results of the above studies, it may be concluded that a buffaloes having higher body weight at first calving will produce more milk in its life time and will also have large productive life besides production of more number of offspring.

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REFERENCES

1. Barman, R.S.D.; Grewal, S.S.; Dalal, S.S.; Verma, A.K. and Yadav, A.K. (2012). Genetic and phenotypic relationship of various production and reproduction traits in Murrah Buffaloes. *Indian J. Anim. Prod. Magmt*. 28 (1-2): 116-120.
2. Harvey, W.R. (1987). Least squares with maximum likelihood, PC Version (PC-1) United States Dept. of Agric. (USDA), Beltsville, Maryland. USA.
3. Alli, A., Ahamad, Z., Mohiuddin, G. and Akhtar, P. (2000). Genetic and phenotypic parameter of some life time performance traits in Nili-Ravi buffaloes, *Buffalo bulletin*. 17(1):3-6.
4. Godara, A., Singh, D. and Grewal, S.S. (2004). Factors affectivity production, reproduction and lifetime traits and their association with production life. *Indian Buffaloes Journal,* 2(1): 23-27.
5. Kumar, A.; Singh, C. V. and Kumar, D. (2009). Effect of genetic and non-genetic factor on production and reproduction traits in Sahiwal Cattle. *Indian J. Anim. Prod. Magmt*. 25(1-2): 108-111.
6. Dagur, S.S.; Goel, R. and Kumar, S. (2012).Evaluation of production performance of Frieswal cows. *Indian J. Anim. Prod. Magmt*. 28(1-2): 113-115.
7. Bashir, M. K., Khan, M.S., Bhathi, A.S. and Iqbal, A. (2007). Lifetime performance of Nili-Ravi buffaloes in Pakistan. *Asian-Australian Journal of Animal Science,* 20(5): 661-668.
8. Mallick, P.K.; Gosh, A.K.; Sahelin, M.D. and Singh, H. (2011). Estimation of genetic and phenotypic parameter for first lactation and life time performance in Red Sindhi Cattle. *Indian Vet. J*. 88(12): 40-43.
9. Meena, S.M., Mathur, M.C. and Jain, L.S. (2003). Effect of non-genetic factors on productive herd life and longevity in Surti buffalo, *Indian. Journal of Animal Sciences*, 73(11): 1260-1262.
10. Gowane, G.R. and, Tomar, S.S. (2007). Genetic and non genetic factors affecting selective value in a heard of Murrah buffaloes. *Indian Journal of Dairy Sciences.* 60(1): 25.
11. Patel, A.K. and Tripathi, V.N. (1998). Genetic studies on lifetime performance in Surti buffalo. Proc. 6th World Congress on Genetics Applied to Livestock Production, Armidale. NSW, Australia, 11-16.

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