Decline in Reproductive Performance in High Producing Murrah Buffalo

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ABSTRACT

In the present investigation the average performance of various performance traits in Murrah buffaloes has been studied. Data on 1224 lactations of Murrah buffaloes scattered over 19 years from January 1993 to October 2011 maintained at organized herd of National Dairy Research Institute. A total of 522 buffaloes completed first lactation and 368, 226 and 108 animals completed second, third and fourth lactations, respectively. Following traits were studied, age at first calving (AFC), days to first service (DFS), service period (SP), pregnancy rate (PR), lactation length (LL), 305 days or less milk yield (305 DMY) and 305 days or less wet average (WA). Study revealed that average performance of AFC, DFS and SP was 43.97 ± 0.36 months, 90.10 ± 1.60 days and 139.91 ± 2.96 days. Overall average pregnancy rate was estimated as 0.36 ± 0.013 whereas it was found to be 0.34 ± 0.02, 0.39 ± 0.02, 0.33 ± 0.03, 0.38 ± 0.05 for first, second, third and fourth parity, respectively in Murrah buffalo. The average performance of LL, 305 DMY, WA were estimated to be 284.38 ± 1.08 days, 2034.42 ± 20.79 kg and 7.29 ± 0.06 kg. It may be inferred that intense selection of buffalo for milk production if continued for long with giving due attention to reproductive traits then it is likely to cause deterioration in reproduction traits in days to come.

Keywords: Production traits, Reproduction traits, Pregnancy rate, Murrah buffalo.

Dairy sector in the India has shown remarkable development in the past decade. Country has achieved the highest milk production of 127.5 MT in the year 2012-13, which has led to increase in the per capita availability of milk up to 281 g/day (NDDB, 2012). Buffalo can be considered as a pillar for the development of dairy industry in India as the species is a major contributor in country's milk production (56% to total milk), despite the fact that they constitute only 34.6% of total bovine population, and this can be attributed to steady increase in buffalo population in India during last two decades, which is about 1.93% (FAO, 2012).

The shift toward more productive cows and larger herds is associated with a decrease in reproductive efficiency (Lucy, 2001) and long term intense selection of dairy

animals for milk production will exacerbate the condition (Pryce *et al.,* 1999). To overcome the deterioration in fertility traits, emphasis may be given on both production and fertility traits during selection of dairy animals. In the present study, fertility was defined in terms of pregnancy rate. Pregnancy rate is defined as the percentage of non pregnant buffaloes that become pregnant during each 21 days period. It measures how quickly a buffalo become pregnant again subsequently after calving. Many countries have incorporated fertility as criteria for selection, and have used Pregnancy Rate (PR), Daughter Pregnancy Rate (DPR) for genetic evaluation of their male and female animals (VanRaden *et al.,* 2004; De Vries, 2010; Cabrera, 2011). Present investigation is an attempt to study the average performance of various production traits and reproduction traits in different lactations of Murrah buffaloes over a period of 19 yrs at the organized herd of National Dairy Research Institute, Karnal.

MATERIALS AND METHODS

Study was conducted on data pertaining to 522 Murrah buffaloes maintained at National Dairy Research Institute, Karnal over a period of 19 years from January 1993 to October 2011 under Network Project of Buffalo Improvement programme. The normal reproduction and production records (other than reproductive disorders and abnormal milk records) were considered. The records of buffaloes showing reproductive disorders such as abortion, dystocia were not included in the study. The buffaloes produced milk for at least 100 days and minimum of 500kg milk, calved and dried under normal physiological conditions were included in the present study. The normal distribution of each reproduction and production trait of buffaloes was judged by estimating the mean and dispersion (standard deviation) of the traits.

The analysis of data was done with the help of SYSTAT-12 available at Dairy Cattle Breeding Division of the National Dairy Research Institute, Karnal, India. The means, standard errors and coefficients of variation of all production and reproduction traits were estimated by using standard statistical procedures (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

All the records of each trait covering mean $\pm$ 3SD were considered for normalization of the trait. On normalization of traits, the number of buffaloes available for the study is presented in Table 1. The number of lactations was restricted to four as 80% buffaloes produced milk yield up to fourth lactation constituted 90.27% of the total milk production in the herd. In NDRI Murrrah herd, voluntary waiting period have been standardized as 63 days (Patil *et al.,* 2012) therefore, pregnancy rate was estimated with buffaloes having minimum 63 days as waiting period or days to first service.

Table 1: Data structure for production and reproduction performance in Murrah buffalo

| Lactation | No. of buffaloes | No. of buffaloes (UN) | SP | | | PR | LL(N) | 305 DMY(N) | WA |
			UN	N					
First	522	411	388	372	340	404	404	404	
Second	368	238	224	210	204	230	230	230	
Third	226	142	135	134	126	138	138	138	
Fourth	108	82	79	77	78	81	81	81	
Total	1224	873	826	793	748	853	853	853	

UN, Un-normalized; N, Normalized; SP, Service period; PR, Pregnancy rate; LL, Lactation length; 305DMY, 305 days or less milk yield; WA, Wet average

Results indicated that the overall age at first calving (AFC), service period (SP), Waiting Period (WP) or days to first service (DFS) and PR of Murrah buffaloes (Table 2) were estimated as 43.97 ± 0.36 months, 139.91 ± 2.96 days, 90.10 ± 1.60 days and 0.36 ± 0.01 days with coefficients of variation 15.96, 57.94, 49.97 and 94.98 %, respectively. The average SP,DFS and PR were estimated as 151.84 ± 4.34 days, 98.62 ± 2.41 days and 0.34 ± 0.02 in first ; 123.29 ± 5.45 days, 83.57 ± 3.04 days and 0.39 ± 0.02 in second ; 127.09 ± 7.19 days, 78.74 ± 3.54 days and 0.33 ± 0.03 in third and 152.08 ± 9.57 days, 86.53 ± 4.51 days and 0.38 ± 0.05 in fourth parity, respectively. The estimated reproduction traits were almost in conformity with the results obtained by workers (Suresh *et al.*, 2004, Nawale, 2010 and Patil *et al.,* 2012). The wide coefficient of variation of pregnancy rate indicates that, PR is mostly influenced by environment as it encompasses females' ability to return to normal reproductive status after calving, to display visible signs of oestrus, to conceive when inseminated, and to maintain the pregnancy.

For production traits, the overall lactation length (LL),305 Days or less Milk Yield (305 DMY) and 305 Days or less Wet Average (WA) were estimated as 284.38 ± 1.08 days, 2034.42 ± 20.79 kg and 7.29 ± 0.06 kg with coefficients of variation 11.15, 30.86 and 23.45% respectively (Table 2). The average LL, 305 DMY and WA were estimated as 286.80 ± 1.49 days, 1866.41 ± 28.66 kg and 7.27 ± 0.08 kg in first lactation; 281.42 ± 2.17 days, 2132.13 ± 38.39 kg and 7.33 ± 0.11 kg in second lactation; 280.85 ± 2.86 days, 2242.10 ± 50.24 kg and 7.36 ± 0.16 kg in third lactation and 286.72 ± 3.62 days, 2241.06 ± 70.26 kg, 7.20 ± 0.20 kg in fourth lactation, respectively (Table 2). The estimated production traits were almost in conformity with the results obtained by many workers (Kundu *et al.* 2003, Suresh *et al.*, 2004; Wakchaure, 2007 and Gupta, 2009). Reports indicate (Lucy, 2001; Pryce *et al.,* 1999) that animals with the greatest milk production have the highest incidence of infertility, but epidemiological studies suggest that, in addition to milk production, other factors are probably decreasing reproductive efficiency in our dairy herds. The reproductive physiology of dairy animals is changing fast over the past 20-30 yrs in our country, and physiological adaptations to high milk production may explain part of the reproductive decline. Thus, it may be inferred that intense selection of buffalo for milk production if continued for long with giving due attention to reproductive traits then it is likely to cause deterioration in reproduction traits in days to come.

Table 2: Parity wise means, standard errors and coefficients of variation of reproduction and production traits of Murrah buffalo

Traits	Parity	Normalized data	
		Mean ± SE	C. V (%)
Age at first Calving (months)	43.97 ± 0.36	15.96	
Service period(days)	Overall	139.91 ± 2.96	57.94
	1	151.84 ± 4.34	52.76
	2	123.29 ±5.45	63.12
	3	127.09 ± 7.19	63.55
	4	152.08 ± 9.57	55.61
Pregnancy Rate	Overall	0.36 ± 0.013	94.98
	1	0.34 ± 0.02	99.03
	2	0.39 ± 0.02	89.15
	3	0.33 ± 0.03	88.54
	4	0.38 ± 0.05	93.07
Lactation length(days)	Overall	284.38 ± 1.08	11.15
	1	286.80 ± 1.49	10.48
	2	281.42 ± 2.17	11.67
	3	280.85 ± 2.86	11.96
	4	286.72 ± 3.62	11.35
305 days milk yield(kg)	Overall	2034.42 ± 20.79	29.84
	1	1866.41 ± 28.66	30.86
	2	2132.13 ± 38.39	27.31
	3	2242.10 ± 50.24	26.32
	4	2241.06 ± 70.26	28.22
Wet Average (kg)	Overall	7.29 ± 0.06	23.45
	1	7.27 ± 0.08	22.82
	2	7.33 ± 0.11	23.15
	3	7.36 ± 0.16	25.20
	4	7.20 ± 0.20	24.64

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