SOME ENVIRONMENTAL EFFECTS ON PRODUCTIVE PERFORMANCE OF NILI-RAVI BUFFALOES IN AZAD KASHMIR

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ABSTRACT

A total of 376 Performance records of 109 Nili-Ravi buffaloes maintained at Livestock Development Research Centre, Raroo, Muzaffarabad, Azad Kashmir, during 1989-2003 were utilized for the evaluation of some environmental factors affecting 305-day milk yield, lactation length and dry period. The least squares means for 305-day milk yield was 2191.858±35.553 Kg. The effect of year and season of calving and parity was significant (P<0.01) on the trait. The least squares means for lactation length was 369.53±8.44 days. The effect of year and season of calving on lactation length was significant (P<0.01), while a non-significant effect of parity on the trait was observed in this study. The least squares means for dry period was 194.4±12.37 days. Dry period was significantly influenced by season and year of calving, while the effect of parity on dry period was non-significant in the present study.

Key Words: Nili Ravi buffaloes, Azad Kashmir, Productive performance

INTRODUCTION

Nili-Ravi buffalo are considered the best dairy animal in the tropics. Their home tract is in canal irrigated areas of central Punjab (Shah, 1991), where they are fed abundant green fodder. Owing to its potential, it produces far less milk in its home tract, which may be attributed to (1) little attention being paid in the past for improvement through selection and progeny testing (2) Late age at maturity (3) Silent heat and (4) long calving interval. The situation gets complicated when it is taken away from its home tract, especially to a hilly state like Azad Kashmir, where environment is harsh and non-conducive for this animal due to lack of green fodder, water scarcity in many places throughout the summer, lack of knowledge among farmers about rearing of the animal and lack of A.I facilities. The present study was therefore planned to determine the influence of some environmental factors like, year and season of calving and parity on the productive performance of Nili-Ravi buffaloes in Azad Kashmir. It is envisaged that the information so generated would be helpful in formulating future breeding plans for improvement of this breed in Azad Kashmir.

MATERIALS AND METHODS

A total of 376 breeding and performance records of 109 buffaloes, maintained at Livestock Development Research Centre (LDRC) Raroo, Muzaffarabad Azad Jammu and Kashmir over a period of 15 years, from 1986-2003 were used in the present study.

The data consisted of buffalo, service sire and calf identities, date of birth, date of service, date of calving, date of drying, date of disposal and lactation milk yield. Derived variables included 305-day milk yield, lactation length and dry period.

In addition to the basic edits of consistency checks for dates and animal identities, records of buffaloes, which had aborted, missed a year due to sickness or other reasons were eliminated.

A spreadsheet, MS Excel ® was used for data entry and manipulation.

The division of year into five seasons and mathematical model assumed was after Hussain *et al*. (2006).

RESULTS AND DISCUSSION

The least squares means for 305-day milk yield, lactation length and dry period are presented in Table 1.

The least squares mean for 305-day milk yield was found to be 2191.858±35.553 Kg, which compares favourably with the findings of Shafique and Usmani, (1996) who reported that the overall means for 305-day milk yield in Nili-Ravi buffaloes was 2193.4±23.4 kg. Khan, (1986) and Thevamanoharan, (2002) reported higher milk yields of 2219.64±11.22 and 2382.l3±2l.3 kg, respectively in Nili-Ravi buffaloes in Pakistan.

The least squares means for 305-day milk yield in the present study were higher than that reported by Ashfaq and Mason, (1954) and Cady et al., (1983), who reported a milk yield of 1969, 2064 and 1702 kg in Nili-Ravi buffaloes in Pakistan, suggesting that if Nili-Ravi

buffaloes have the potential to perform very well outside their home tract, even in harsh environment of hilly state like Azad Kashmir, where availability, quantity and quality of forage is very poor and there is still room for its betterment.

The least squares mean for lactation length in Nili-Ravi herd in the present study was 369.53±8.44 days, however, Cady et al., (1983) and Thevamanoharan, (2002) reported shorter lactation length of 284 and 309.99 days, respectively in Nili-Ravi buffaloes in Pakistan. In case of exotic dairy cattle breeds like Jersey, Friesian and Brown Swiss and their crossbred progeny with local breeds of tropics and subtropics a lactation length of 305 days is generally adopted as a standard and most of the sire producing programs in the developed countries have adopted 305-day lactation records. This is certainly a logical base to standardize records to measure the production of milk in dairy cows. It is also obvious that an animal would produce more milk when it calved once a year. However, in buffaloes since gestation period is 310 days (30 days more than cows), the lactation period may tend to be longer (330 days). A lactation length of 325 days has been suggested as an ideal lactation period for buffaloes (Khan, 1986). In this way the calving interval of 400 days may be taken as optimal with a dry period of 7 to 9 weeks, which could be an ideal situation in the developing countries if optimal feeding and management conditions are provided. Under the prevailing conditions, farmers tend to milk the buffaloes as long as possible to obtain maximum milk, ignoring the economics of lifetime milk production.

There are other possible reasons responsible for longer lactation periods in buffaloes. The buffaloes being seasonal breeders, once an estrous cycle is missed due to some reproductive disorder or nutritional deficiency, they are milked for an extended period to obtain maximum output until the next season thus prolonging the length of lactation.

Least squares mean for dry period in Nili-Ravi herd in the present study was 194.4l±l2.37 days. The findings of the present study were in agreement with the findings in Nili-Ravi buffaloes in Pakistan by Khan, (1986) who reported a dry period of 191.35 days. The findings of present study were also comparable with the findings of Gupta et al., (1994), who reported a dry period of 184 days in Murrah buffaloes in India. The variation observed in mean values of dry period could be environmental (feeding, management, climatic and herd structure). The wide variation in values for dry period in Nili-Ravi buffaloes indicated that there is a scope for reducing this parameter to an optimum level through effective breeding management, balanced feeding and proper housing to prevent exposure to adverse climatic conditions, Keeping in view the importance of optimum dry period, it is obvious that the dry period in present study was higher than expected, which may be due to many reasons but feeding, management and climatic conditions seems to be the main causes affecting this trait. It can be optimized to less than 90 days in such a way that animals recoup their body reserves (lost during milk secretion) when they are not in milk. This will also provide adequate nutrition to the fetus for its healthy growth, provide rest to the mammary glands on one hand, and avoid unnecessary prolonged dry period and wastage of valuable resources of animals during unproductive phase on the other hand.

A significant ($P<0.01$) effect of year and season of calving on 305-day milk yield was observed in present study, which was in accordance with the findings of Khan, (1986); Shafique and Usmani, (1996); Thevamanoharan, 2002), who reported that analysis of variance for the evaluation of environmental factors on 305-day lactation milk yield revealed that variability due to year and season of calving was significant in Nili-Ravi buffaloes, however Khan, (1996) reported that there was no significant effect of calving season on milk yield in Nili-Ravi buffaloes.

Parity also had a significant effect on 305-day milk yield. The least squares means for 305-day milk yield in buffaloes in their first (1^{st}), second (2^{nd}) and third (3^{rd}) parities were almost the same, while milk yield was lowest in the buffaloes in their fourth (4^{th}) and fifth (5^{th}) parities.

The variation in milk yield observed in different years reflected the level of management as well as environmental effects. The level of management is bound to vary according to the ability of the farm manager, his efficiency in the supervision of the staff, his system of crop husbandry, method and intensity of culling (Ashfaq and Mason, 1954; Khan, 1986). Similarly the variations in the lactation yields of buffaloes calving in different seasons seem mainly due to environmental factors, temperature and nutrition. Milk yield is conspicuously higher for lactations starting in winter (Dec—Jan) and spring (Feb—Apr) than those starting in other three seasons. This difference is clearly associated with the comparative inefficiency of the buffalo in controlling its body temperature during summer season. In hot weather, daily wallowing or spraying with water is essential for its well being (Ashfaq and Mason, 1954). The high milk yield in winter and spring calvers may also be due to availability of good quality green fodder during late winter and early spring. The summer has adverse effect on the productivity of buffaloes by way of increase in the ambient temperature as well as scarcity of green fodder which is usually more acute during May to July.

Analysis of variance revealed a significant effect of both year and season of calving on lactation length. The findings of present study were in accordance with the findings of Khan, (1986) and Thevamanoharan, (2002) who reported that the length of lactation of Nili-Ravi buffaloes calving in different years and seasons varied

significantly (P<0.01), however, Khan and Chaudhary, (2000) reported a non-significant effect of season of calving on lactation length in Nili-Ravi buffaloes in Pakistan.

A significant effect of parity on lactation length in Nili-Ravi buffaloes was observed in present study, which was in agreement with the findings of Marques et al., (1991), who reported a significant effect of parity on lactation length in Jaffarabadi, Mediterranean, Murrah, and Crossbred Murrah buffaloes in Brazil.

Analysis of variance revealed a significant effect (P<0.01) of year of calving on dry period in Nili-Ravi buffaloes. The results were in accordance with the findings of Singh and Nivasarkar, (2000) and Thevamanoharan, (2002) who reported that dry period was significantly influenced by the year of calving in Bhadawari and Nili-Ravi buffaloes in India and Pakistan, respectively, however on the other hand, Saha et al., (2000) reported a non-significant effect of year of calving on first dry period in Murrah buffaloes in India.

A significant (P<0.01) effect of season of calving on dry period was observed in present study, which was substantiated by the findings of Kandasamy et al., (1993), who observed that the season of calving influenced (P<0.05) the dry period in Murrah buffaloes in India, whereas, Thevamanoharan, (2002), reported a non-significant effect of season of calving on dry period in Nili-Ravi buffaloes in Pakistan. The analysis of variance revealed non-significant effect of parity on dry period. The findings of the present study were not in agreement with the findings of Kandasamy et al.,(1993)in Murrah buffaloes in India.

Table 1. Effect of year and season of calving and parity on some productive traits in Nili-Ravi buffaloes

Effects Traits	305-day Milk yield (Kgs)	Lactation length (days)	Dry period (days)
Year of calving			
1990	2109.02+185.27	449.47±25.95	187.68±36.17
1991	2030.30+ 269.57	472.79±38.17	324.17±51.56
1992	2252.88+151.51	377.70±21.77	244.46±30.82
1993	2177.20+126.47	367.32±18.19	156.53±29.23
1994	2298.46+139.51	403.95±19.76	181.25±26.84
1995	2193.60+111.45	350.72±16.09	226.30±26.07
1996	2113.11+109.16	324.33±15.79	139.19±26.58
1997	1985.67+105.59	355.26±15.22	128.38±26.51
1998	2053.51+121.85	379.15±17.42	158.78±28.30
1999	2285.82+126.03	339.12±18.23	138.29±26.13
2000	2678.85+109.40	351.40±15.79	183.70±26.88
2001	2435.59 + 116.01	321.87±16.77	249.15±26.84
2002	2505.70+150.58	310.85±21.75	209.51±50.88
Season of calving			
Spring	2034.95 ± 114.23	375.18 ± 16.34	210.27±22.50
Hot humid	2314.35 ± 120.97	359.79 ± 17.43	261.65±27.41
Dry humid	2223.50 ± 63.10	343.60 ± 9.11	162.39±15.16
Autumn	2344.85 ± 94.51	361.26 ± 13.57	167.62±21.59
Winter	2282.47±102.81	407.83 ± 14.23	170.14±22.60
Parity			
I	2310.14 ± 62.38	328.25±9.02	205.34 ± 13.35
II	2371.31± 64.89	343.33±9.37	177.45 ± 13.46
III	2319.66 ± 79.32	364.57±11.33	191.34 ± 22.04
IV	2029.11 ± 114.47	398.03±16.13	203.53 ± 37.35
V	2169.86 ± 202.72	413.49±28.96	175.31 ± 110.8

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