Dietary influence on primiparous and pluriparous buffalo fertility

D. Vecchio, G. Neglia, M. Rendina, M. Marchiello, A. Balestrieri, R. Di Palo

Dipartimento di Scienze Zootecniche e Ispezione degli alimenti.
Università di Napoli Federico II, Italy

Corresponding author: Domenico Vecchio. Dipartimento di Scienze Zootecniche e Ispezione degli alimenti. Facoltà di Medicina Veterinaria, Università di Napoli Federico II. Via F. Delpino 1, 80137 Napoli, Italy - Tel. +39 081 2536069 - Fax: +39 081 292981 - Email: d.vecchio@unina.it

ABSTRACT: The authors described the effects of diets characterized by different energy density and forages concentrations on reproductive activity of primiparous and pluriparous lactating buffalo cows, undergone the out of season breeding technique. Productive and reproductive data of a buffalo farm in Salerno were collected. Furthermore, the diets administered to the animals from 1998 to 2003 (6 years) were also recorded. The components of the diet were monthly analysed according to the method described by ASPA (1980). The fertility in primiparous buffaloes resulted significantly better ($P< 0.01$) during the last year when the diet were characterized by high energy and less quantity of forage. Differences were also recorded between primiparous and pluriparous buffaloes only in 2002 for milk production ($P< 0.05$) and in 1999 and 2002 for year's milk production ($P< 0.05$). The utilization of diets characterized by high use of concentrates and high energy improved fertility and milk yield in primiparous.

Key words: Buffalo cows, Diet, Fertility, Milk yield.

INTRODUCTION – The out-of-season breeding technique decrease fertility in buffalo cows (Zicarelli, 1995). Lactating buffalo shows some physiologic characteristics similar to those of double aptitudes animals and, hence, it modulates the productive activity on the basis of the diet (Campanile, 2006). In fact, the energy is utilized for maintaining requirements, for production requirements and, during the anabolic phase of the lactation, for recovering the body reserves. The remaining energy is utilized for the galactopoietics activity. The increase of the diet energy density, reached by the reduction of forages and the increase of fermentable carbohydrates (more concentrates), represents a deleterious factor for the productive (shortening of the lactation curve) and reproductive (increase of endometritis due to sub-clinic acidosis) activity of the animals, if it is not limited to the first 100 days of lactation (Campanile, 1997). It would be appropriate the formulation of diets characterized by at least 45% of forages, in order to guarantee an optimal ruminal activity.
The aim of this study was to evaluate the effects of diets characterized by different energy density and forages concentrations on reproductive activity of primiparous and pluriparous lactating buffalo cows, undergone the out of season breeding mating technique.

MATERIAL AND METHODS – Productive and reproductive data of a buffalo farm in Salerno province were collected. Furthermore, the diets administered to the animals from 1998 to 2003 (6 years) were also recorded (Table 1). The components of the diet were monthly analysed according to the method described by ASPA (1980).
Furthermore, the following parameters were calculated:

a) Intercalving period: it is the temporal interval (number of days) between one calving and the following;
b) Real fertility of the herd: it is the incidence of animals which deliver again within the following year;
c) Apparent fertility of the herd: it is the incidence of pregnant animals calculated on the total number of adult animals of the farm;
d) Conventional milk production: milk production in relation to the conventional lactation length (270 days in buffalo species);
e) Year's milk production: conventional production of each buffalo rectified in relation to the real intercalving period {(conventional production/intercalving period)*365}.

Table 1. Chemical characteristics of dry matter in the diets administered to the buffaloes during the 6 years of the trial.

	1998	1999	2000	2001	2002	2003
PG	15.5	15.5	15.5	15.5	15.5	15.5
LG	2.5	2.5	3.8	5.5	6.0	6.0
NDF	44.4	41.4	40.0	36.9	36.3	36.3
ADF	24.2	24.1	24.3	21.8	21.8	21.8
NSC	29.6	32.6	33.7	33.7	34.4	34.4
% concentrates	50.5	54.0	49.5	56.4	60.0	60.0
MFU/DM	0.87	0.87	0.92	0.98	0.97	0.97

The differences among the years, between primiparous and pluriparous buffalo cows, in relation to the real and the rectified intercalving period, the conventional and the year's milk production, were evaluated by ANOVA. The differences within the years and between primiparous and pluriparous buffalo cows in relation to real and apparent herd fertility were calculated by chi-square test.

RESULTS AND CONCLUSIONS – The fertility in primiparous buffaloes resulted significantly higher ($P<0.01$) during the last year (Table 2 on the net page). Also the intercalving period was higher, although no statistical differences were observed. These results were obtained by reducing the forages amount of the ration and, consequently, by increasing the energy density of the diet. On the contrary, in pluriparous buffaloes, the reduction of forages amount worsened the fertility, but reduced the intercalving period throughout the trial.
The energy density rise and the reduction of forages amount of the diet, caused a loss of fertility, due to the subclinical acidosis, consequent to the starches increase. This phenomenon is responsible of an increase of endometritis and not pregnant subjects (Campanile *et al.*, 1991). In buffaloes superovulated by p-FSH, the raise of diet energy content by increasing starches amount, causes a reduction of the number of recovered embryos/flushing (Di Palo et al., 1994). In primiparous buffaloes, that need nutrients for both milk production and body growth, the use of diet characterized by a high concentration reduce the energy deficit of the first months of lactation.
These animals, in fact, produced the similar yield of milk and milk/year of pluriparous subjects. In particular, some differences were recorded between primiparous and pluriparous buffaloes only in 2002 for milk production ($P<0.05$) and in 1999 and 2002 for year's milk production ($P<0.05$).
The utilization of diets characterized by high concentrates and high fermentescible carbohydrates at rumen level, reduced fertility rate in pluriparous buffaloes, whereas the last parameter was improved in primiparous animals. This aspect is probably due to the lower negative energetic balance in subjects whose growth is still going on. Therefore, on the basis of the results reported in this trial, it is advisable to adapt the rationing to the categories of animals, in order to improve the productive and reproductive performances.

Table 2. Fertility rate (%), mean intercalving period (days), milk production (kg) and milk production/year (kg) recorded in primiparous and pluriparous buffalo cows throughout the trial.

	Fertility	Intercalving period	Production	Production/year
1998	%	Mean ± SE	Mean ± SE	Mean ± SE
	(n)	(n)	(n)	(n)
Primiparous	46.4	548 ± 30	2193 ± 73	1559 ± 81
	(30)	(30)	(30)	(30)
Pluriparous	61.5	516 ± 24	2090 ± 41	1629 ± 60
	(65)	(65)	(65)	(65)
1999				
Primiparous	30.4[a]	577 ± 50	2255 ± 121	1579 ± 120[a]
	(23)	(23)	(23)	(23)
Pluriparous	59.1[b]	506 ± 21	2247 ± 52	1824 ± 163[b]
	(88)	(83)	(88)	(83)
2000				
Primiparous	63.6	483 ± 29	2718 ± 145	2120 ± 100
	(22)	(21)	(22)	(21)
Pluriparous	65.5	486 ± 17	2601 ± 51	2145 ± 71
	(113)	(96)	(114)	(96)
2001				
Primiparous	50.0	483 ± 44	2716 ± 191	2179 ± 137
	(10)	(9)	(10)	(9)
Pluriparous	56.0	466 ± 11	2666 ± 50	2237 ± 63
	(141)	(105)	(131)	(105)
2002				
Primiparous	60	455 ± 18	2276 ± 74[a]	1942 ± 103[a]
	(40)	(39)	(42)	(39)
Pluriparous	49.2	454 ± 15	2559 ± 63[b]	2229 ± 71[b]
	(132)	(84)	(109)	(84)
2003				
Primiparous	78.1[A]	454 ± 28	2434 ± 110	2082 ± 102
	(32)	(32)	(32)	(32)
Pluriparous	53.3[B]	495 ± 18	2538 ± 53	2112 ± 67
	(152)	(117)	(117)	(117)

a vs b = P<0.05; A vs B = P<0.01.

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