

EFFECT OF LEVEL OF CONCENTRATE SUPPLEMENTATION ON GROWTH RATE AND AGE AT MATURITY IN GROWING BUFFALO HEIFERS

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ABSTRACT

This study was conducted to observe the effect of supplementation of concentrate mixture along with green fodder on growth rate and age of maturity in growing buffalo heifers. Twenty seven heifers of Nili-Ravi buffalo, with 18-21 months of age and on an average 280.0 Kg body weight, were randomly divided into three groups A, B and C, with 9 animals in each group. All the groups were given chaffed green fodder *ad lib.* on group feeding basis. In addition, heifers of groups A and B were given 2.0 and 4.0 kg of concentrate mixture per head per day, while the group C received no concentrate and was kept as control. Daily green fodder consumption was 32.5, 30.00 and 37.50 Kg, with a growth rate of 0.558, 0.659 and 0.354 Kg in groups A, B and C, respectively. The age at maturity averaged 774, 728 and 993 days, while body weights were 411, 431 and 388 Kg in respective groups. The results revealed that the maturity age was significantly reduced ($P < 0.01$) by concentrate supplementation compared with fodder alone. Cost of rearing of buffalo heifers up to age of maturity was 5829.00, 6862.00 and 8747.00 rupees in respective groups. Rearing of buffalo heifers on green fodder *ad lib.* along with supplementation of 2 Kg of concentrate mixture was economical.

Key words: Age of maturity, green fodder, concentrate supplementation, rearing cost, buffalo heifers.

INTRODUCTION

Pakistan has approximately 28.4 million heads of buffaloes which are the main source of milk and meat production in the country (Anonymous, 2006). Buffalo is known to be late maturing animal and the age of maturity varies from 36 to 38 months (Hinkovski, 1990). Timely sexual maturity and regular reproduction are the fundamental requirements of a dairy animal. Besides genetics, the age of maturity is also affected by plan of nutrition (Poy and Panday, 1971; Schoppee *et al.*, 1996). Relatively little work has been undertaken to ascertain the nutritive requirements of buffaloes in various age groups. The present study was undertaken to observe the growth rate and age of maturity in buffalo heifers by feeding green fodder alone or in combination with different levels of concentrate mixture and ultimately to study the economics of rearing of buffalo heifers.

MATERIALS AND METHODS

The study was initiated during 2002 and the duration of trial was two years. Twenty seven Nili-Ravi buffalo heifers with an average body weight of 280.0 Kg and 18-21 months of age were selected from the available stock at the Livestock Experiment Station, Bahadar Nagar, Okara, Pakistan. This age group of

heifers represented 'young stock' group of animals at the farm. These animals were randomly divided into three groups A, B and C, with nine animals in each group. The average initial body weights were 280.22 ± 15.75 , 277.78 ± 16.79 and 286.11 ± 18.33 Kg for heifers in groups A, B and C, respectively. Heifers in all three groups were fed on available seasonal green fodder *ad lib.* with or without wheat straw. Chaffed green berseem with high moisture contents was mixed with 15% wheat straw. Other fodders like oats, oats + berseem, maize and Mott grass were chaffed and offered without wheat straw. The heifers in groups A and B received 2.0 and 4.0 kg concentrate mixture per head per day. No concentrate mixture was given to heifers in group C which served as control. Samples of concentrate mixture, green fodder and dry roughages were analyzed for dry matter (DM) and crude protein (CP) contents (AOAC, 1984), as given in Table 1. The concentrate mixture was fed in the morning before offering green fodder. Weighed quantities of green fodder were offered in the morning and the leftover was measured. The heifers were weighed at the beginning of trial and then on fortnightly basis till the completion of the study.

When the heifers attained the age of two years, a teaser bull was used in the morning and evening for the detection of heat. Rectal examination was done on monthly basis and development of reproductive organs

Table 1: Chemical composition (%) of concentrate mixture, green fodder and wheat straw fed to experimental animals

Feed/Fodder	Dry matter (DM)	Crude protein (CP)	Total digestible nutrients (TDN)
Concentrate mixture	86.63	15.00	72.00
Berseem	22.00	20.00	60.00
Berseem + oats	21.00	14.00	56.00
Maize	24.00	09.00	53.00
Mott grass	20.50	07.50	52.00
Wheat straw	89.75	03.50	42.00

was monitored. The data on feed intake, growth rate, age and weight at maturity were statistically analyzed using completely randomized design, while Duncan's multiple range test was applied to determine the difference between means (Steel and Torrie, 1984).

RESULTS AND DISCUSSION

Feed intake and weight gain

The daily fodder intakes were 32.50, 30.00 and 37.50 Kg in groups A, B and C, respectively. The average dry matter intakes were 9.08, 10.26 and 8.48 Kg, whereas the daily protein and TDN intakes were 1.13 and 5.63 Kg; 1.32 and 6.30 Kg for groups A and B, while for group C these values were 1.00 and 4.74 Kg. Statistical analysis revealed significant difference among the groups for these parameters ($P < 0.05$).

The average daily growth rates in heifers of groups A, B and C were 0.558 ± 0.06 , 0.659 ± 0.07 and 0.354 ± 0.06 Kg, respectively (Table 2). The growth rate was lowest in control group fed on fodder, while highest in group B, the difference was significant ($P < 0.05$). Makkar *et al.* (1981), while studying the effect of plan of nutrition on growth rate and age of puberty in buffalo heifers, reported lowest daily weight gain (387 gm) in heifers fed green fodder alone. Similarly, Kaur and Arora (1989) conducted a trial on two groups of buffalo heifers where group A was fed according to NRC standard, while group B was given feed with 35.9% less crude protein and 16.22% less TDN than Group A. The

overall daily growth rate in group A was significantly higher ($P < 0.05$) than group B.

Age and weight at maturity

The age at maturity averaged 773.89 ± 56.62 , 727.77 ± 44.17 and 993.33 ± 68.78 days, while the body weights were 411.10 ± 43.24 , 431.17 ± 49.29 and 387.78 ± 44.94 Kg in groups A, B and C respectively. The statistical analysis showed non-significant difference between groups A and B, while significant difference ($P < 0.05$) was observed in group C vs groups A and B (Table 2). Nanda *et al.* (2003) concluded that better nutrition reduces the age of maturity in buffalo heifers. These results revealed that the age of maturity in fodder based group was delayed by 219 and 265 days compared to groups A and B given concentrate with fodder. Yadav *et al.* (1998) reported that the range for age of maturity was 677-868 days under different feeding systems.

Rearing cost

The rearing cost was lowest (Rs. 5829.00) for group A fed on fodder plus 2.0 Kg concentrate ration, while it was highest (Rs. 8747.00) for group C fed on fodder only (Table 3), because it took 219 extra days for animals in group C to mature. Ahmad (2002) worked out the rearing cost of buffalo heifers on concentrate and green fodder (20:80) up till maturity as Rs. 7641.00 including the cost of housing, water and electricity etc. According to Tozer and Heinrichs

Table 2: Feed intake and live weight gain in experimental buffalo heifers

Particulars	Group A	Group B	Group C
	(Fodder + 2Kg Conc.)	(Fodder + 4Kg Conc.)	(Fodder only)
Initial body wt. (Kg)	$280.22^a \pm 15.75$	$277.78^a \pm 16.79$	$286.11^a \pm 18.33$
Age at start of experiment (Days)	$590.00^a \pm 35.44$	$570.00^a \pm 40.54$	$580.00^a \pm 37.50$
Daily weight gain (Kg)	$0.558^a \pm 0.06$	$0.659^a \pm 0.07$	$0.354^b \pm 0.06$
Age at maturity (Days)	$773.89^a \pm 56.62$	$727.77^a \pm 44.17$	$993.33^b \pm 68.78$
Live weight at maturity (Kg)	$411.10^a \pm 43.24$	$431.17^a \pm 49.29$	$387.78^b \pm 44.94$

Values with different superscripts within a row differ significantly ($P < 0.05$).

Table 3: Rearing cost of buffalo heifers of three groups

Parameters	Group A	Group B	Group C
Cost of fodder @ Rs. 0.5/Kg	0016.25	0015.00	0017.75
Cost of dry fodder @ Rs. 1.00/Kg	0000.05	0000.50	0000.50
Cost of conc. mix. @ Rs. 6.50/Kg	0013.00	0026.00	-----
Cost of labor @ Rs. 140.0/day	0001.73	0001.73	0001.73
Miscellaneous expenses/day	0000.20	0000.20	0000.20
Daily rearing cost (Rs.)	0031.68	0043.43	0021.18
Total rearing cost / animal (Rs.)	5829.00	6862.00	8747.00

(2001), lowering the age of maturity by one month lowers the cost of farm by 4.3%. The rearing cost was minimum in buffalo heifers in group A (green fodder + 2 Kg concentrate). Although per day feeding cost was lower in fodder based group but extra time in attaining the maturity rendered this system costly and less economical.

Based on the data obtained in this experiment, it may be concluded that feeding of buffalo heifers on green fodder along with supplementation of 2.0 Kg concentrate ration is appropriate for rearing of buffalo heifers from one and half year to age of maturity.

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