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ESTRUS INDUCTION IN BEETAL GOATS DURING LOW BREEDING SEASON

N. Ahmad, K. Javed, M. Abdullah, A. S. Hashmi* and A. Ali

Department of Livestock Production; *Institute of Biochemistry and Biotechnology, University of Veterinary and Animal Sciences, Lahore, Pakistan.
Corresponding Author E-mail**:** nisarahmad@uvas.edu.pk

ABSTRACT

An experiment was conducted during low breeding season on 20 anestrus Beetal goats. These animals were kept at Small Ruminant Training and Research Centre (SRT and RC), University of Veterinary and Animal Sciences, Ravi Campus, Pattoki. The animals were randomly divided in four groups (A, B, C and D) five animals in each group. Group A was considered as negative control by offering only fodder; group B animals were offered fodder and flushing ration (positive control group); group C animals were given fodder along with hormone therapy (0.5ml each of GnRH, PGF2α and GnRH) and goats in group D were fed green fodder, flushing ration (600 gm/animal) and hormone therapy (GnRH, PGF2α and GnRH).This experiment lasted for one month. The reproductive behavior regarding signs of heat, breeding and conception was observed. Blood serum for total protein, albumin, globulin, glucose and urea were analyzed to see the health status of the animals. Data were analyzed by applying ANOVA technique under CRD and differences among treatments were tested by using Duncan's Multiple Range using SAS 9.1.5. It was observed that estrous induction (60%) was low in group A while conception (80%) and kidding rate (60%) were higher in group B. However, mean birth weight ok kids was higher in group A (3.16±0.76 kg). Twinning percentage was only 20% in A and B groups, whereas, triplet births were also 20% in group D. Mean gestation length was minimum in group B while maximum in group A. The mean values of total protein, globulin and glucose were higher in group A whereas albumin in group C and more urea concentration (36.80±3.23 mg/dL) was observed in animals of group B.

Keywords: Beetal goats, anestrous, reproductive management and serum biochemistry.

INTRODUCTION

Pakistan stands at 3rd number with 66.6 million goat population after China and India, producing 657 and 822 thousand tones of mutton and milk from this specie per annum, respectively (Anonymous, 2014). In tropical and sub tropical areas of the world and also in Pakistan, most of the Beetal goats do not follow seasonal breeding pattern and breed round the year although have peak breeding season during months of Sep-Oct. This increases the difficulties of management in commercial flocks and high kid mortality has been observed during severe seasons. The progressive farmers have adopted hormonal therapies and controlled breeding pattern for specific seasons (once a year) for convenience in management.

Chevon does may be planned to kid every 8 months by synchronization has importantly resulted in higher meat production particularly during anestrous (Schneider and Stanko, 2005). High reproductive rate is the base of production efficiency, which means more surplus animals for sale as meat, and a higher selection differential leading to a faster response to selection (FAO, 1986). Nutrition of goats is considered as a significant controller of reproduction. Therefore, flushing ration has been known to induce definite effects in improving body condition, fertility and ovulation rate of does along with substandard nutritional status (Luginbuhl and Poore 1998; Johnson, 2001). Keeping in view all these factors, current study was designed to induce estrus in Beetal goats, by adopting Ov Synch protocol i.e. GnRh + PGF2 and GnRh at 0, 7th and 9th day, respectively.

MATERIALS AND METHODS

Location: The experiment was conducted at Small Ruminant Training and Research Center (SRT and RC), University of Veterinary and Animal Sciences, Ravi Campus, Pattoki, Pakistan. In order to initiate the normal estrous activity in anestrus Beetal goats during low breeding season, 20 Beetal goats were identified and divided randomly into 4 groups i.e. A, B, C and D having 5 animals each.

Management: Beetal goats of Group A were treated as negative control by offering only green fodder. The animals of group B were provided with flushing ration of crude protein (12%), metabolizable energy 2.2 Kcal and TDN 63%, along with green fodder. This group was considered as control group. The goats in group C were kept on green fodder along with hormone therapy (with GnRH, PGF2α + GnRH). GPG protocol (First of all injection of GnRH then PGF2α then GnRH) was followed. The goats in group D were provided with green fodder, flushing ration (600 gm/animal) and hormone therapy (GnRH, PGF2α + GnRH). The animals of all groups were offered with routine fodder @ 10 % of their body

weight. All the animals were given free access to water but were tethered at the time of feeding. Each animal of group C and D received, on day zero, an injection of GnRH (50µg; dalmarelin; Fatro; Italy, @ 0.5ml, intramascularly) followed by an injection of PGF2α at day 7, (0.75mg; dalmazin, Fatro; Italy, @ 0.5 ml intramascularly). Second injection of GnRH on day 9 was given to the animals of groups C and D. Estrus symptoms were observed up to 72 hours. The buck was allowed to detect heat of each goat daily for 5-10 minutes in the morning and evening.

Blood Collection: Blood was collected weekly in plane vacutainers and serum was separated by centrifugation at 10,000 rpm for ten minutes at 4°C. The data related to blood biochemistry was maintained starting from the induction of hormones up to one month. Parameters studied for blood biochemistry were albumin, globulin, total protein, urea and blood glucose by using kits of Human company, Germany.

Statistical Analysis: To asses the effect of treatments, the analysis of variance was done under completely randomized design (Steel *et al*., 1997) using GLM procedure of SAS. Statistical package SAS 1995 (SAS institute, Cary, NC). In case of significant differences, mean values were compared through Duncan's Multiple Range Test (Duncan, 1955).

RESULTS AND DISCUSSION

The productive and reproductive parameters studied in this experiment have been summarized as in table 1.

Estrus Induction: Low estrous detection (60%) was observed in group A (control), as compared to the 100 percent estrous detection in groups B, C and D. Results of present study differ from Chao *et al*. (2008) who found that 40% of the goats showed estrus cycle ranging from 18 to 21 days. The results of present study resemble with findings of De Nicolo *et al*. (2008) who reported estrus symptoms in control group ewes were 86% during out of breeding season.

Conception rate: Conception rate (80%) was found to be highest in group B supplemented with concentrate. Low conception rate (40%) was seen in A group (-tive control group). These results were close to the findings of Lofstedt and Eness (1982) who reported that conception rates (CR) was 32% in ewes while using FSH and GnRH. Whereas C and D groups showed intermediate (60%) conception rate (CR).

Kidding rate: Kidding rate (KR%) was found to be higher (60%) in relation to elevated 80% conception rate which was observed in group B, whereas, rest of other groups A, C and D showed equal level of kidding rate i.e. 40%. These findings are closely in line with the work of Zhao *et al*., 2010 who observed kidding 53.6%, whereas Titi *et al*. (2008) and Batista *et al*. (2009) observed 77 and 92.1- 94.9% kidding rate.

Birth weight: Weighing scale was used for the purpose of measuring birth weight of newborns. Highest birth weight (3.16±0.76 kg) was found in group A as compared to 3.12±0.94kg, 3.06±1.0kg and 2.75±1.06kg in group B, D and C, respectively. Birth weights of Beetal goat kids were found close to the findings i.e. 3.3kg and 3.6kg of Misra (1981) and Shafiq and Sharif (1996), respectively.

Type of birth: Highest percentage of single birth (40%) was found in group B and C as compared to the 20% single birth in group A and D. However twining was not found in group C and D whereas 20% twin births were observed in group A and B. Triplet birth was observed only in D group (20%). Findings of Goonewardene *et al*. (1997) also resemble with the findings of the present study. Kidding rate in Saanen and Alpine goats was observed as 16 and 64%, respectively, 41% single, 47% twins, 6% triplet and quadruplet births were recorded. Moaeen-ud-Din *et al*. (2008) stated overall triplet percentage in Matou goats as 16.3%. Whereas, single birth percentage was found to be 27.4 as compared to 20-40% during present study. Afzal *et al*. (2004) and Llewelyn *et al*. (1992) stated twining as 47.9 and 75% in Beetal goats in Pakistan and indigenous goats in Zimbabwe, respectively.

Gestation length: Gestation length was found as 151.33± 0.57days, 147.5±1.73 days, 148.5± 3.53days and 149.25±0.05 days in groups; A, B, C and D, respectively. Khanum *et al*.(2007) and Moaeen-ud-Din *et al*., (2008) also reported similar gestation length as 145.2±4 to 145.8±5 and 150±7.4 days, respectively.

Blood serum analysis: The parameters of blood serum analysis are summarized in table 2.

Total protein: The highest and lowest concentration of total protein (6.78±0.18 g/dL and 6.60±0.13 g/dL) was observed in A and B groups, respectively. These results are close to those of El-Khodery *et al*. (2011) and Choi *et al*. (2006) who reported protein concentration in serum as 5.6±0.4-7.9±0.6g/dL and 6.92± 0.7- 7.20± 0.9g/dL (before feeding to Korean black goats) and (6.67±0.7-7.89± 0.5 g/dl) after feeding.

Albumin: The lowest concentration of albumin (3.16±0.07 g/dL) in group B and the highest (3.43±0.09 g/dL) in group C was observed. These results coincide with findings of Kaneko (1989), Benjamin (1989), Castro *et al.* (1977), El-Khodery *et al*. (2011), Gupta *et al*. (2011) Alberghina *et al*. (2011) and Swarup *et al*. (1986) who narrated albumin concentrations as 27-39g/L, 31.0±6.0 g/L, 1.9±0.2 – 3.1±0.4g/dL, 2.96±0.10 – 3.01±0.11g/dL, 31.80± 4.00g/L and 3.1±0.1g/dl, respec-

tively. However, these findings differ from the work carried out by D'Angelino *et al.* (1990), Solaiman *et al.* (2009) and Choi *et al.* (2006) who reported results 28±5.4, 3.77g/dL, before feeding 4.23±0.2-4.44±0.3g/dL and after feeding 5.81±0.5-6.52±0.5 g/dL, respectively.

Globulin: The concentration of globulin was found to be 3.59±0.16, 3.56±0.15, 3.17±0.17 and 3.34±0.184 g/dL in groups A, B, C and D, respectively. Highest values for globulin were found in group A whereas, the lowest concentration values for globulin (3.17±0.17 g/dl) were found in group C. These values differ from the data reported by Behera *et al.* (1993) who reported 2.78-3.64 gm, in Black Bangal goats. These differences may be due to breed difference, management practices, gender, over hydration and low protein value of fodders in subtropical regions.

Blood glucose: The concentration of glucose was found to be 59.30±2.64, 54.70±2.72, 55.60±2.61 and 54.0±2.44 mg/dL in groups A, B, C and D, respectively. Lowest values for glucose was found in animals of group D. Results of blood glucose are coinciding with the findings of Khan and Ludri, 2002 and Choi *et al*. 2006 who reported blood glucose value 59.0±1.36mg/mL and 57.6±5.9-63.6±15.5, respectively.

Urea: The concentration of urea was found to be 33.40±2.79, 36.80±3.23, 35.20±3.07 and 34.00±3.13 mg/dL in groups A, B, C and D, respectively. These values differ from the data reported by Kaneko, (1989), Benjamin, (1989), Behera *et al*. (1993), Castro *et al.* (1977), Mbassa *et al*. (1993), Gray *et al*. (1988) and Ramin *et al*. (2005) reported 3.57-7.14 mM/L in non-pregnant ewes, 7.64-22.92mM/L, 12.37-20.50 mM/L in Black Bangal goats, 17.80 ± 3.13 mM/L in Pygmy goats, 7.40 in cross bred goats, 5.34±2.29 mM/L and 4.87±0.05 mM/L, respectively. The reason for the differences with the present work may be breed difference, management practices, gender, over hydration and low protein value of fodders in subtropical conditions.

Table No. 1. Productive and Reproductive performance parameters in different groups of Beetal goats

Treatment groups	N	Estrus induction (%)	Conception Rate (%)	Kidding rate (%)	Mean Birth weight ± Std. Dev. (Kgs)	Mean Gestation Days ± Std. Dev
A-(**Control**)	5	60	40	40	3.16±0.76[a]	151.33±0.57[a]
B- (**Fodder + conc**.)	5	100	80	60	3.12±0.94[a]	147.50±1.73[a]
C- (**Fodder + GPG**)	5	100	60	40	2.75±1.06[b]	148.50±3.53[a]
D-(**Fodder +Conc.+ GPG**)	5	100	60	40	3.06±1.00[c]	149.25±0.50[a]

The values having different super scripts in a column are significant (P<0.05)

Table No. 2. Means of total protein, Albumin, Globulin, Glucose and Urea in blood serum of different Beetal groups.

Treatments	Means of Blood Serum Constituents ± Std. Error				
	Total Protein	Albumin	Globulin	Glucose	Urea
	(g/dl)			(mg/dl)	
A=(Control (Fodder) n=5	6.78±0.18	3.19±0.05	3.59±0.16	59.30±2.64	33.40±2.79
B=(Fodder + Conc.) n=5	6.74±0.16	3.16±0.07	3.56±0.15	54.70±2.72	36.80±3.23
C=(Fodder + GPG) n=5	6.60±0.13	3.43±0.09	3.17±0.17	55.60±2.61	35.20±3.07
D=(Fodder + conc. + GPG) n=5	6.59±0.24	3.25±0.13	3.34±0.18	54.00±2.44	34.00±3.13

The data in column are statistically non significant (P>0.05).

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