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Effect of Grazing Supplementation on Some Reproductive Traits of Sudanese Nubian Goat

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Abstract: In this experiment twelve female Sudanese Nubian goat kids born during the period between October 1998 to August 2000, to parent stock raised on traditional pastroralism, were used in completely randomized design to investigate the effect of grazing supplementation on age and weight at sexual maturity, age and weight at first conception and age at first kidding. The average age at puberty of female kids was 9.15 ± 0.17 months, while the average weight at puberty was 12.74 ± 1.37 kg. Nutritional supplementation did not significantly affect both traits. The average age at first conception was 10.86 ± 2.41 months, with an average body weight of 15.10 ± 1.62 kg. The nutritional supplementation exerted non-significant effect on both traits. The average age at 1st kidding was 16.5 ± 2.67 months. Nutritional supplementation had non-significant effect on age at 1st kidding.

Key words: Nubian goat, puberty, conception, age a 1st kidding

INTRODUCTION

Among the important factors which influence the efficiency of goat production is reproduction, there are several factors which influence the efficiency of reproduction (Silva, *et al*. 1998, Greyling, 2000, Song *et al*., 2006 and Moaeen-ud-Din, *et al*. 2008).The study of such factors will help the goat breeder to improve the goat reproductive efficiency.

The effects of grazing supplementation on age and weight at sexual maturity, age and weight at first conception and age at first kidding were studied in the present investigation.

MATERIALS AND METHODS

Twelve female Sudan Nubian goat kids were used in this experiment. The kids were born during the period between October 1998 to August 2000, to parent stock raised on traditional pastroralism. The grazing zone of these animals was in the southern Butana plains of Sudan near Abu Deleig, 100 km north east of Khartoum. The metrological conditions of the grazing pasture and pasture composition are given in table 1 and 2 respectively. The year was divided into three seasons, summer (from March to June), autumn (from July to October) and winter (from November to February). The parent stock was divided into three groups (A, B and C) of equal number and weight, during winter and summer goats were allowed day grazing and in the evening they were kept indoors in enclosures made of mud, to allow giving supplement. Group A was given sorghum grains at night, at a rate of 500 gram/head/day for 30 days before parturition and throughout the lactation period. For the remaining time of their physiological cycle this group was given sorghum at a rate of 170 gram/head/day. Group B was also given sorghum grains at night at a rate of 170 gram/head/day throughout their physiological cycle to simulate the traditional management in the area. Group C was given adlibitum a molasses based diet throughout it's physiological cycle (table, 3). All groups were offered sorghum stalks at a rate of 500 gram/head/day and allowed access to fresh pore-hole water twice a day in dry summer and once in winter.

In autumn the goats and their kids were taken outside Abu Deleig area to its surrounding plains, where night grazing was also practiced in addition to day grazing. No dietary supplementation was offered during this period. Watering was once a day from running surface water (Khors) during the early wet season and from excavated ponds at the end of the season.

Kids born to these goats were allowed to freely suckle colostrum for the first three days after parturition,

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thereafter they were separated from their dams during the day. In the evening half of their dam milk was milked before kids were released to spend the night with their dams. Kids were weaned at three month of age. Consequently and to the sexual maturity (9 month age) kids were divided into two groups (A and B).In winter and summer group (A) was given sorghum grains at a rate of 250 gram/head/day, while group (B) was given sorghum grains at a rate of 100 gm/head/day, to simulate the traditional practice in the area. During this period all kids received sorghum stalk at a rate of 250 gram/head/day. In autumn kids depended solely on grazing.

Meteorological Data:

Meteorological information on temperature, relative humidity and rainfall at the time of investigation were collected from the nearest meteorological station (Shambat), (Table, 1)

Statistical Analysis:

Means and standard deviations of the different traits were computed. Analysis of variance was performed in accordance to general linear method. All techniques of the statistical analysis were conducted using computer program statistical package for social science (SPSS, 1998).

Table 1: Some meteorological data of the region during the experimental period of the study

Year	1998			1999			2000		
Month	R.H.%	Temp.°C	R.F.mm.	R.H.%	Temp.°C	R.F mm.	R.H.%	Temp.°C	R.F.mm.
January	26	20.8	-	28	23.7	-	36	22.9	-
February	21	23.0	-	24	28.4	-	33	24.1	-
Marsh	17	26.1	-	15	27.1	-	21	26.2	-
April	15	31.7	-	14	31.2	Trace	18	31.7	Trace
May	18	34.1	-	22	35.2	Trace	26	34.3	0.1
June	22	34.5	-	25	34.8	4.7	26	35.7	-
July	39	33.9	1.4	44	31.5	42.2	36	32.8	2.5
August	50	30.7	34.7	51	30.3	51.3	39	32.5	2.0
September	52	31.3	87.6	44	31.1	20.4	39	31.7	16.3
October	37	32.0	7.2	36	31.5	4.2	30	30.2	24.1
November	25	32.9	-	26	28	-	27	26.7	-
December	28	25.5	-	33	25	-	29	22.5	-

R.H. relative humidity
R.F. rain fall

Table 2: Chemical composition of natural pastures in the study area

Botanical Name	Local Name	Type DM%	C.P. %	C.F.%	E.E.%	Ash%
Acacia ehrenbergiana	Salam	Bark &Branch	12.66	27.51	1.95	6.36
Acacia ehrenbergiana fruit	Salam fruit	Fruit	1.67	16	3	8.25
Acacia ehrenbergiana flower	Salam flower	Flower	0.71	16.5	1	9.75
Acacia mellifera	Kitir	Tree	16.3	30.3	1.80	8.7
Acacia tortilis sub-sp. Radiana	Seyal	Tree	12.14	28.55	2.12	4.14
Schoenefeldia gracilis	Dembelab	Grass	4.9	36.7	1.0	15.5
Aristid spp.	Gau	Grass	5.7	38.4	0.5	10.0
Urochloa trichopus	Taffa	Grass	8.3	34.3	0.9	13.9
Cymbopogon nervatus	Nal	Grass	6.4	31.9	1.4	8.4
Tribulus terrestris	Dirasa	Grass	26.17	33	4	24
Targus berteronianus	Shara	Grass	9.88	8.84	1.36	21
Ipomoea cordofana	Hantoot	Grass	18.38	17.5	1.5	22
Aristida adscension	Humra	Grass	2.98	43	2.22	8.75
Sorghum straw	Gasab Feterita	Stem	1.58	24.5	0.5	7

Date of collection: between end of September and beginning of November (1998). Stage of collection: Late bloom stage, dried aerial part for grasses and fresh twigs for trees
C.F. Crude fiber
C.P. Crude protein
E.E. Ether exrtract

Table 3: Ingredients and proximate analysis of experimental diet (As fed basis)

Components %	Ration A	Ration B	Ration C	Sorghum Stalks
Molasses	-	-	50	-
Sorghum grains	100	100	-	-
Wheat bran	-	-	41	-
Groundnut cake	-	-	8	-
Salt	-	-	1	-
Total	100	100	100	

Table 3: Continue

Proximate analysis %				
Dry matter	94.5	94.5	91.8	93.00
Crude protein	12.75	12.75	12.15	4.14
Crude fibre	2.87	2.87	6.1	24.5
Ether extract	2.46	2.46	2.71	.5
NFE	74.34	74.34	51.08	47.83
Ash	2.08	2.08	9.09	7.68
ME (MJ/kg)	12.84	12.84	9.51	6.22

RESULTS AND DISCUSSION

Table (1) shows that the average age at puberty of female kids was 9.15 ± 0.71 months. The data indicated that the age at puberty was affected by feed supplementation. Female kids of group (B) nutritional supplement were sexually mature at an earlier age (8.76 ± 1.25 months) compared to female kids belonged to group (A) nutritional supplement (9.54 ± 0.17 months), but the difference does not secure a statistical significance (P> 0.05).

Table 1: Age at puberty of female kids at different nutritional supplements

Supplement	No. of female kids	Mean (months)	Standard deviation
A	6	9.54	± 0.17
B	6	8.76	± 1.25
Average	12	9.15	± 0.71

The data in table (2) shows that the average weight of female kids at puberty was 12.74 ± 1.37 kg. The weight at puberty of female kids of supplement (A) and (B) were 13.4 ± 1.43 and 12.07 ± 1.30 kg respectively. The differences between the two values however did not attain a statistical significance (P> 0.05).

Table 2: Weight at puberty of female kids at different nutritional supplements.

Supplement	No. of female kids	Mean (kg)	Standard deviation
A	6	13.4	±1.43
B	6	12.07	±1.30
Average	12	12.74	±1.37

The data in table (3) demonstrated that the average age at 1stconception was 10.86 ± 2.41 months. The data also showed that female kids of supplement (A) conceived at a younger age (9.85 ± 1.8 months) compared to their counterpart fed on supplement (B) (11.87 ± 2.67 months). The differences however did not secure a statistical significance (P> 0.05).

Table 3: Age at 1st conception at different nutritional supplements.

Supplement	No. of female kids	Mean (month)	Standard deviation
A	6	9.85	± 1.80
B	6	11.87	± 2.67
Average	12	10.86	± 2.41

The figures in table 4 indicated that the average weight at 1st conception was 15.10 ± 1.62 kg. The average weights at 1st conception of female kids of supplement (A) and (B) were 14.26 ± 0.62 and 15.93 ± 2.61 kg respectively. The difference between the two values however did not attain a statistical significance (P> 0.05).

Table 4: Weight at 1st conception of female kids at different nutritional supplements.

Supplement	No. of female kids	Mean (kg)	Standard deviation
A	6	14.26	± 0.62
B	6	15.93	± 2.62
Overall	12	15.10	± 1.62

The data in table (5) demonstrated that the average age at 1st kidding of the experimental animals was 16.5 ± 2.67 months. The data also highlighted the effect of nutritional supplementation on the age at 1st kidding and indicated that the group maintained on supplement (A) was younger in age at 1st kidding (15.28 ± 1.97 months) compared to the other group, fed on supplement (B) (17.73 ± 2.96 months). The difference however did not secure a statistical significance.

Table 5: Age at 1st kidding of goats belonging to different nutritional supplements.

Supplement	No. of female kids	Mean (months)	Standard deviation
A	4	15.28	± 1.97
B	4	17.73	± 2.96
Average	8	16.50	± 2.67

Discussion:

Several factor influence reproduction in dairy goats of these age and weight at sexual maturity, age and weight at 1st conception, age at 1st kidding are among the most important ones. The age at sexual maturity calculated in this study was 8.5 ± 1.31 months, which was in agreement with the finding of Zeshmarani *et al*. 2007 for Assam Hill goats. However older or younger ages at sexual maturity were reported by Hassan *et al*. 2007 for Black Bengal goat, Zeshmarani *et al*. 2007 for Manipuri goat and Moaeen-Ud-Din et al. 2008 for Matou goat. The present study indicated that there were slight, non-significant differences between ages at sexual maturity of female kids of different nutritional supplements this was in agreement with Fasanya *et al*. 1992 for Savanna Brown goat and Greyling, 2000 for Boer goat.

The weight at sexual maturity calculated in this study was 16.39 ± 3.98 kg, this weight was less than the weight at sexual maturity of Beetal goat reported by Maroof *et al*. 2007. The insignificant effect of nutritional supplementation on weight at sexual maturity documented in this study was in agreement with Fasanya *et al*. (1992) for Savanna Brown goats.

The age at first conception calculated in this study was 10.86 ± 2.41 months, which was comparable with what had been claimed by Zeshmarani *et al*. 2007 for Assam Hill goats. However older or younger ages at first conception were reported by Cabello *et al*. 1991 for Anglo-Nubian goats and Zeshmarani *et al*. 2007 for Manipuri Black Bengal goats. The present study indicated that there was slight, non-significant difference between ages at first conception of female kids of different nutritional supplements.

The weight at first conception calculated in this study was 19.85 ± 3.54 kg. This weight was comparable with what had been reported by Imeryüz and Köseoglu 1980 for Angora goat, Mittal and Ghosh 1985 for Parbatsar goats and Cabello *et al*. 1991 for Anglo-Nubian goat. The slight, non-significant difference between weights at first conception of female kids reported in this study was in agreement with Imeryüz and Köseoglu 1980 for Angora goats.

The age at first kidding documented in this study was 16.5 ± 2.67 months. This result is comparable with what had been advocated by Maroof *et al*. 2007 for Beetal goat and Zeshmarani *et al*. 2007 for Manipuri goat.The nutritional supplement had no significant effect on age at first kidding. This agreed with the finding of Fasanya *et al*. (1992) for Savanna Brown goats.

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