

Various Factors Affecting Birth weight of Sudanese Nubian Goat Kids

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Abstract: Ninety-two male and female Sudan Nubian kids were used in completely randomized design to investigate the effect of sex, type of birth, parity order, nutritional supplementation and year / season of kidding on birth weight. The results revealed that, the overall birth weight was $2.344 + 0.557$ kg. Sex of kid, type of birth and year/season of kidding had a significant effect on birth weight. However parity order and nutritional supplementation had no significant influence on birth weight.

Key words: Nubian goat, kid, Birth weight

INTRODUCTION

Goats play an important role in the livelihood of wide sector in Sudanese community. The AOAD^[4] estimated the goat population of Sudan to be 38,540,000 head. The main types of goat in the Sudan are Nubian, Sudan desert, Nilotic dwarf and Tegri, Nubian goat is the only specialized dairy goat^[12]. In addition, some of their mixed crossed with saanen, Toggenburg and Anglo – Nubian were also found since the importation of exotic breeds in 1976.

Several studies, have shown that birth weight is affected by sex type of birth, parity order, nutrition and year / season of kidding^[22,5,21,2,19]. Information on birth weight and factors influencing are important, their importance stems from the fact that the future of any goat production operation depends upon successful program for raising kids for replacement of parent stock.

The present work was there for undertaken to study the effects of sex, type of birth, parity order, nutritional supplementation and year / season of kidding on birth weight.

MATERIALS AND METHODS

Ninety-two male and female Sudan Nubian kids used in this experiment, were born to Nubian parent stock during the period between October 1998 to August 2000, the common system of parent stock management is traditional pastoralism. During winter and dry summer (table, 1) goats were taken during the day light to natural grazing in the vicinity of Abu Deleig area (table, 2) and in the evening they returned

to the area and kept in their enclosures, in the enclosures the parent stock was divided to three groups (A,B and C.),these groups were fed as follows: group A were given sorghum grain (table, 3) 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 170 gram/head/day. Group B were given sorghum grain at a rate of 170 gram/head/day (local practice) throughout their physiological cycle. Group C was given ad libitum molasses ration (table, 3) throughout it's physiological cycle. All groups were offered sorghum straw (table, 2) at a rate of 500 gram/head/day. All groups were allowed access to fresh pore-hole water twice a day in dry summer and once in winter.

In the wet summer the goats were taken outside the area (Abu Deleig) to it's surrounding plains, where they graze from the morning till the sunset, then they rest for few time, and then start a night grazing which extend to near the morning. This type of grazing extends from August to October; the goats in all groups did not receive any supplementary diet during this period. Watering was once a day from Khors (small natural canal) at the beginning of this season and from excavated ponds at the end of the season.

The birth weight was taken immediately after birth and when kids were dry,

The period of study was divided into three seasons.

- Dry summer which extend from April to June.
- Wet summer which extend from July to September.
- Winter which extend from October to March

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

Statistical Analysis: Means, standard deviations and correlation coefficient of different traits were computed. Analysis of variance was performed in accordance to general linear method. Duncan's multiple range test was used with factors that had significant effect on the traits studied. All techniques of the statistical analysis were conducted using computer program statistical package for social science.

RESULTS AND DISCUSSION

Results: The data in table (4) shows 92 birth weight records. The mean birth weight of male kids was significantly ($P < 0.05$) higher than that of female kids. The recorded values were 2.374 ± 0.622 and 2.312 ± 0.481 kg for male and female kids respectively. The average birth weight of kids of the two sexes was 2.344 ± 0.557 kg. The data in table (5) highlight the effect of litter size on birth weight. The data indicated that birth weight of single born kids was significantly higher than both twin and triplet born kids; following the same lines the birth weight of twins was significantly higher than that of triplets. The respective values for birth weight of singles, twins and triplets were 2.489 ± 0.522 , 1.963 ± 0.325 and 1.500 respectively. Parity also seemed to have exerted an effect on birth weight of kids. The figures in table (6) demonstrate that the birth weight of kids born in the 2nd parity were heavier than those born in the first parity. Kids of third parity were also less in weight than kids of second parity. The recorded values were 2.274 ± 0.604 , 2.548 ± 0.487 and 2.209 ± 0.501 kg for parity one, two and three respectively. The differences however did not secure a statistical significance. On the other hand the results indicated that birth weights were also affected by feed supplementation. The birth weight of kids born to the group maintained on molasses based diet (C) secured the heaviest birth weights compared to the two other groups. The kids' birth weight of group (C) was 2.52 ± 0.25 kg as compared to 2.19 ± 0.55 and 2.45 ± 0.59 kg for groups (B) and (A) respectively. The differences however did not attain a statistical significance (Table, 7). The data in Table (8) shows the effect of year/season of kidding on birth weights. The results verified significant effects on the birth weight ($P < 0.05$). The heaviest kids were kidded at wet summer 1999 (2.82 ± 0.51 kg) while the lightest kids were delivered at winter 2000 (2.06 ± 0.26 kg). The results in table 9 indicated a positive

correlation ($r = 0.216$) between the dams weight and birth weight of kids. This positive correlation however was not significant.

Discussion: The overall birth weight obtained in this study (Table, 3), compared favorably well with birth weights reported by Mittal and Pandey^[15] for Barbari goat and Tag Eldin^[20] in the same breed. When compared with the birth weight of some tropical and temperate breeds reported by Mittal^[14] for jamunapari in India and Montaldo and Jaurezi^[16] for Granada goats, it came clear that these breeds were much more heavier at birth than Nubian goats considered in this study, this may be attributed to the smaller mature weight of the Nubian goats, the mature weight of jamunapari goats, ranged between 40 and 60 kg, as reported by Devendra and Burns^[7], compared to 27 kg for Nubian goats^[13].

In the present study sex had been shown to influence weight at birth. Males were significantly heavier than females (Table, 3). These results agreed with the finding of Castillo *et al.*^[6] for Anglo-Nubian, Alpine, Toggenburg and Saanen goats and Tewfik^[21] for Sudanese Nubian goats. This may be attributed to the anabolic effect of male sex hormones as stated by Hafiz^[11].

Type of birth had a significant influence on birth weight (Table, 4). Single born kids weighed significantly heavier than twins and similarly twins were heavier than triplets. This may be due to that litter mates had to share the prenatal maternal nourishment unlike kids born as singles. The present results agreed favorably well with what had been obtained by Elnaim^[8] and Banda *et al.*^[5] for Sudanese Nubian and local Malawi goats respectively.

The present study indicated that parity order had no significant effect on birth weight, and kids of parity two were heavier than kids of parity one and three (Table, 5). The present result complies with what had been obtained by Prasad *et al.*^[18] for Barbari goats and Verma *et al.*^[22] for Black Bengal goats. The present result may be attributed to fluctuation in the rate of the rainfall during the experimental period, as the goats were depend on grazing as a main source of nutrition.

The insignificant difference in birth weight of kids of dams at different nutritional supplements reported in this study (table, 6) comply with Fasanya *et al.*^[9] for Savanna Brown goats and Gubartalla^[10] for Sudan Nubian goats. However, it is contrast with finding of Tag Eldin^[20] for Sudan Nubian goats, who reported a significant effect of level of nutrition on birth weight. The present results may be attributed to the slight differences in the energy and protein content of the three supplements (Table, 2).

The interaction effect of year and season of kidding was found to have a significant effect on birth weight (Table, 7). This was favourably well agreed with Ageeb^[1] for Baggara goats and Banda *et al.*^[5] for Local Malawi goats. The significant effect of year/season interaction on birth weight is justifiable by the great variation in precipitation intensity and distribution witnessed through the experimental period. This was reflected in good and poor grazing resources as dictated by the amount and distribution of rainfall. The positive correlation ($r = 0.22$) between birth weight and dam's weight, reported in this study (table, 8) is in close agreement with the reports of Moulik and Systrad^[17] for Black Bengal and Andrade *et al.*^[3] for Anglo-Nubian. This indicates that doe's weight was among the most important factors which influence the kids weight at birth, so management should be as optimum as possible to permit does to grow and have reasonable weights before they are put for breeding

Conclusion: Attention should be paid for improvement of birth weights through improved feeding and delaying the first mating until does are near their optimum reproductive age.

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