

Effect of Sex of Desert and Taggar Kids on Growth Performance under Extensive System in South Kordofan State

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Abstract: *Thirty five male and female Sudan Desert and Taggar goat kids has been investigated to study the effect of sex of kids on birth weight, growth rate and weaning weight of Desert and Taggar goats under traditional management system depended on natural grazing in South Kordofan state at Al Debatat locality. The result revealed that Desert male kids had significantly ($p < 0.01$) higher birth weight (2.25 ± 0.08 kg) than Taggar male kids (2.00 ± 0.06 kg) and Taggar female kids had a significantly ($p < 0.01$) lower birth weight (1.91 ± 0.04) than Desert female kids (2.08 ± 0.10 kg). The growth rate for three month of age was significantly ($p < 0.01$) higher for desert male and female kids compared with male and female of Taggar kids. Large body weight gain per day ($p < 0.01$) scored by Desert kid. Sex of kids had higher significantly ($p < 0.01$) effect on body weight at weaning, where Desert male kids had significantly ($p < 0.01$) higher weaning weight (11.88 ± 0.45 kg) than Taggar male kids (8.70 ± 0.20 kg) and Desert female kids had a significantly ($p < 0.01$) higher weaning weight (10.07 ± 0.20) than Taggar female kids (8.12 ± 0.28 kg). Also there was significantly ($p < 0.01$) higher between male and female of Desert kids.*

Keywords: *Taggar, Desert, goat, growth performance, traditional, Sudan.*

1. INTRODUCTION

Goat contributes largely to the livelihoods of the livestock keeping households of low-and medium-input farmers, many of whom have few resources beyond their smallholdings and livestock. In addition, goats are known to be potential genetic resources for meat, milk, skin and fiber. They also play an important role in the socio-economic life of the people as they feature prominently in socio-cultural functions like ceremonies and religious festivities. Over the last 20 yr, goats have shown the largest increase in numbers among all domestic animals used as livestock (Dubeuf and Boyazoglu, 2009). The population of goat in the world was approximately 807 millions of which Indian houses of about 25% of the total population by 195 millions (FAOSTAT, 2007). Goats are widely distributed in the tropics and subtropics as a result of the ability to adapt to a variety of environments. The goats are widely spread in all Sudan states and play a substantial economic role in the live hood of many families in urban and rural areas, goats are important to the subsistence needs as they can provide abundant regular supply of meat, milk, fiber and skin. (Elsharif, 2003). Goats are bred for meat and milk production (Dossa et al., 2007 and Jimmy et al., 2010). Desert and Taggar goats were found in Western Sudan particularly in Kordofan states, they are meat types. Generally goats in Sudan are raised traditionally depend on range land. Productivity from goats in the extensive system is said to be poor with a low weaning rate, a high mortality rate and low turnover (Bembridge and Tapson, 1993). Thus, traits affecting economic viability include those associated with growth. Growth is the most important trait in small ruminant production affecting the contribution of the sector to the farm household thru live animal sale and meat production. (Belay and Mengistie, 2013). Body weight and growth rate at different ages are of highly economic importance which vary among goat breeds (Tabbaa et al., 2005). Body weight and rate of gain are among the most economically important and easily measured traits of meat animals. Although weight is an important objective in selection,

knowledge of the phenotypic and genetic parameters of the growth trait upon which to base selection is of utmost importance. For that reasons the aim of this study is to evaluation the effect of sex on growth rate from birth to weaning time of Desert and Taggar kids managed during rainy season in South Kordofan state, Sudan.

2. MATERIALS AND METHODS

The present study was conducted in South Kordofan state at Al Debabat locality (100 km south of ELObeid) which lies within the medium rain (500mm) woodland savannah (longitudes 12.39° N, Latitudes 29.48°E). The soil types varied from sandy (goz) in north to heavy clays (vertisoil) in the south. The mean monthly temperature ranged from 31.3 C° in April to 25.8 C° in July, annual rainfall ranging between 500-800 mm, with peak rain in August (S.K.D.P, 2000)

2.1. Experimental Animal's Management and Diets

Thirty five male and female Sudanese goat kids (18 Sudanese Desert kids and 17 Taggari kids) were used in this experiment. The kids were born during the period rainy season of year 2012, to parent stock were advanced pregnant does (12 Desert goats and 12 Taggar goats) raised on traditional management. All animals were treated with the necessary medication against endo-and ecto-parasites and vaccinated against Anthrax and Hemorrhagic Septicemia. The animals were ear tagged, weighted and divided into two groups as group A is Taggar goats (does and kids) group B is Desert goats (Does and kids). The grazing zone of these animals was in the around the study area, the parent stock was prepared to be kidding during the beginning of the rainy season. The two breed were divided into two groups. All goats and their kids were allowed day grazing from 8.00 am to 6.00 pm and in the evening they were kept indoors in enclosures. 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, 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. The birth weight was taken immediately after birth and when kids were dry. All kids were then weighed at weekly intervals up to age at first kidding; the animals were weighed in the morning.

2.2. Statistical Analysis

All the data obtained from the experiment were analyzed with, means and standard errors of the 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 Statistical Package for the Social Sciences, software package (SPSS, 1999).

3. RESULTS

3.1. Effect of Sex on Birth Weight

Sex of kids had highly significant ($p \leq 0.01$) effect on birth weight. Male kids were heavier than female kids. The birth weight of Desert and Taggar goat's kids is shown in (Table 1). Type of breed exerted a significant ($p \leq 0.001$) effect on kids' birth weight, also the effect of sex within same breed was significant ($p \leq 0.05$). Average birth weight of male and female Desert goats kids were 2.25 ± 0.08 , 2.08 ± 0.10 kg respectively, and average birth weight of male and female Taggar goats kids were 2.00 ± 0.06 and 1.91 ± 0.04 kg respectively. The weight difference between Desert and Taggar males was about 250g, and between Desert and Taggar female about 180 g

Table1. Effect of sex on birth weight of Sudanese goats (means \pm SE)

Variable	No	Male	No	Female
Taggar goats	8	2.00 ± 0.06^b	9	1.91 ± 0.04^b
Desert goats	8	2.25 ± 0.08^a	10	2.08 ± 0.10^a

^{ab} Values in the same columns followed with different letters are significant at $P < 0.05$

From Table 1, it can be seen that the birth weight of male and female were varied in two breeds. The average birth weight of Desert male kids were higher ($p \leq 0.05$) than the female kids. The mean birth weight of Taggar male kids were higher ($p \leq 0.05$) than female kids. The mean birth weights of both sexes of Desert were higher than Taggar. The birth weight depends on breed, feeding, location, care and management e.g., overall health hygiene of pregnant does. The weight difference between males and female in each breed was about 90g and 170g for Taggar and Desert respectively

3.2. Effect of Sex on Growth Rate

Type of sex exerted a significant ($p \leq 0.001$) effect on kids' growth rate at different ages, also the effect of sex within same breed was significant ($p \leq 0.05$) on growth rate at different ages (Table 2). However Desert male kids were scored heavier weights as 4.34 ± 0.12 , 7.36 ± 0.37 and 11.88 ± 0.45 kg at 30, 60 and 90 days respectively, than Taggar male kids which recorded lighter weights as 3.40 ± 0.15 , 3.40 ± 0.15 and 8.70 ± 0.20 at 30, 60 and 90 days respectively.

Table 2. Effect of sex on growth rate of Sudanese goat s (means \pm SE)

Breed type	N	30 days	60 days	90 days	Gain /day/ g
Male kids					
Taggar	8	3.40 ± 0.15^b	5.42 ± 0.15^b	8.70 ± 0.20^b	74.52 ± 2.06^b
Desert	7	4.34 ± 0.12^a	7.36 ± 0.37^a	11.88 ± 0.45^a	1.07 ± 5.42^a
Female kids					
Taggar	8	3.25 ± 0.38^b	5.26 ± 0.37^b	8.13 ± 0.28^b	69.76 ± 2.35^b
Desert	8	4.31 ± 0.23^a	6.68 ± 0.22^a	10.07 ± 0.20^a	87.98 ± 1.56^a

^{ab} Values in the same columns followed with different letters are significant at $P < 0.001$

Female of Desert kids also scored higher significantly ($p \leq 0.001$) growth rate at different ages, as 4.31 ± 0.23 , 6.68 ± 0.22 and 10.07 ± 0.20 kg compared with Taggar female kids which recorded 3.25 ± 0.38 , 5.26 ± 0.37 and 8.13 ± 0.28 kg at 30, 60 and 90 days respectively. From (Table 2) the male kids scored higher ($p \leq 0.05$) weight than female in same breed in different time of ages. Also sex significantly ($p \leq 0.001$) affect daily body weight gain from birth to weaning period in three months, where Desert male and female scored higher gain (1.07 ± 5.42 and 87.98 ± 1.56 g respectively) than Taggar male and female kids (74.52 ± 2.06 and 69.76 ± 2.35 g respectively). Male kids in each breed had higher ($p \leq 0.05$) gain than female part.

3.3. Effect of Sex on Weaning Weight

Type of sex exerted a significant ($p \leq 0.001$) effect on kids' weaning weight, type of sex within same breed was significantly ($p \leq 0.05$) affected weight in Desert kids only (Table 3). Where male kids from Desert goats had larger body weight at weaning time (11.88 ± 0.45 kg) compared with Taggar male kids (8.70 ± 0.20 kg), where Desert female kids scored higher weight at weaning (10.07 ± 0.20 kg) compared with Taggar female kids (8.12 ± 0.28 kg). However, male kids in both breed scored higher body weight at weaning compared with female kids. The weaning weight difference between Desert and Taggar males was about 3.18 kg, and between Desert and Taggar female about 1.95 kg, the weaning weight difference between males and female in each breed was about 58 g and 1810 g for Taggar and Desert kids respectively.

Table 3. Effect of sex on waning weight of Sudanese goats (means \pm SE)

Variable	Weaning Weight (kg)			
	No	Male	No	Female
Taggar goats	8	8.70 ± 0.20^b	8	8.12 ± 0.28^b
Desert goats	7	11.88 ± 0.45^a	8	10.07 ± 0.20^a

^{ab} Values in the same columns followed with different letters are significant at $P < 0.001$

4. DISCUSSION

Birth weight is an economically important trait in livestock production. It is measure of prenatal growth and which affect partially in post natal development. Bailly and Mears (1990) reported that birth weight determine the future performance of individual engaged in prevailing environment. Thiruvenkadan et al., (2009) reported that sex, the period of birth and type of birth of kids were the major factors affecting birth weight in Tellichery goats. In This study showed that Desert males and female kids were heavier than Taggar male and female kids, This results were higher than that reported by Bushara et al., (2013) for Taggar kids, Abu Nikhaila and EL Hag (2003) for Nubian kids and lower than what reported by Tucho et al., (2000) for Boran Somali, Ugur et al., (2004) and EL-Abid et al., (2008) for Nubian kids, Zeryhun (2006) for Abergelle kids, Zeleke (2007) for Somali goats in Eastern Ethiopia and Belay and Mengistie (2013) Abergelle kids. Generally the male's kids were heavier than their female contemporaries in both breed and this agree with Baiden (2007) and

Gbangboche et al., (2006) who stated that the birth weight varied significantly from the different birth type and sex. Similar results were found by Liu et al., (2005), Ahuya et al., (2009); Jimenez-Badillo et al., (2009) and Bushara et al., (2013). The heaviest of male kids to female attributed to the anabolic effect of male sex hormones during pre-natal growth and to uterine environmental (Faiz et al, 1994), or may be due to the genotype of both the mother and the foetus play a vital role in determining the birth weight, while the consequent litter weights basically depend, beside the foetuses genotype, on the suckled milk from the dam (Abdel- Azeem, 2006).also may be due to what reported by Ugur et al., (2004) who observed that the difference in weight between both sexes may be due to the fact that the pregnancy period of does carrying male kids is usually longer (1–2 days) than those carrying female.

4.1. Effect of Sex on Growth Rate

The growth rate of the ruminant grazing tropical pastures or consuming crop residues alone are generally low and represent only about 10% of the animals genetic potential (Tedonkeng Pamo et al., 2002). Male kids were heavier at birth than female kids and tended to have a higher average daily gain, in this study the results showed that male gained more than female, and were heavier than female in subsequent growth rate and grew faster than female kids. In this study sex of kid significantly affected three months weight and daily body gain and this agree with Gbangboche et al., (2006) who indicated that sex, age of dam and kidding year are the important sources of variation for growth traits from birth till 3 months of age. Both kid sex from Taggar does were lighter at three months of age and daily body gain than kids from Desert does. Higher growth rate were obtained by Khadiga et al., (2008) and El-Abid (2008) for Nubian goats, Sundaram et al., (2012). The growth rate in pre weaning period was slightly higher in males than females. This is a natural phenomenon that male kids grow faster than females, as their mature weight is also heavier. Similar result was reported by Htoo et al., (2015), Dereje et al., (2015) for indigenous goats in Ethiopia and Assan (2013) who stated that body weight and growth rate of tropical goats are described to be low when compared with other temperate breeds.

Generally the differences in the pre-weaning weight gains are closely associated with the differences in level of milk intake during milk feeding period and the nutritional status of the doe (Debele et al., 2015). Or may also be due to the size and weight of dam and buck used at the time of mating, or possible due to higher nutrition might ensure subsequent better embryonic development during the pregnancy period. This agree with ELimam et al., (2007), Madibela et al., (2002), Abu Nikhaila and EL Hag (2003) and Sundaram et al., (2012) who suggested that the variation in body weight can be attributed to adaptations of kids to the region with time and environmental conditions with changes in weather parameters with interactions amongst different animals within the same breed.

4.2. Effect of Type of Sex on Weaning Weight

Weaning weight would reflect mothering ability of dam as well as the inherent growth potential. In this study it was found that the mean weaning weight of male Desert goat was higher than male Taggar goat. The reverse results were observed for female kids in both breed, this results online with Islam et al., (2009) who stated that the sex type has significant effect on weaning weight and male kids were slightly heavier than females at weaning. However, the mean weaning weight of male and female Desert kids were higher than male and female Taggar kids. In the current study the weaning weight of Desert goat similar to Ali (2010) for same breed, and was higher than what reported by Chowdhury et al., (2002), Kosum et al., (2004), Khadiga et al., (2008) for Nubian goats, and higher than what reported by Bushara et al., (2017) for Desert goat.

The weaning of Taggar kids male and female reported here was satisfy this results was similar to Acero-Camelo et al., (2008), Elabid (2002) reported weaning weight of Nubian kids were 8.641 Kg and 8.150 Kg for male and female respectively, and lower than what reported by Dereje et al., (2015) for Abergelle and Begait indigenous goats in Ethiopia and higher than what reported by Bushara et al., (2013) for Taggar goat. In weaning period the male exhibited higher weight than female kids, similar observations were claimed by Sexana et al., (1990), Gubartalla et al., (2002), Alexandre et al., (1999) and Abu Nikhaila and EL Hag (2003).The high weight gain for the male kids may be due to effect of male sex hormones and the aggressive nature of male during suckling and feeding.

The high weaning weight obtained in this study may be due to due to availability on feed from pasture quantity and quality during the rainy season which had direct influence on the dam's nutrition and

hence amount of milk available to the unweaned kids. The discrepancies and difference in weaning weight of kids in this study and literature cited here may be due to breed variation and differences in management particularly the age of weaning. Males are in the majority of cases born heavier than females, this also translates in heavier weaning weights and growth rates for the male. The steroid hormone levels could have a role in this aspect, whereby, testosterone has a higher anabolic effect than estrogen. On the other hand, females face greater physiological stress in the form of pregnancy, kidding and nursing the kid, which drains the female's body reserves, thus lowering their body weights.

5. CONCLUSION

The result obtained in the current study, in general, showed that the growth performance of Desert and Taggar goats is medium as compared to Nubian goat breeds. The environmental factors like sex of kid affected weight at different ages and growth rates. The lower performance of female kids from both breed does need special attention as they delayed pubertal time and thus affect productivity of animal.

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