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Productive Performance of F1- (Damascus Goat × Desert) under Traditional Management in North Kordofan

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Abstract:

This study carried out in North Kordofan state, Western Sudan (latitudes 12:15-16:32 N and longitudes 27-32 E), during the period Feb 2018 - Aug 2021 to assessment the productive and reproductive performance of crossed F1 (Desert× Damascus) under the traditional management systems, to evaluate adaptation of crossed to environmental conditions of study area, to study milk production of the crossed goats. 44 females crossed goat F1 (Damascus×Desert goat) were selected at weaning age. Two mature Damascus bucks were used in the experiment all animals were identified using ear tags and treated against external and internal parasites. All animals will set free during the day and kept in closed pen during the night. The behavior of the animals and the adaptation on the environment was observed and recorded in addition to any problems like disease; Data were analyzed using the Statistical Package for Social Sciences, software package (SPSS, V23, 2017). In this study, the Damascus Bucks were severely affected under the conditions of nature grazing and suffered from parasites and high temperature, Bucks have died as a result of tick fever according to Anatomical symptoms, The parameters of dams varied according to litter size, Females were born as a single reached puberty at (278.2±7 days) with body weight of 20.01 kg while the twins females was puberty age (291.6±9 days), and weight was 16.91kg , The average lactation period was 120 days with average total milk production of 40.46± 1.74 kg, this study conclude that the crossed Females are late in sexual maturity, So The genetic cross as a way to improve the herd without taking into account environmental conditions does not lead to the desired results.

Keywords: *Productive performance, crossed goats, age of puberty, kidding, traditional management.*

Introduction

Goats make a valuable contribution especially to the poor family in rural areas in many developing countries. Goats in Sudan play an important role in the economy of the country and in the life of many Sudanese families as a favorite household dual-purpose animal (milk and meat). Their

importance is well recognized in rural areas of the country and Kordofan region in particular where under the harch sem-arid conditions, raising goats proved being the most suitable livestock production pattern by the small subsistent farmers (Sahal et all, 2022). Pre and post-weaning performance of Crossed kids F1 (Desert and Damascus) under the traditional management system, North Kordofan-Sudan.2022). The main types of goats in Sudan are Desert, Nubian and Tagger (Sahal et all, 2023). These breeds are considered as great valued animals in arid zones where they provide inhibiters of these areas with valuable products (Ageeb, 1992). Nubian goats are raised along the river Nile and irrigated areas, and they are considered as milk animals while Desert goats are found mainly in semi-desert areas and used mainly for meat production. Recently the government imported some types of goats to improve milk and meat production. Some crosses of imported goats with local types are expected to be very good for milk production and have good adaptation to environmental conditions.

According to Bushara et al. (2017), the "reproductive efficiency in dams is characterized by the individual and compound parameters". A high rate of reproductive efficiency is generally thought to be the most important prerequisite for the production of meat, milk, skins, and breeding stock, Therefore, assessment of the general reproductive characteristics of indigenous and imported breeds is necessary prior to developing strategies aimed at improving milk production.

Materials and Methods

This study carried out in North Kordofan state, during the period February 2018 - August 2021. April, May and June are the hottest months of the year The average daily temperature ranges between 10-35 C° with annual variation of 15 C°, While December, January and February are the coldest ones.

Forty-four crossed (F1) females (Desert + Damascus) were mated with pure Damascus bucks and kept under natural grazing. The sexual behavior of bucks and females, their adaptation to the environment and their reproductive performance (age and weight at puberty, at first service and at kidding) were recorded. After kidding data were collected concerning gestation period and milk production. In the morning kids (second generation) were usually kept in a home while their dams were grazing. In the evening one teat was suckled while the other was milked. The same thing was done in the morning and hence milk yield was recorded.

Statistical Analysis

Data were analyzed using the Statistical Package for Social Sciences, software package (SPSS, V23, 2017).

Results and Discussion

Sexual behavior of females and bucks

The results indicated that Damascus bucks were usually quiet and did not vote during activity well and they did not haunt females. They usually mate in early morning or at night and need a longer time to complete the process of mating. It was noticed that the bucks severely suffered from high temperatures and parasites. The two bucks at last died because of tick fever.

The reproductive behavior of crossed goats did not differ much from that of Desert goats. The crossed animals needed one to two times sexual mating in the same cycle of eroticism for the occurrence of pregnancy. No problems associated with pregnancy and kidding were recorded and it seems that the crossed animals were adapted well to the climatic conditions compared with the bucks.

Puberty age and weight

The study found that the average age of puberty in the crossed goats was 283.4 ± 8 days with some differences between single and twins concerning this trait. This result is in the same line with Tabba et al. (2005), who mentioned that the mean age at puberty was 278, 287 and

320 days for Mountain Black, crossed breed and Damascus goats, respectively. The puberty age of female Desert goats was reported by Wilson and Clarke (1975) as 108 - 187 days. Mohamed and ELimam (2007) reported 15.95±0.20 months for the same trait for Desert goats. Also, Bushara et al., (2017) reported the puberty age of Desert goats as 242.57±4.97. Age at puberty in goats differs according to breed e.g. Saanen, Angora, Black Bengal, Barbari Nannies, Damascus and Boer goats reach puberty at the age of 218, 240, 197, 213, 300 and 157-191days, respectively (Papachristoforou et aI., 2000). Seasonal effects on puberty and reproductive characteristics of female Chios sheep and Damascus goats born in Autumn or in February (Greyling, 2000). The current results showed that crossed animals reached puberty at a later age compared with local breeds, and this may be due to genetic factors since Damascus goats reach sexual maturity at a late age. The delay in puberty is undesirable because it affects the productive life of the animal. Age of puberty is a very important factor for achieving higher economic efficiency under declining pastoral resources.

In the current study, for single female the weight of puberty was20.01± 0.56kg and age of puberty was 278.2±7 day on the other hand for twine female the weight of puberty 16.91±0.446 kg and age of puberty was 291.6±9 day for both of litter size the average weight of puberty was 17.98±0.41kg (Table 1) which is near to values (18.59 Kg) reported by Bushara et al., (2017) for Desert goats, but higher than that reported by Gubartalla, Nikhaila and Khidir (2002) for Nubian goats (16.26 kg). Amoah and Bryant (1998) on their study of the control lighting and time of birth on occurrence of puberty in of seasonality stated that there is a large variation in body weights at puberty found among goat breeds, Boer goat reached puberty at 31.1 kg, compared with 30 kg for Saanen kids (Greyling, 2000). The puberty is variable and is not only under the impact of age, but also affected by factors such as breed (i.e, genetic makeup of the animal), nutrition, management, environmental temperature, and photoperiod and body weight.

Age and weight for service at first time

The average age and weight at the first service differ according to litter size for single was 22.28 kg and 353.4 day for twine was 19.06 kg and 376.5 day. It is also may be related to genes effects or environmental conditions and nutritional factors, especially since the natural pastures in the study area is somewhat are poor and it was noticed that the indigenous goats in the region overtake crossed goats in these traits.

Age and weight of dams at first kidding

In the current study single dams gave their first kids earlier and with better weights compared with twins' dams (see Table 1). The kidding at first time in crossed goats is a late compared to the indigenous breeds. Bushara et al., (2017) mentioned that the age of kidding at first time of Desert goats was 397.70±12.12 days. The delayed age at first kidding in crossed goats may be due to genetic factors since Damascus goats reach sexual maturity at late age. Also, environmental conditions and feeding factors can affect the time of puberty and thus kidding at first time. ELimam et al., (2007) reported kidding for the first time Taggari goat at 13.10 months. Hassan et al., (2007) mentioned that the age at first kidding for Black Bengal goats was 360.5±10 days.

The body weight at first kidding in the current study differs also according to litter size. Single dams were in better condition compared with twins (see Table 3). Bushara et al., (2017) reported average weights for Desert goats at first kidding as 25. 91± 0.24 kg. Also, Gubartalla, Nikhaila and Khidir (2002) reported that the body weight at first kidding for Nubian goats was 24.2 kg. Silva et al., (1998) reported 25 and 30 Kg as first kidding weight for Alpine and Mexican goats, respectively.

In the current study, the reproductive behavior of the crossed does not differ much from the Desert goats. The crossed goats needed 1 to 2 times sexual mating in the same cycle of eroticism for the occurrence of pregnancy. No problems associated with pregnancy and childbirth were recorded in the crossed flock. It turns out that the crossed animals adapted well

to climatic conditions and were not much affected by heat like their parents (pure Damascus). The average length of the gestation period for the crossed was 149± 4.2 days. In the early days post-kidding, the kids faced problems in suckling, as the doe ' udder was of small size the kids could not breastfeed alone and had to intervene to help the doe to breastfeed her kids. The reproductive performance of crossed goats does not differ much from the Desert goats except for puberty, age of mating for the first time and age of birth where local goats seem better than the crossed in these traits. Other indigenous breeds like Nubian goats and mountain goats (Taggri) are quite similar to crossed goats and may overtake them in the adaptation to climatic conditions and ability to produce in natural pasture conditions.

Table 1 Age and weight of crossed dams at first kidding in North Kordofan state, Sudan

Litter size	No.	Age (days)	Wt.(Kg)
Single	18	504.3±6.3	26.28±1.56
Twins	26	529.5±8.1	22.03±1.27
Total	44		

Milk yield and milk production of crossed goats

Table 2 shows that the average total milk production of crossed goats was 40.46± 1.74 kg which is equivalent to 0.326 kg per day during the lactation period of 120 days. The minimum milk yield was recorded during the first and second weeks while the maximum milk yield was recorded during 11th week, and then the production showed a gradual decline until 120 days (see Figure 1). These results are compatible with El-Taher (2010) who reported the average total milk for Desert goats in natural grazing was 33.31 kg during a lactation period of 90 days. This level of production was similar to that reported by Bushara et al., (2010; 2011) for Taggari goats, but was lower than the findings of Gubartalla Nikhaila and Khidir (2002) stated that for Sudanese Nubian goats. Elzubier et al., (2005) stated that the average daily milk yield of crossed goats (Nubian×Sannen) was 1.237 kg.

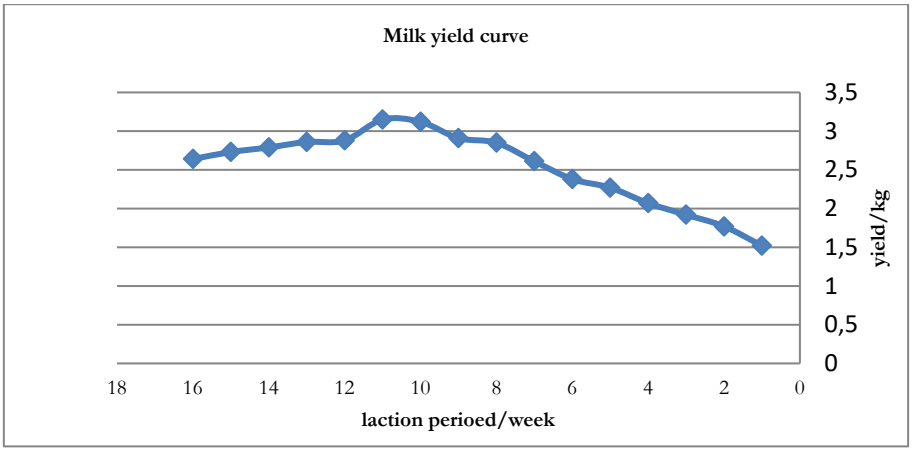

Figure 1. Milk yield curve in crossed goat (Desert × Damascus) under traditional management

Table 2: Milk yield of crossed goats in North Kordofan state, Sudan

Month	1st. week	2nd. Week	3rd week	4th week	Total milk	Average daily milk
1st.month	1.52	1.77	1. 92	2.07	7.27 ±0.38	0.243
2ed	2.27	2.38	2.61	2.85	10.11 ±0.79	0.337

3rd	2.91	3.12	3.15	2.88	12.06 ±0.95	0.402
4th	2.86	2.79	2.73	2.64	10.62±0.89	0.367
Total milk					40.46±0.74	0.326±0.76

Conclusion

From this study, the Damascus Bucks were severely affected under the conditions of nature grazing and suffered from parasites and high temperature.

Kids as a result of crossed breeds the birth weight is very high, but daily growth is like that of domestic goats.

Females are late in sexual maturity.

The Crossed goats are weak in milk production and local Nubian goats were better than it in milk production and were adapted well.

The genetic cross to improve the herd without considering environmental conditions does not lead to the desired results.

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