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Evaluation of West African Sheep under Two Production Systems

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Abstract: The West African sheep was originated in the West African countries, brought to Sudan in 1930. These breeds include (Uda, Sankara and Weila) strains. They are normally reared to gather as mixed pastoral flocks, followed different routes during summer and autumn seasons. In the first phase of this study 75 females and 10 males were selected with typical characteristics of the breed, brought to the University of Nyala experimental farm. In the second phase basic information from tribal breeders and their sheep flocks were collected. For each phase flock statistics were recorded and then some reproductive and productive traits were estimated. Season and age effect on mortality of sheep flock was estimated. Likewise feed lot experiment was done to examine the possibility of sheep for improvement of meat production. Body length, heart girth, height at withers and chest depth were measured for lambs at birth to one year age and similar measurements were taken for adult flocks.

Key words: Sheep, production system

INTRODUCTION

Suleiman *et al.*[1] indicated that ewes body weight, ewe age, year and season of breeding, breed variation, sex and type of birth were major factors in sheep productivity. Body weight had a significant effect on duration of the induced ovarian cycle[2]. Heavier and older ewes had frequent estrus cycle, better conception rate, lower barrenness rate and higher litter size than the young 2 teeth ewes[3]. Summer lambing was slightly better than winter lambing[4]. Sex and type of birth, lamb age and birth weight were effect lambs mortality. Therefore, 30 to 50% of parental deaths may be attributed to cold and cold induced starvation[5]. Lamb birth weight and pre-weaning growth rate are an important factor in sheep production. It is influenced by genetics and environmental factors[6]. In sheep the growth of the young following birth depends mainly on the milk production of the dam as well as her mothering ability. There fore ewes with twin birth had higher lactation milk and longer lactation periods than ewes with singles birth[7].

As animals grow, carcass weight increases as a proportion of live weight, the ratio of muscle (lean) to bone increases and progressively more adipose tissue (fat) is laid down. The effect of sex, age, type of birth and nutrition on meat traits were reported by many authors[8]. Estimation of the relationship between body measurements in sheep may help to provide means for predicting traits which are not normally and easily measured under field conditions[1]. The sex of animal had a significant effect on weight, height at withers, and body length and chest girth at 4 permanent incisors stage[9]. The objective of this study was to evaluate the production of West African Sheep under experimental and field condition in Sudan.

MATERIALS AND METHODS

Sheep flocks: The two phase of study was conducted in 2002. In the first phase 75 females and 10 males were selected with typical characteristics of the breed and brought to the University of Nyala experimental farm. Females and males were arranged for mating in four groups, for two mating seasons. Mating plan and flock management was explain in details else where by[10]. In the second phase a questionnaire was designed to collect basic information from tribal breeders and their sheep flocks. Sheep breeders were visited at Sasiban and Tomat (Southern Darfur state, Sudan), 150 records of questionnaire were filled individually and with a group discussion (2-3 breeders). 40 rams and 67 ewes were randomly selected, dentition and weighed. Similarly, body measurements were estimated.

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Meat traits: For meat evaluation 6 male lambs (born in the experimental farm) at one year age were feed for 45 days with ration formulated from 20% shorghum, 35% groundnut cake, 43% groundnut hulls, 1% lime stone and 1% salt. The chemical composition was determined by an approximately analysis as follows 24.90% CP, 13.20%CF, 6.60% EE, 13.60% ash and 35.90% NFE. Animals were weight after an over night fasting except for water, slaughter by skilled man fallowing the local Moslem practice and were prepared for subsequent carcass study as described by[11].

Body measurements: Body measurements taken included body length (from the tip of the scapular to the pin-bone), heart girth (the circumference of the chest), chest depth (between breast and withers) and height at withers (from the highest point on the dorsum of the animal to the ground surface at the level of the front feet). All measurements were taken using a linear tape and a herd measuring stick.

Data records and analysis: Dams and lambs records were kept during the study periods. Since lambs differ in age at weaning, weight of experimental lambs was corrected using the formula described by[10]. The data obtained were analyzed statistically using: descriptive statistics and Chi square (X^2) test.

RESULTS

Sheep breed: The West African sheep in Sudan was originated in the West African countries. Three strains were named after a person (Omer Uda) brought them for the first time to the Sudan in 1930. Uda strain is mainly white beyond the chest region and brown or black at the chest and neck part of the body. Sankara is wholly white in coat color, and a third type Weila was characterized by white coat colour and black spots on the neck, head and face. These sheep groups are normally reared together as mixed pastoral flocks, the flock size ranges between 50–200 heads, with about 1:20 sex ratio.

These tribal sheep were kept under a nomadic system and pastoralist grazing, followed different routes during summer and autumn seasons. For instance, the Uda and Sankara moved together spending the rainy season at Southern Darfur. During the summer time, they resort and stay at Sam in Central Africa. Other part of the Uda group is reared by Umbararo tribe they spend the summer at Daba in Chad. The Weila group takes resort at Southern Sudan during summer, while they stay at Western Sudan during autumn. During this process of migration, animals are moved every day over four hours walking distance from the previous camp.

Reproduction performance: Experimental ewes show better reproduction performance in winter than wet-summer lambing season. The high conception rate (81.23%) of experimental sheep was estimated for winter lambing ewes with (78.69%) Fertility rate, (18%)barrenness rate, (1.20%)litters size, (91.67%) lambing rate(% of pregnant), (15.90) twining rate and (50.98) male ratio. The mean gestation length for experimental ewes was 150.23 ± 2.53 days.

The surveyed ewes were conceived and lambed throughout the year, they were attend first oestrus at 7.49±0.84 (months) and first lambing at 13.23±0.83 (months). Oestrus cycle was found to be 19.21±3.32 (days) and estrous duration 28.69±9.40 (hours), Lambing interval was extend to 6.91±0.69 (months). Litter size, twining rate and gestation length was 1.24±0.33, 14.56±7.27 and 151.47±2.72 (days), respectively.

Production performance: In the experimental study average birth weight, weaning weight and pre-weaning growth rate of lambs was 2.90±0.50 kg, 10.76±2.27 kg and 90.00 gram per day, respectively. Males and singles lamb grew faster than females and twins lamb. On the other hand, body weight for adult rams and ewes was recorded, for rams it was 43.83 kg. While for females, it was 29.79 kg, the effect of age on weight was shown in (Table 1).

The surveyed animals were weaned at 96.78±13.85 (days). The average milk yield calculated after milking 15

Table 1: Mean (±sd) body weight (kg) of experimental and surveyed flocks.

	Experimental		Surveyed	
Age group	Rams	Ewes	Rams	Ewes
I Pair	235.35± 0.55	3329.20±3.80	1935.85± 7.50	3434.13±5.14
2 Pairs	543.80± 4.03	2430.20±3.90	1151.91± 6.05	941.90± 2.25
3 Pairs	349.53±2.89	437.58±2.63	10 57.13± 6.24	2045.47±6.40
4 Pairs			451.25±5.54	
Overal	1043.83± 5.90	6129.79±4.24	4045.59±11.65	6739.50± 8.17

1, 2, 3 and 4 pairs refers to rams and ewes with pairs of permanent incisor

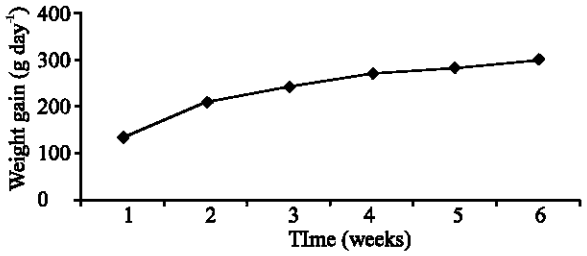

Fig. 1: Growth rate of fattening lamps

Table 2: Mean (± sd) body length (B. L), heart girth (H. G), height at withers (H) and chest depth (D) of experimental lambs

Parameter	No	B.L (cm)	H.G (cm)	H (cm)	D (cm)
Birth	23	25.73 ±1.98	31.81 ±1.52	36.77 ±1.99	14.04 ±1.55
Weaning	27	42.27± 6.08	53.72±6.68	57.27± 6.73	26.33 ±3.67
6 months	27	46.02 ±3.31	55.39± 3.91	61.72 ±4.46	28.67 ±3.22
9 months	23	46.91± 4.47	58.34 ±4.39	64.31 ±3.82	30.53± 3.47
12 months	23	55.64± 4.27	71.88 ±3.66	71.45± 5.08	36.87 ±3.61

ewes was 0.229 liters per ewe. Season effect on mortality of surveyed flock was estimated as 20.0, 19.40 and 17.90% for winter, wet–summer and hot–summer, respectively. While, age effect on mortality was found to be 26.20, 11.40 and 19.75% for pre-weaning age, post–weaning age and adult age, respectively. Body weight measured at their natural habitats showed rams were 45.59±11.65kg and ewes were 39.50±8.17kg. The effect of age on body weight was shown in (Table 1).

The initial and final weight of fattening lambs was 25.60 kg and 35.40 kg, respectively. The average daily weight gain (g/head/day), daily feed intake (kg) and feed conversion ratio (kg/ feed/ kg gain) was 216, 2.92 and 13.5, respectively. Their growth rate was shown in (Fig. 1). Dressing out (% on slaughter weight) was 45.5% and longissmus dorsi area was 11.9 cm. Muscle, bone and muscle fat ratio was 65.8, 21.8 and 12.4%, respectively.

Body measurements: The average body length, heart girth, height at withers and chest depth for experimental lambs was estimated at birth, weaning, 6, 9, 12 months age and the generated results of these are presented in (Table 2). Similar measurements were taken for adult, for experimental flocks rams were 65.20±2.93, 82.80±3.09, 80.68±3.10 and 38.90±4.55, respectively. And ewes they were 58.54±3.17, 74.40±9.69, 72.64±3.15 and 29.51±2.47-cm, respectively. While for surveyed flocks, rams estimates were 64.17±6.00, 86.59±9.61, 82.65±7.81 and 43.43±8.10-cm, and for ewes the corresponding estimates were 61.87±4.88, 83.10±6.79, 76.97±10.10 and 41.12±5.63-cm, respectively.

DISCUSSION

Reproduction performance: The reproduction performance of the experimental ewes were better in wet–summer than hot-summer season, it was due to inadequate food during the hot-summer periods Musa *et al.*[10]. While the surveyed ewes were found to conceive throughout the year, because in the tropics ewes could theoretically come into heat at any time of the year Payne[12]. For both systems ewes have lower performance compared to Sudan desert sheep breed Sulieman and Eissawi[13]. Barrenness is very sensitive to mating weight, increasing rapidly with declining weight. Therefore, a minimum of 30kg body weight was required for increasing litter size, successful service and thus conception El-hag *et al.*[14]. The average gestation length for surveyed ewes was slightly higher than experimental ewes, and the similar result was reported for Sudan Nilotic sheep Abdalla[15].

In the present study West African sheep was attend the first estrous at similar age of Shugor, Dubasi and Watish sheep, while estrus cycle was slightly longer Suleiman[16]. In contrast, Barbary sheep ewe lambs started sexual activity at 10 months of age Khaldi[2]. It was influenced by plane of nutrition and live weight of animals Suleiman[16]. Lambing interval was in close agreement with the estimate of Abdalla[15] (205.50±23.60 days) for Nilotic sheep. In contrast, a longer period of 399±54.9 days for Muzaffarnagari sheep was estimated by Mandal *et al.*[17]. Therefore, milk yield was found to be 0.299 liter per day.

Production performance: Lamb birth weight was less than Sudan desert sheep breeds Mansour *et al.*[18]. Pre-weaning growth rate was influenced by sex and type of birth because female lambs at birth are about 7% of their mature body weight while males are only 4 to 5%, also my be due to competition for milk and birth weight difference Suleiman and Eissawi[13].

Season and year of birth greatly influenced mortality at all ages Suleiman *et al.*[1]. The highest mortality reported was (50.00%) for winter born lambs, (22.50%) for hot summer and (27.50%) for wet summer Sulieman *et al.*[1]. Mortality was decreased with increasing age of lambs. Otesile *et al.*[19] found that 55% of the death occurred in sheep less than one year old. The causes of mortality in the present study were found to be 29.30% Trypansomeisis, 32.30%Pneumonia, 27.30% parasites and 11.10% others (mange, sheep box, diarrhea and toxic plants). An average body weight for the same breed estimated by Wilson[20] was 65kg for ram and 45kg for ewe.

The daily gain of fattening lambs was higher than that reported by Alhadrami *et al*.[21]. Growth rate increased with increasing feed intake and feed conversion ratio. Fattening lambs has better dressing out percentage, longismus dorsi area, bone and muscle fat than control lambs Musa[11]. The muscle percentage was similar to that noted by Amegee[22], while the bone to fat percentage was lower than those estimated by Ahamed and Suleiman[8].

Body measurements: The strains of West African Sheep in this study had lower body length and heart girth, and higher at withers than Muzaffarnagari breed in India at birth and at weaning Mehta *et al*.[9]. In contrast, Mehta *et al*.[9] found that sex and type of birth influenced body measurements. Recently, Abdalla[15] inferred that there were no differences between males and females from birth to one-year-old, but found that twin born lambs have lower estimates than single born lamb. Also body measurements of rams and ewes for experimental and surveyed studies were estimated. They were found to be higher in rams than ewes and in surveyed flock than in experimental flocks. In agreement with the present study, Mehta *et al*.[23] indicated that sex of the animal had a significant effect on body weight, height at withers, body length and chest girth at 4 pairs of permanent incisors teeth age stage. These estimates were more than those reported by Suleiman *et al*.[1] for Shugor, Dubasi and Watish Sheep.

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