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**The Effect of Feed Supplementation on the Productive and Reproductive Performance of Desert Ewes in Rangeland of Kordofan, Sudan.**

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**Abstract**

The effect of concentrate supplementation on body weight and reproductive performance of desert sheep was studied. The aim of the present work was to investigate the effects of supplementary feeding during mating and at late pregnancy on ewes productive, reproductive performance and lamb growth rate.

In this study, 340 ewes were selected and they divided into four feeding treatments, ewes in the three supplemented groups were flushed (receiving supplement for 45 days at mating time) and steamed-up (receiving the supplement for 45 days pre-lambing) while the control group received no supplements as in the farmer practice. The results indicated that, supplementation improved fertility, prolificacy, fecundity, pregnancy and weaned rate and also dam supplementation decreased abortion rate. This study indicated that, supplementation is an efficient strategy to reduce nutritional stress in desert ewes and increase their productivity in the arid and semi-arid zones, also supplementation of ewes during mating and late pregnancy was improved their lamb growth rate before weaning. Single lambs were significantly heavier than twins at birth and before weaning. Male lambs had heavier body weight at birth than female lambs.

**Introduction**

The Sudan national sheep flock is estimated to be 50.9 million heads (FAO 2009). Sudan desert sheep are raised mainly under harsh dry land farming conditions for meat production. The nutritional limitation, low nutritive value of the range, high ambient temperature, scarcity of feed and water has great effect on the production of the sheep in semi arid area of Kordofan state. The most critical period for grazing sheep in the semi desert zone is from February to June, when the ambient temperature becomes hot and range grasses are scanty and depleted of nutrients. Shortage of feed during the mating season is the main factor, which affect the sheep production in the range land of Kordofan. Taking into account that natural pastures are poor in their quality, the problem of over grazing, especially near the water recourses is strong and performance is low, an improvement needs practicable treatments. The objectives are to study the effects of a moderate dry season feed supplementation in two physiological stages (mating period and pre-lambing period) on ewe productivity and reproductive performance.

## **Material and Methods**

### **Study area**

The study was conducted at Agricultural Research station, El-Obeid, North Kordofan state, (latitude 11°:15'-16°:30' N and longitudes 27°-32° E), Sudan. Most of North Kordofan state lies within arid and semi-arid ecological zones.

### **Experimental animals**

A total of 340 ewes and 18 rams of Desert sheep subtype Hammari were used in this study. After a two weeks of adaptation period the animals were divided randomly into four groups. The breeding is controlled with application of "Kunan" during the breeding season (February to March) and the birth of lambs occurred in the rainy season.

### **Experimental feed**

One group (60 ewes) was used as a control (CTL) (like in farmer traditional practice). The second group (92 ewes) was supplemented with ration A (GNC) that composed of 99% ground nut cake, 0.75% common salt and 0.25% salt lick, the third group (96 ewes) was supplemented with ration B (GNC-M) which composed of 89% ground nut cake, 10% molasses, 0.75% common salt and 0.25% salt lick. The fourth group (92 ewes) was supplemented with ration C (RS-M) that composed of 89% Roselle seeds, 10% molasses, 0.75% common salt and 0.25% salt lick. Animals were then allowed to graze normally under range conditions. Ewes were offered 450 g / head of the ration every three days at the watering periods and the rams 600 g / head for three days, Supplementary feeding practices were imposed on ewes prior to mating (flushing) for 45 days and during late pregnancy (Steaming-up) for 45 days.

Mature 18 rams introduced to all experimental ewes, the ratio of the sex were 1:20. The rams were supplemented with same ration B at the rate of 600 g/ram every three days. The watering stock after three days, ewes were monitored for signs of behaviour estrous and those detected were serviced naturally, those returned to estrous were serviced again, ewes demonstrating were naturally mated twice daily. Ewes that, lambled, mated and pregnant were recorded in each group, numbers of borne lambs also recorded, lambs were weighted at birth and every weeks. Reproductive and productivity parameters were calculated according to Landais and Cissoko (1986).

## **Results and Discussion**

### **Reproductive performance of ewes**

Supplementation had considerably improved the percent of ewes that get pregnant in the first service. The conception from the first service were highest on ewes fed with GNC-M and RS-M, the control group recorded highest none pregnant ewes (Table 1). Supplementation improved the reproductive performance, ewes on GNC-M recording the best reproductive performance (Table 2). Supplemented ewes were serviced and conceived within a shorter time than ewes on the farmers practice that had needed repeated services to conceive. This agreed with the findings of El-Hag et al (2007) and El-Hag et al (1998). Flushing and steaming-up had increased lambing, fertility, prolificacy, fecundity, pregnancy, weaning rate, and reduced abortion rate, as observed for Sudanese desert sheep by Bukhari (2005).

### **Growth rate of lambs**

Figure 1 illustrated the daily growth rate of lambs in monthly periods during the whole experimental period of 120 days, Lambs borne from ewes of control group had less body weight gain compared with lambs borne from supplemented groups. Lambs of RS-M were recorded best growth rate in before weaning and recorded less weight after weaning. Single lambs recorded significantly heavier weight than twin lambs before weaning (figure 2). Male lambs recorded higher growth rate before weaning (figure3). This study indicated that, supplementation during mating

is an efficient strategy to reduce nutritional stress in ewes and increased their productivity by improving the growth rate of lambs that borne from supplemented ewes, these results were similar with that reported with Idris (2008).

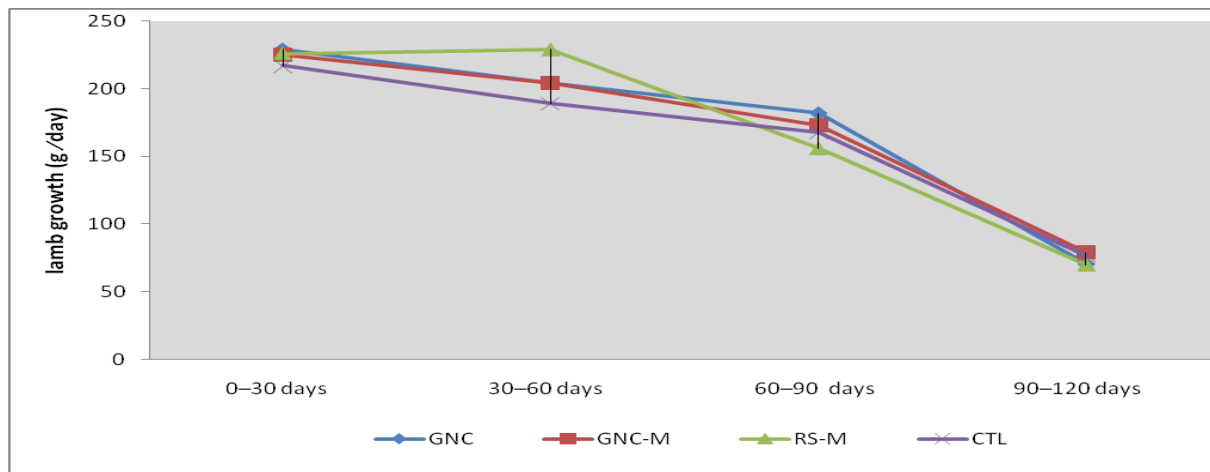
**Table 1. Effect of supplementation on reproductive performance (number of services)**

Factor	Pregnancy rate at different service number								
	1 <sup>st</sup> Service		2 <sup>nd</sup> Service		3 <sup>rd</sup> Service and more		Not Pregnant		
	No.	% of Total	No.	% of Total	No.	% of Total	No.	% of Total	
Supplementation	GNC	61	67.03 <sup>b</sup>	10	10.99 <sup>bc</sup>	4	4.40 <sup>b</sup>	16	17.58 <sup>b</sup>
	GNC-M	72	74.23 <sup>a</sup>	13	13.40 <sup>b</sup>	6	6.19 <sup>b</sup>	6	6.19 <sup>c</sup>
	RS-M	66	71.74 <sup>a</sup>	7	7.61 <sup>c</sup>	7	7.61 <sup>b</sup>	12	13.04 <sup>b</sup>
	Control	28	46.67 <sup>c</sup>	10	16.67 <sup>a</sup>	7	11.67 <sup>a</sup>	15	25.00 <sup>a</sup>

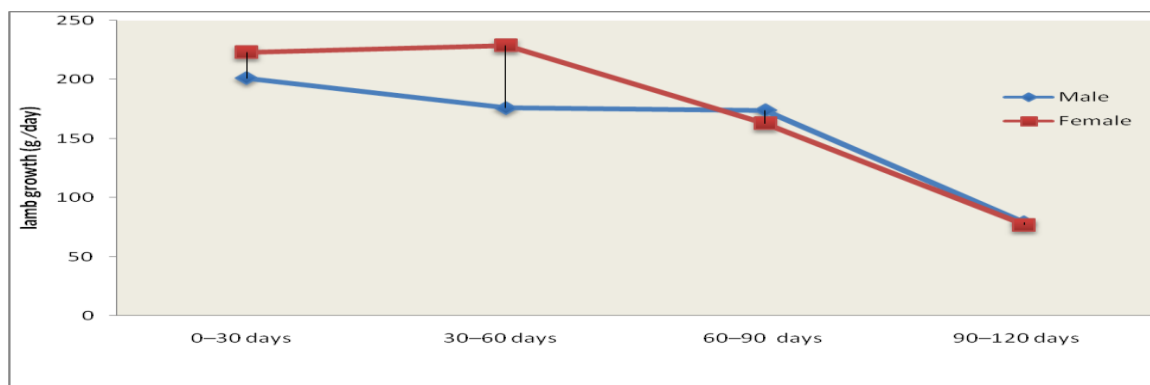
<sup>abc</sup> Means in the same column bearing different superscripts are significantly (P<0.05) different.

**Table 2. Effects of supplementation on ewe reproductive performance**

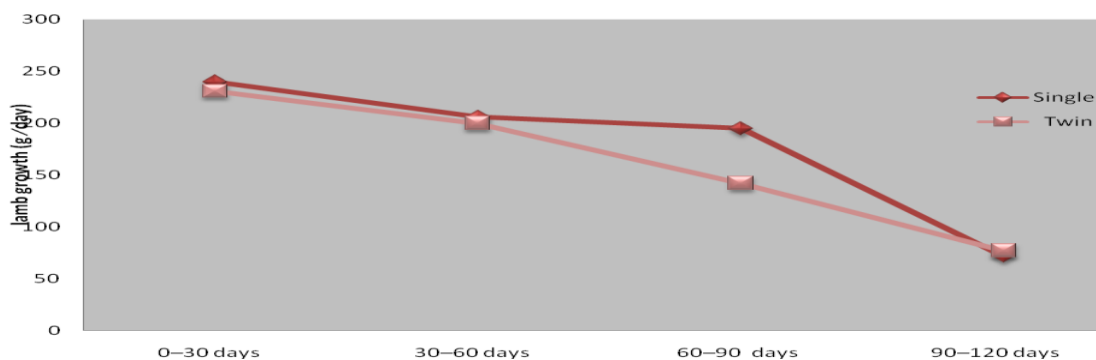
Factor		Fertility rate (a) %	Fertility rate (b) %	Prolificacy %	Weaning rate (a) %	Weaning rate (b) %	Fecundity %	Abortion %	Fertility rate (a) %
Supplementation	GNC	74.73 <sup>b</sup>	82.42 <sup>b</sup>	116.16 <sup>a</sup>	65.93 <sup>b</sup>	75.94 <sup>c</sup>	86.81 <sup>b</sup>	2.20 <sup>a</sup>	74.73 <sup>b</sup>
	GNC-M	90.72 <sup>a</sup>	93.81 <sup>a</sup>	109.09 <sup>a</sup>	90.72 <sup>a</sup>	91.67 <sup>a</sup>	98.97 <sup>a</sup>	2.10 <sup>a</sup>	90.72 <sup>a</sup>
	RS-M	81.52 <sup>b</sup>	86.96 <sup>b</sup>	108.00 <sup>a</sup>	72.82 <sup>b</sup>	82.72 <sup>b</sup>	88.04 <sup>b</sup>	5.43 <sup>b</sup>	81.52 <sup>b</sup>
	Control	53.33 <sup>c</sup>	75.00 <sup>b</sup>	103.13 <sup>b</sup>	46.67 <sup>c</sup>	84.85 <sup>b</sup>	55.00 <sup>c</sup>	15.00 <sup>c</sup>	53.33 <sup>c</sup>



**Figure 1: Effect of pre-partum supplementary feeding on lamb growth**



**Figure 2: Effect of sex on lamb growth**



**Figure 3: The effect of birth type on lamb growth**

### Conclusions and Outlook

The result of the study indicated that, supplementation of desert ewes during the dry season is very important, also the study indicated the importance of the nutritional status of dams during mating and late pregnancy to improve production and reproduction performance of the animals.

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