Climate change adaptation strategies for sheep production in range land of Kordofan

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Abstract

This study was carried out to decrease the effect of climate chance on sheep productivity in north Kordofan state. A total of 340 ewes and 18 rams of desert sheep were selected from the nomadic herds, ewes were divided randomly into four groups, group one was as farmer's practice (not supplement) and the other three groups were supplemented. The breeding was controlled by tied the reproductive organ "application of *Kunan*" during the breeding season (February to March). The results of the study indicated the importance of the nutritional status of the animals to adapt the effect of climate chances on rangeland by supplementation strategies during the long dry season, also the application of breeding control increased lambing, fertility rate, prolificacy, weaning rate, fecundity and pregnancy % ,also the growth rate of lambs was improved bu supplementation their mothers.

Keywords: Climate change, desert sheep, supplementation strategies, productivity, North Kordofan

Introduction

Desert sheep and their crosses make about 80 % of the sheep found in Sudan and mainly predominant north of 12º N (Devendra and Mcleroy 1982), they are raised mainly under harsh dry land farming conditions for meat production (Khalafalla and Sulieman 1992). The nutritional limitation, low nutritive value of the range, high ambient temperature, scarcity of feed and water are have 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 of Sudan is from February to June, when the ambient temperature becomes hot and range grazing is scanty and depleted of nutrients. Shortage of feed in mating season is the main factor, that effect to sheep production in the range land of Kordofan. Nomadic sheep flocks spend the dry season near watering yards, during winter months, when ambient temperature is mild and the range contains some green fodder, herds can extend the watering intervals from 10 to 15 days. The main ultimate objective was to introduce supplementation concept to nomadic herd owners in the dry season.

Material and Methods

Study area

The study was carried at Agricultural Research station, El-Obeid, North Kordofan state,(latitude11˚:15̀-16˚:30̀ N and longitudes 27˚-32˚ E), Sudan.

Experimental work

A total of 341 desert ewes (1 to 6) years old reared in natural range condition were selected during the normal breeding season (February-March). Ewes were divided into four groups, one group (60 ewes) was used as a control (like in farmer traditional practice). The second group (92 ewes) was supplemented with ration A (99% Roselle seeds and 1% common salt and sold lick), the third group (97 ewes) was supplement with ration B (89% Roselle seeds, 10% molasses and 1% common salt and sold lick) and the fourth group (92 ewes) was supplemented with ration C (89% groundnut cake, 10% molasses and 1% common salt and sold lick). Supplementary feeding practices were imposed on ewes prior to mating (flashing)for 45 days and during late pregnancy (Steaming-up) for 45 days in the long dry season. Mature 18 rams introduced to all experimental ewes, the ratio of the sex was 1:20. All Rams were divided to 3, 5, 5, and 5 rans for the first, second, third and fourth group respectively, and they were supplemented with same ration B. Rams were allowed to mix with ewes twice daily: at 6:00 and 18:00 h.

Animals were allowed to graze normally under range conditions and offered 450 g / head of the ration every three days and the rams were fed 600 g / head for three days,Ewes were monitored for signs of behaviour estrous and those detected were serviced naturally, those returned to estrous were serviced again, the born lambs were weighed after birth, then at 15, 30,45 ,60 ,75 ,90 ,105 and 120 days of age, also ewes weight were recorded weekly.

Control breeding by application of (Kunan)

The control of breeding is by tied the reproductive organs of the ram *(Kunan),* this is a common practice to control breeding which is usually carried out during (February -March) with subsequent lambing during autumn (July-September).This practice would ensure good grazing for lambs. However, weaned lambs may be exposed to long dry winter and summer period when agricultural by products and residues, especially groundnut seed cake and hay are widely used by sheep owners.

Statistical analyses

Data were analyzed by least square mixed model (Harvey 1990).

Results and discussion

Pre-partum supplementation of the dams had significant ($P<0.05$) effect on ewes reproductive performance (Table 1). In general, flushing and steaming-up had increased fertility, prolificacy, fecundity, pregnancy, weaning rate, and reduced abortion rate, as observed for desert sheep by El-Hag et al. (2006) and El-Toum (2005).

Ewes' pre-partum supplementation improved lambs growth rate before weaning (0-90). Hence lambs born from supplemented ewes had highest growth rate than those suckling non supplemented ewes (fighure 1). Supplementation of pregnant ewes during late gestation may provide adequate energy and protein to

support maintenance of animal physiological needs, mammary gland growth, colostrums and milk yield. This result was in line with findings of Oeak et al (2005). In this study,

higher growth rates in lambs is expected to increase milk production as supported by observations by Rafiq et al (2006). Supplementation had no effect on lambs' growth rate after weaning (90-120 days of age), this may be due to the short lactation period of the desert sheep. Lambs whose mothers were treated with supplementation had higher body weight than lambs suckling control ewes (fighure 2); this explanation is in line with findings of Rafiq et al (2006). also the study revealed that supplementation had no significant (P> 0.05) effect on lambs growth rate in the intervals 90-120 days of age(after weaning).

Table 1 : Effect of pre-partum supplementary feeding on ewes reproductive performance..

Factors		Fertility rate (a) %	Fertility rate (b) %	Prolificacy %	Weaning rate (a) %	Weaning rate (b) %	Fecundity %	Abortion %	Pregnancy %
Treatment	Ration A	74.7^{b}	82.4^{b}	116.2^{a}	65.93^{b}	84.9^{b}	86.8^{b}	2.2^{a}	82.4^{c}
	Ration B	90.7^{a}	93.8^{a}	109.1^{a}	90.72^{a}	91.7^{a}	99.0^{a}	2.1^{a}	93.8^{a}
	Ration C	81.5^{b}	87.0^{b}	108.0^{a}	72.82^{b}	82.7^{b}	88.0^{b}	5.4^{b}	87.7^{b}
	Control	53.3^{c}	75.0^{b}	103.1^{b}	46.67^{c}	75.9^{c}	55.0^{c}	15.0^{c}	75.0^{d}

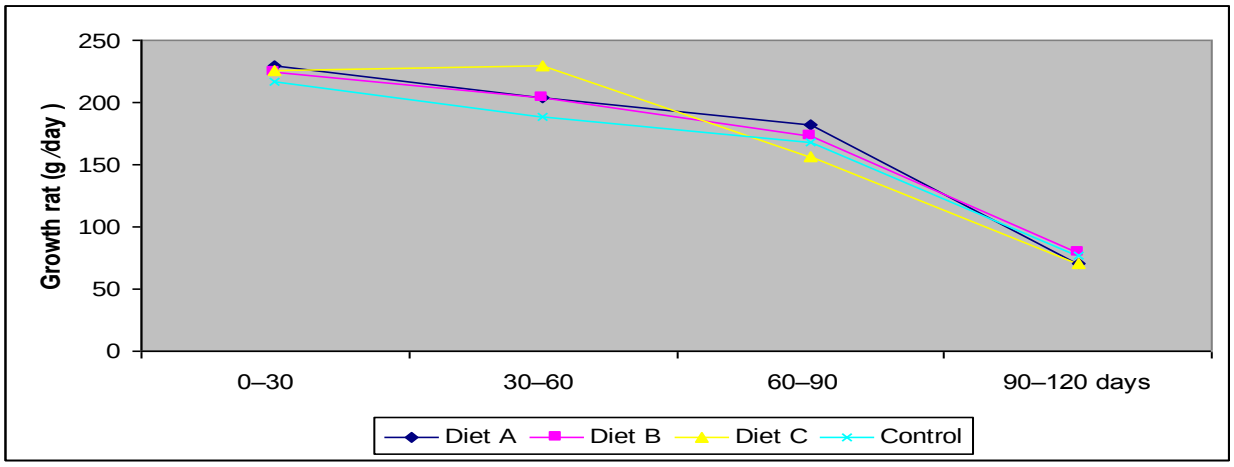

Figure 1: Effect of pre-partum supplementary feeding on lamb growth rate

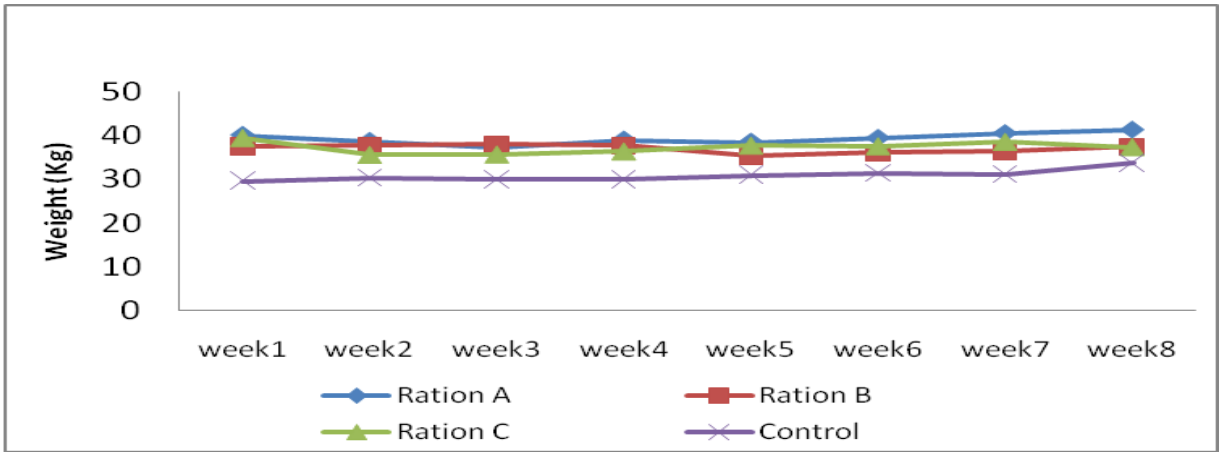

Figure 2 : The effect of Supplementation on ewes body weight

Conclusion and Recommendation

The study indicated the importance of the nutritional status of the nomadic ewes at mating . supplementation reduced the effect of the climate chance on productive and reproductive performance. Supplementation and application of *Kunan* during breeding season are very important strategies to adapt climate change in the rangeland of Kordofan.

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