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Full Length Research Paper

The Hamari sheep production systems in Darfur and Kordofan

Osman A. Dahab, *Ibrahim A. Ishag and Mohamed-Khair A. Ahmed

Department of Genetic and Animal Breeding, Faculty of Animal Production, University of Khartoum, Sudan

***Corresponding Author's E-mail: abu_elharith2006@yahoo.com**

Abstract

The aim of this work is to study flock size, structure and management practices of Hamari sheep. The averages flock size were 217.2 and 268.8 heads in North Darfur and North Kordofan; respectively. The feeding management depended on natural pasture in addition to crops residues and minerals. The study found that the common diseases were Pneumonia and Mycoplasma. Mortality was high in the flocks and most animal died at age 6 – 12 months and the main causes of death were foreign bodies and lack of pasture. The breeding season started at the first of February to March. Breeding rams were selected from the flock at 6 months of age. The ewes gave the first lamb at age 12 months and gave one lamb every year. The main production constraints were lack of pasture and labor. The study concludes that flock size and structure of Hamari sheep varied between farmers. Breeding females constituted most of the flocks, and reproductive performance was average but can be enhanced through management and selection. The study suggested more detailed and larger studies are needed on Hamari sheep to characterize the reproductive and production systems.

Keywords: Desert sheep, Sudan, production system, production constraint

INTRODUCTION

Sheep of Sudan are bred mainly for meat production. Their economic importance arises from the fact that sheep are the major source of red meat for local consumption and for export (Ministry of Animal Wealth and Fisheries, 2004). Sheep population is still raised under nomadic conditions using traditional methods of management and natural grazing which are affected by seasonality of rain fall. Mcleroy (1961) reported that there are many sub types of Sudan Desert Sheep in Kordofan State, the major sub types are: Kabbashi and Hamari sheep. Sheep husbandry system especially in Kordofan is varied between sedentary and Nomadic flocks. In sedentary systems, the flocks are kept close to villages with minimal movement compared to the nomadic system, where movement is throughout the year (Eltahir et al; 199). El Hag et al. (2001) reported that husbandry systems have some effects on production characteristics of Sudan desert sheep and that mortality rate in breeding ewes was lower in sedentary flocks than in nomadic ones. The range in gestation length appears to be the same as those in temperate zone breeds (140 – 160) day (Willamson, et al. 1987). Ahmed (2008) reported that breeding season had significant effect on desert sheep reproductive performance. Traditionally practiced control of breeding leads to the production of only one lamb crop per year, while uncontrolled breeding results in shorter parturition interval enabling approximately three lamb crops to be obtained in two years (FAO, 1985). The objective of this work is to study flock structure and breeding system and management practices in the open range in North Kordofan and North Darfur States.

MATERIALS AND METHODS

Semi structured questionnaires were used to collect infor-

Table 1. Sheep flock size and structure among studied areas

Item	Region		Sig. level
	North Darfur	North Kordofan	
Total number	217.2	268.8	*
Ewes	118.4	156.3	*
Mature male	31.5	33.9	NS
Female lambs	34.7	43.4	*
Male lambs	36.5	41.3	NS

*and NS: significant at P<0.05 and not significant at P>0.05

Table 2. Season of migration in Kordofan and Darfur

Region	Wet season	Dry season	Level of Sig.
North Darfour	98%	2%	NS
North Kordofan	100%	0%	

NS: not significant at P>0.05

Table 3. Nutrition program in North Darfur and North Kordofan

Feeds	Region	
	North Darfour	North Kordofan
Grazing	12%	1%
Hay	19%	20%
Crop residues	1%	1%
Grazing + hay	10%	4%
Grazing +concentrates	3%	5%
Hay + crop residues	8%	0%
Grazing + minerals	9%	0%
Grazing + concentrate + minerals	7%	3%
Grazing +concentrates + hay	8%	2%
Hay + crop residues + minerals	5%	24%
Hay + concentrate + minerals	13%	12%
Hay + concentrate	3%	12%
Hay + crop residues+ concentrate	2%	16%
Level of significance	*	

*: significant at P<0.01

mation about Hamari sheep owners in North Darfur and North Kordofan States. The questionnaires were designed to generate the important relevant information about flock size, structure, demographic data, feeding and management systems as well as the methods of husbandry and breeding practices. Questions and interviews were conducted with 100 owners of Hamari sheep in North Kordofan and also 100 owners of Hamari sheep in North Darfur.

The collected data were classified and statistically analyzed using SPSS (Statistical Package for Social Sciences, version 11.5, 2006). Chi square tests for independence were run and the results were presented mainly as frequencies and descriptive statistics.

RESULTS

The flock size and structure is presented in Table (1).

The average total livestock number per flock was 217.2 heads in North Darfur and 268.8 heads in North Kordofan. The survey showed that the Hamari sheep were reared under a traditional pastoralist system, which is characterized by communal grazing on natural pasture as the main source of feed.

Table (2) shows the pattern of migration in the different seasons. The finding revealed that the seasonal migration was adopted more frequently in the wet season than in the dry season.

Table (3) shows feeding patters and feed stuffs used regularly or supplemented during dry summer or winter seasons. Hay supplementation during dry summer is practiced by 20% of owners in two regions. All interviewees said that feeding and water supply are important constraints hindering flock production and development.

Table (4) shows that most owners in North Kordofan paid for drinking water while the majority of owners in

Table 4. Access to drinking water

Region	Free	Paid	Level of Sig.
North Darfour	77%	23%	*
North Kordofan	7%	93%	

*: significant at P<0.01

Table 5. Sales of animals during the last 6 months

Region	Yes	No	Level of Sig.
North Darfour	69%	31%	*
North Kordofan	87%	13%	

*: Significant at P<0.05

Table 6. Percentage of male and female animals sold

Region	Male	Female	Level of Sig.
North Darfour	96.8%	3.2%	NS
North Kordofan	98.8%	1.2%	

NS: Not significant at P>0.05

Table 7. Percentage of animals sold according to age

Region	< 6month	6-12 month	>12 month	Level of Sig.
North Darfour	20.6%	41.3%	38.1%	*
North Kordofan	14.6%	66.7%	18.8%	

*: Significant at P<0.01

Table 8. Prevalent diseases as reported by farmers in North Darfour and North Kordofan

Disease	Region	
	North Darfour	North Kordofan
Anthrax	7.0%	5.2%
Sheep pox	22.0%	21.9%
Mycoplasma worms	23.0%	18.0%
Worms	6.0%	6.3%
Pneumonia	34.0%	41.7%
Heoroghic septicemia	2.0%	0.0%
Thaleria	2.0%	2.1%
Foreign bodies (omdradim)	4.0%	4.2%
Level of significance	*	

*: significant at P<0.05

North Darfur had free access to drinking water.

According to the questionnaire results all breeders said that the main goal of animal keeping was to sell live animals or produce meat. On the other hand all respondents revealed that they did not keep records about nutrition, health, reproduction and production.

Table (5) and (6) show the percentage of owners who sold animals and the sex of animals sold during the past 6 months. Most owners in the two regions sold animals and the males contributed the highest percentages of sold animals.

Table (7) gives the percentage of animals sold in three age groups. The age at which most animals were sold was 6 – 12 months.

Tables (8) and (9) show the common or prevalent diseases and mortality incidence in the flock of the two regions. The most prevalent disease was pneumonia followed by sheep pox and worms according to sheep owners and also most owners reported the incidence of mortality in their flocks.

Table (10) shows the percentage of owners reporting mortality among the different age groups. The sheep

Table 9. Percentage of owners reporting mortality in flock during the past 12 month.

Region	Yes	No	Level of Sig.
North Darfour	71.0%	29.0%	NS
North Kordofan	69.7%	30.3%	

NS: Not significant at P>0.05

Table 10. The percentage of reports of mortality in the different age groups

Region	< 6months	6-12 months	>12 months	Level of Sig.
North Darfour	20.4%	36.7%	42.9%	NS
North Kordofan	16.1%	56.5%	27.4%	

NS: Not significant P>0.05

Table 11. Causes of sheep mortality in North Darfour and North Kordofan

Reason of death	Region	
	North Darfur	North Kordofan
Foreign bodies	23.1%	14.5%
Mycoplasma	13.5%	1.6%
Worms	7.7%	8.1%
Thaleriosis	5.8%	6.5%
Lack of pasture	9.6%	30.6%
Diarrhea	3.8%	1.6%
Hemoroghic septicemia	7.7%	14.5%
Anthrax	1.9%	1.6%
Pneumonia	21.2%	16.1%
Sheep pox	5.8%	4.8%
Level of significance	*	

*: Significant at P<0.05

Table 12. Source of breeding ram

Region	Own flock	Other flock	Level of Sig.
North Darfour	98%	2%	N.S
North Kordofan	100%	0%	

NS: Not significant P>0.05

owners in North Darfur explained that the highest mortality rate occurred in their animals at ages above 12 months; while those owners in North Kordofan said that most mortality occurred in animals at age 6 – 12 months.

Table (11) shows the main causes of mortality. The results indicated that foreign bodies and pneumonia were the main reasons of death in North Darfur while the lack of pasture (malnutrition) and pneumonia were the main reasons in North Kordofan.

According to questionnaire results the breeding season starts from the first of February up to March. The results in table (12) show that the owners kept replacement rams from their own flocks. All owners used the sons of the previous sires as replacement sires in their flocks.

Table (13) shows that the majority of farmers selected their rams at the age of 6 months. Table (14) shows that the majority of respondents said that male lambs that were not selected for breeding purposes were castrated but few of them said they left unselected males in the flock or sold them before they reached maturity.

Table (15) gives the characteristics on the basis of which the breeding rams were selected. These characteristics were long legs, big size, big head, long tail, Roman nose and red color.

Table (16) shows the willingness of ram owners to lend their breeding rams to other flocks. The majority of

Table 13. Selection age of breeding ram by region

Age (months)	Region	
	North Darfur (%)	North Kordofan (%)
1	1	0
3	1	2
4	8.1	3
5	17.2	4
6	47.5	77
7	14.1	8
8	0	1
9	8.1	2
10	0	1
12	30	2
Level of significance	*	

*: significant P<0.05

Table 14. The method of disposal of unselected males

Region	Castrated (%)	Left in the flock (%)	Sold before maturity (%)	Other (%)	Level of Sig.
North Darfour	95	1	3	1	*
North Kordofan	74	4	22	0	

*: Significant at P<0.01

Table 15. Priorities of respondents regarding the characteristics of selection of breeding rams (%).

Characteristics	Region	
	North Darfour	North Kordofan
Long legs	17.9	11.8
Big size	23.8	40
Big head	16.7	20
Red color	25	10.6
Long tail	2.4	7.1
Roman nose	14.3	10.6
Level of significance	*	

*: significant at P<0.05

Table 16. Lending breeding rams for service in other flocks during the past year

Region	Yes (%)	No (%)	Level of Sig.
North Darfour	72.4	27.6	N.S
North Kordofan	79.4	20.6	

Significant at level 5%

owners lent their rams to other flocks. Table (17) indicates that rams may be kept for breeding up to 10 years; but the majority of owners kept breeding for one year only.

The results in Tables (18) revealed that the means of age at first lambing were 11.68 and 12.30 months in North Kordofan and North Darfur regions, respectively. The lambing interval ranged between 11 – 12 months which means the ewes gave lamb every year.

Table (19) shows the production constraints. The result revealed that farmers ranked the production constraints according to their relative importance in each region. The most important constraints were lack of pasture, capital and prevalence of diseases in North

Table 17. The lifespan of breeding rams in the flocks (in years)

Region	Number of years					Level of Sig.
	1	2	3	4	5-10	
North Darfour (%)	58.2	31.3	3.0	6.0	1.5	N.S
North Kordofan (%)	72.4	18.4	6.6	2.6	0.0	

N.S: Not significant at P> 0.05

Table 18. Age at first lambing (month)

Area	Age at first lambing (months)	
	Means	Standard deviation
North Kordofan	11.68	1.94
North Darfour	12.30	3.92
	Lambing interval (months)	
North Kordofan	11.06	2.17
North Darfour	11.94	2.63

Table 19. Production constraints in North Darfur and North Kordofan

Constraints	Region	
	North Darfur	North Kordofan
Lack of pasture	0.45	0.54
Security	0.60	0.40
Lack of water	0.46	0.45
Diseases	0.47	0.53
Capital	0.47	0.53
Labor	0.60	0.40
Level of significance	*	

*: Significant at P<0.01

Kordofan State, while the important constraints in North Darfur were labor and security.

DISCUSSION

The results found that the average total livestock number was 217.2 heads in North Darfur and 268.8 heads in North Kordofan; this result was not in line with reported by Omer (2011), who reported that average flock size was 156 heads. Also the results showed that Hamari sheep flocks were reared under a traditional pastoralist system. Omer, (2011) and Eltahir et al. (1999) also reported that Hamari sheep flocks have been reared under traditional pastoralist system. The result revealed that owners in the two regions migrated with their animals at the wet and dry seasons. Similar results were also reported by Omer (2011), who found that there were seasonal movements of animals in search of food and water throughout the year. The study showed that all respondents did not keep records. This is probably due to the fact that most of sheep owners are illiterate. The results explained that most owners sold animals during the last six months and that the males at age 6 – 12 months contributed the highest percentages of sold animals. Most sold animals were males and this may be due to the type of market demand or the the fact that owners kept females for breeding. The study revealed that foreign bodies and pneumonia were main reasons of death in North Darfur while the lack of pasture (malnutrition) and pneumonia were the main reasons in North Kordofan. This is probably a reflection of the fact that rangeland in North Kordofan are poorer. In order to decrease the rate of mortality it is necessary to adopt supplementary feeding in the dry season and vaccinate against infectious diseases. The results showed that the breeding season started from the first of February up to March, the same findings were observed by Omer (2011), who reported that the flock owners began breeding from the first of February. The present results revealed that the means of age at first lambing were 11.68 and 12.30 months. A slightly different finding was reported by Mcelroy (1961) and Devendra and Mcelroy (1982) who indicated that Kabbashi sheep reach sexual maturity in both sexes by 7 -10 months of age. The owners in North Darfur listed security and labour as the main production constraints. Animal rustling and insecurity are major problems for producers in Darfur

while in Kordofan problems of range degradation and disease are more important.

CONCLUSIONS AND RECOMMENDATIONS

The results concluded that, flock size and structure of Hamari sheep varied between farmers and regions, and the management system is traditional pastoralist. Feeding depended mainly on natural pasture, which is affected by seasonality of rainfall, and that reflects negatively on reproduction and production. There is a clear need for supplementation with concentrates in North Kordofan, especially during mating and late pregnancy to improve performance. This will require effective extension efforts combined with health services. As for North Darfur security concerns and the lack of health services remain the most important constraints.

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