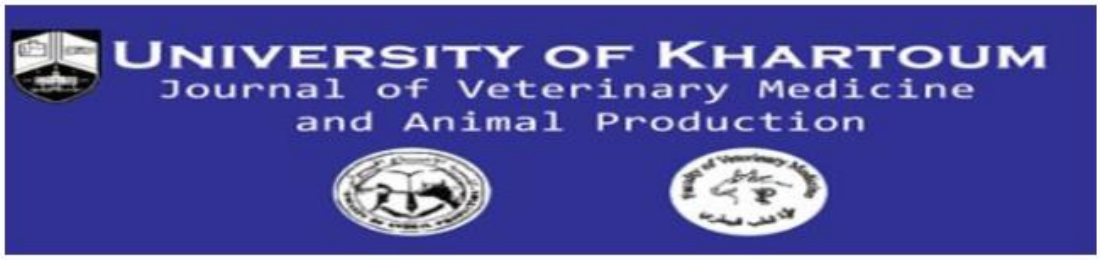
U. of K. J. Vet. Med. Anim. Prod., Vol.7, Issue 2(2016) p 142-149
ISSN: 243456



Objectives and Practices of Horse breeding in Western and Southern Darfur States - Sudan

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Abstract

This study was performed to generate base-line information on the goals and practices of horse breeding in Western and Southern Darfur States using a structured questionnaire and observations to collect information from a total of 200 horse owners in both states in one visit interviews. The results indicated a significant proportion of illiterates among the horse owners. Horses were important as a source of income generation as one third of owners obtained their cash from raising them. The majority of horse owners keep only males horses and the average herd size found was quite small (1.61 ± 0.98 heads). Horses play multi-functional roles in their production systems; racing, riding and work were approximately equally important. The majority of horse owners (48%) obtained their replacements through purchasing from commercial herds. Almost all respondents adopted natural mating, but the mating was controlled in 55% and haphazard in 45% of the herds. Plans aiming at genetic improvement of the horses were totally absent in the areas neither by the owners nor by the relevant institutions. The majority of horse owners particularly, those who breed horses for racing and riding purposes were interested in improving their animals by crossbreeding using the available European stallions in the horse improvement centers in Darfur. On the other hand, 55% of the respondents reported prevalence of diseases specially, viral and bacterial ones and feed deficiency in terms of quality and quantity during the last 12 months preceding the survey. The horse owners stressed that the Darfur conflict and water shortage were very important constraints also. Clearly, more research is needed in order to design sustainable programs for improving and utilizing the Sudanese horse populations. Finally this study recommends establishment of horse research centers in some parts of the country, specially, in Darfur.

Keywords: Sudan, horses, production systems, breeding goals

Introduction

In sub-Saharan Africa, animal agriculture is characterized by diverse and complex production systems, and contributes significantly to improved family nutrition and health. Sale of animals and their products helps to improve and stabilize household income. The intangible products obtained from animals are important in areas lacking formal insurance and developed financial markets (Udo and Cornelissen, 1998)

The diversity of agro-ecological zones, climate and cultural conditions has resulted in production systems with well adapted horse ecotypes or breeds (Vila *et al.*, 2001). The horse ecotypes in the Sudan serve numerous functions in their respective production systems and are bred and selected for sustainable performance (Bashir, 2008). The horse population is estimated at 786,148 heads distributed throughout the country, particularly, in Darfur which is home for 64.7% (508,637 heads) of the Sudanese horse population (Ministry of Animal Resources and Fisheries, 2011).

The changes in living and production patterns in addition to extensive crossbreeding with imported types have led to a drastic reduction in the numbers of Sudanese horses. Active and sustainable utilization (i.e. in-situ conservation) together with improving production levels of adaptive breeds are recommended as central elements to better management/ conservation of AnGR (FAO, 1997).

Phenotypic and genetic characterization to assess the existing biodiversity and differences among the Sudanese horse ecotypes is an essential prerequisite to facilitate the conservation and utilization programme in an effective and meaningful way. However, very limited research; if any is being done on equines in the Sudan, and consequently, very limited information is available. Experience shows that success or failure of breeding projects in the tropics is always connected with the degree of involvement and consideration of farmers' wishes. However, farmers have to be willing to improve their animals genetically and take an active part in the development and implementation of any measure from the very beginning (Zumbach and Peters, 2002; Fall, 2000 and Philipsson, 2000). Screening and analyzing the local conditions, i.e breeder's perception and the local activities at farmer's and organizational level are considered to be a pre-requisite towards any management and conservation measures (Baker and Gray, 2003). This study is part of a research project aimed at contributing to the efforts of characterization and conservation of local animal genetic resources currently undertaken by the Ministry of Animal Resources and Fisheries. The general objectives of this part of the project was to obtain baseline data by identify the goals and practices of horse breeding in Western and Southern Darfur states – Sudan .

Materials and Methods

Study Area

A household survey was conducted through a structured questionnaire and guided interviews (from 20th August to 20th October 2010) with horse owners (household survey) in Southern and Western Darfur states, where the majority of horse population in the Sudan is kept. The horses in these states are kept by Arab tribes (e.g. Benihelba, Trjam, Rezaigat, Taaisha and Habbannia) and Falatta. Towns or villages were selected according to their clustering within the state and accessibility (some areas were not secure during the study as a result of the Darfur conflict).

Data collection

A set of detailed structured questionnaires were prepared and used to collect information from a total of 200 horse owners in both states in one visit interviews. Some of the information collected during interviews was supported by observation. The questionnaire was designed to obtain information on general household characteristics, indigenous breeding practices, disease prevalence, breeding objectives and production constraints.

Data analysis

The SPSS computer software (SPSS 2012) was used to analyze the data. Results are presented mainly in the form of descriptive tabular summaries. Chi-square or t tests were carried out as appropriate to assess the statistical significance or otherwise of particular comparisons.

Results

General information

Table 1 shows some general horse household characteristics in the selected areas. A considerable percentage of horse owners were illiterate (41.8%), while a minority (2.5%) was graduates. The results indicated that none of the horse owners were female. Moreover, about one third of owners (33.5%) generated their income from the horses, while 46.0% of them indicated that they earned income from other activities such as trade, other livestock breeding, crop farming and as employees in the public and private sectors.

Herd characteristics

The survey revealed that the majority of the horse owners (81.6%) keep the horses beside other species such as cattle, sheep and goats, while the remaining percentage (18.4 %) reared horses only (Table 2). With regard to the herd structure, the majority of the herds were composed of either only males (68.5%) or only females (22.0%). The herds those composed of both sexes represented only 9.0% as shown in Table 2.

Table 1: General household characteristics in Southern and Western Darfur

Characteristics	Numbers	Percentage (%)
Level of education	**(200)**	**(100)**
Illiterate	**84**	**41.8**
Khalwa*	**49**	**24.4**

Intermediate	**39**	**19.4**
Secondary	**23**	**11.4**
Uni.Graduates	**05**	**2.5**
Gender of horse owners	**(200)**	**(100)**
Male	**200**	**100**
Female	**0**	**0**
Source of income	**(200)**	**(100)**
Horse only		**33.5**
Horse with others		**20.5**
Others		**46.0**

*Khalwa: Religious school

Table 2: Horse herd characteristics per household in Southern and Western Darfur States

Item	Number	Percentage (%)
Livestock kept		
Horses only	37	18.4
Horses with other animals	163	81.6
Sex of the horses		
Male only		
Female only	137	68.5
Male and female	44	22.0
	19	9.5

Average herd size = 1.61 ± 0.98 head

Horse breeding objectives

Table 3 outlines the breeding objectives of keeping horses as identified by the horse owners in correlation with the level of education. The results revealed that 38.0%, 31.5% and 30.5% of the owners keep horse for racing, riding, and working purposes, respectively. In addition, there was a significant association between education level and the goal of keeping the horses (X2= 15.357; P>0.05), the graduate owners keep their horses either for racing (60%) or for riding (40%) purposes, while none of those owners reared horses for working was a graduate.

Breeding practices

Some of horse owners (48%) in the studied areas obtained their replacements through purchasing from the other commercial herds. On the other hand, 39% of the respondents mentioned that they saved their replacements from within their own herds (Table 4).

Table 3: Effect of the level of education on the breeding objectives

Level education	Number	Racing (%)	Riding (%)	Working (%)
Illiterate	84	38.1	35.7	26.2

Khalwa	49	36.2	38.8	24.5
Intermediate	39	28.2	20.5	51.3
Secondary	23	52.2	17.4	30.4
Graduate	5	60.0	40.0	0.0
Total	**200**	**38.0**	**31.58**	**30.5**

Most of the horse owners (86%) made their own decisions in choosing the replacements of their animals, while the remaining percentage sought help from other sources. Chi - square revealed no correlation between the owner level of education and the method of decision making on the choice of animal replacements (X2= 7.247, P >0.05), though most graduate owners made their own decisions regarding choice of horse replacements (Table 5).

Table 4: Source of animal replacement

Source of replacement	Number	Percentage
Purchasing	96	48
From own herd	79	39.5
Purchasing and from own herd	25	12.5
Total	**200**	**100**

Table 5: Level of education and method of decision making on replacements

Level of education	Number	Owner himself (%)	Other person (%)
Illiterate	84	82.1	17.9
Khalwa	49	95.9	4.1
Intermediate	39	79.5	20.5
Secondary	23	87.0	13.0
Graduate	5	100.0	0.0
Total	**200**	**86.0**	**14.0**

Table 6 shows the relative importance of the mating systems practiced by the horse owners in Western and Southern Darfur states and their correlation with the owner's level of education. Almost all the interviewees adopted natural mating. The mating was controlled in 55% and haphazard in 45% of the cases. Moreover; the Chi- square test revealed no association between the mating system adopted and the level of education of the horse owners (X2 = 8.178; P>0.05).On the other hand, 95% of the horse owners did not keep any type of records, while 5% of them kept some records. The results also showed that 20% of graduate owners kept records for their horse performance. Chi – square test showed insignificant association between education level of interviewees and keeping records for horse performance (X2 = 11.22; P>0.05).

Table 6: Mating systems practiced by horse owners in Southern and Western Darfur

Educational level	Number	Natural and controlled	Natural and haphazard

		(%)	(%)
Illiterate	84	58.3	41.7
Khalwa	49	61.2	38.8
Intermediate	39	35.9	64.1
Secondary	23	56.5	43.5
Graduate	5	80	20
Total	**200**	**55**	**45**

Genetic improvement plans

Table 7 outlines the horse owners' perceptions concerning genetic improvement of their horses. Almost 99.5% of the horse owners have no plans to improve their horse.

Table 7: Plans for genetic improvement

Level education	Have plan (%)	Have no plan (%)
Illiterate	0	100
Khalwa	0	100
Intermediate	0	100
Secondary	4.3	95.7
Graduate	0	100
Total	**0.5**	**99.5**

Table 8 illustrates the method of genetic improvement that the horse owners were interested in. The majority (67.5%) were willing to improve their animals by crossbreeding using the available European stallions in the horse improvement centers in Darfur. However the remainder (3%) were interested either in selection (29.5%) or in using both methods of genetic improvement. Chi -square test indicated insignificant association between owner education level and method of genetic improvement ($\chi 2 = 4.921$; $P>0.05$).

Table 8: Preferred methods of genetic improvement as identified by horse owners

Education level	Crossbreeding (%)	Selection (%)	Crossing and selection (%)
Illiterate	66.7	28.6	4.8
Khalwa	63.3	32.7	4.1
Intermediate	76.9	23.1	0
Secondary	65.2	34.8	0
Graduate	60	40	0
Total	**67.5**	**29.5**	**3**

Disease prevalence

Fifty five percent of the interviewed horse owners reported prevalence of diseases within the last 12 months preceding this study. Figure 1 shows the percentages of prevalent diseases in the study area as reported by the owners. The results revealed that viral and bacterial diseases were the most frequent diseases (42.5% and 41.5, respectively) followed by fungal disease (12.5%) and then other diseases (3.5) such as hernia, diarrhea … etc. The results also indicated that 44.5% of the sampled horse owners used to vaccinate their

animals regularly. The majority of the horse owners (65.5%) depend on the private veterinary services while 18% of them depend on the governmental veterinary services to treat their horses.

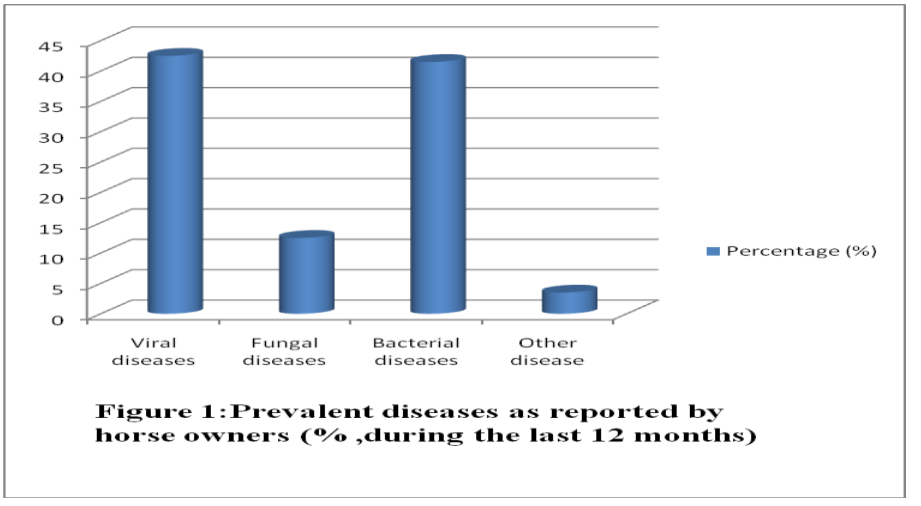

Figure 1:Prevalent diseases as reported by horse owners (% ,during the last 12 months)

Horse production constraints

Figure 2 outlines the serious constraints which faced horse rearing and production in Western and Southern Darfur State. The most important constraint as identified by horse owners was the prevalence of disease (46.4%) followed by lack of feeds (28.6%), the Darfur conflict (20.6%) and lastly water shortage (4.4%). However, 95% of the interviewed horse owners stressed the high cost of feeds

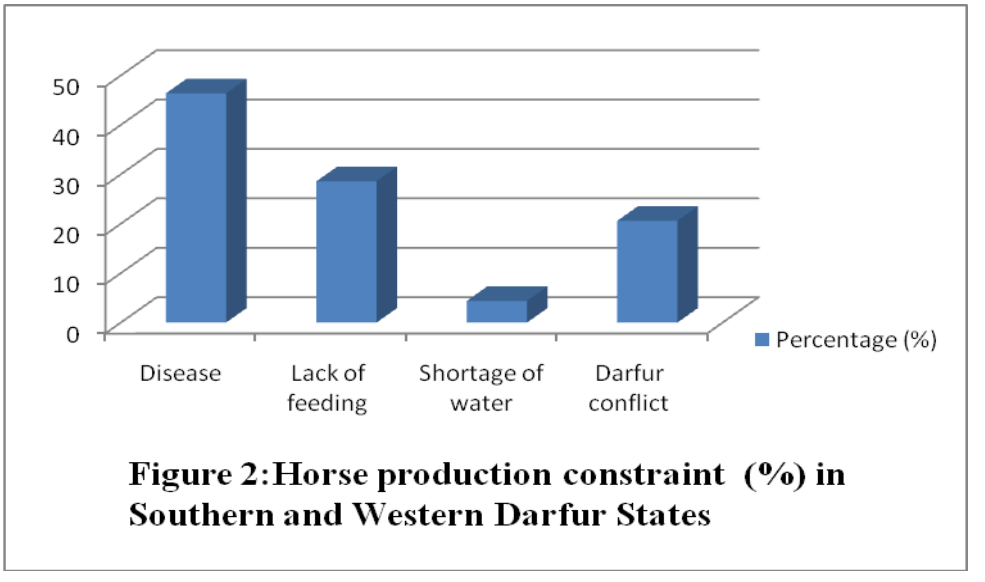

Figure 2:Horse production constraint (%) in Southern and Western Darfur States

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