



HUSBANDRY PRACTICE OF BLACK HEAD SOMALI SHEEP IN PASTORAL PART OF GODE AND ADADILE DISTRICTS, SOMALI REGION, ETHIOPIA.

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ABSTRACT

The study was conducted in pastoral part of Gode and Adadile district of Somali region, Ethiopia. Although most of the sheep population in the study area comprised of Black Head Somali sheep with remarkable socioeconomic relevance to the society, no research has been done

before to describe this sheep breed in the area. Therefore the objective of study was to describe and compare the small holder sheep husbandry practice in Gode and Adadile districts. The study was conducted based on household survey. Purposive sampling was used to select the study sampled areas and households based on sheep availability of sheep. For household survey, 252 households were involved (126 from Gode and 126 from Adadile). Data were described and summarized by using descriptive statistics of SAS version 9.2 (2008). The average sheep flock size was 11.19 in Gode and 18.45 in Adadile. The primary reason of keeping sheep was for cash income, in both districts. Grazing on natural pasture is the major feed source for livestock in both Gode and Adadile districts. The main sources of water were river (Wabe Shebelle), pond, and bore hole. Growth rate, body size, drought tolerant, was the major traits preferred in this study. Feed shortage, water shortage, drought, were the constraints in Gode and Adadile districts for sheep production. Black head Somali sheep adapts the area with harsh environmental condition and have great transaction to the low resource owners in this study.

KEYWORDS: *sheep constraints, purpose of sheep, trait preference, feed source.*

INTRODUCTION

Sheep population is found widely distributed across the diverse agro-ecological zones of Ethiopia. Approximately 75% of the sheep population is kept in small scale mixed farms in the highland regions, which cover regions of over 1500 altitude and receive over 700 mm of annual rainfall, while the remaining 25% are found in the lowlands.^[1] Among indigenous sheep breeds, Black Head Somali sheep are the most promising for their better adaptability under low input extensive production systems in their production environment, where scarcity of feed and water are the two major constraints.^[2]

Successful livestock development program requires both enhancement of productivity and maintenance of local breeds. Sustainable utilization of livestock genetic resources is related to a broad range of issues including the number, distribution and density of the animals over the available land and production systems, the levels of feeding and management of these animals, and the ability of these animals to cope with the specific environmental constraints.^[3]

Characterization of farm animal genetic resources in Ethiopia shows that there is inadequate breed level characterization information, although the country is widely known to possess a large population of livestock with enormous diversity in specific attributes.^[4]

Gode is part of this from which Black Head Somali sheep comprise most of the sheep population of the area and forms the greater proportion of the small ruminant population and contributes a great deal to the national economy as it has special merits in the Middle East and Arabian countries. It is, nevertheless, raised by pastoralists and agro-pastoralists under harsh environmental conditions, with seasonal under-nourishment, long watering intervals, long walks, heat stress and little or no protection against diseases.

Although effort was made to characterize Black Head Somali sheep (BHS), it was limited to few areas which are closer to the major cities such as Jigjiga and Dire Dawa.^[2]

An in-depth production system characterization work has not been carried out on the same breed on the other parts of Somali National Regional State such as Gode zone which are very far from Jigjiga. Furthermore, updating of the previous results is vital since genetic resources and production systems are not static. Hence routine inventories and on-going monitoring is needed.^[5]

The objective of this study was to characterize the production system of Black head Somali sheep in Gode and Adadile districts and to assess the role of black head Somali sheep and trait preference of the community in the study area.

MATERIAL AND METHODS

Description of the study area

The study was conducted in pastoral part of Gode and Adadile districts in Somali National Regional State of Ethiopia which is located at latitude 5° 95' - 6° 12'N, longitude of 44° 95' - 45° 21' E. The altitude of Gode is 320 meter above sea level. The area receives average annual rainfall of less than 300 mm with mean maximum and minimum temperatures of 39°C and 24°C, respectively. Whereas the elevation of Adadile is 300-500 meter above sea level. It has a minimum annual temperature of 28°C and a maximum temperature of 38°C, the climate of Adadile district is characterized as arid to semi-arid agro-ecology.

Sampling technique

Before actual research work discussion was held with the experts in zone and districts pastoral development offices and representative pastoral community on the production system of sheep; present condition of the sheep and concentration of the Black Head Somali Sheep breed. The study sites were selected based on, pastoral settlements and concentration of sheep population. Accordingly Gode and Adadile districts were selected purposively from Gode zone based on the information obtained from discussion with expert and representatives. A total of six kebele (Konka, Goderey, Berson from Gode and Bolahagere, Harus and Dubfyd from Adadile district) were selected following the same sampling technique. Then 42 households having sheep were selected randomly from each Keble which makes the total number of households 252. Survey was conducted by administering questioners to selected households.

Data collection and analysis

Data were collected by administrating a structured questionnaire, individual interview, organizing group discussion and from secondary sources in the wereda and zone agricultural offices. All data gathered during the study period were coded and recorded in Microsoft excel 97-2003. Data from household survey were described and summarized by using descriptive statistics. Chi-square (χ^2) test was carried out as appropriate to assess the statistical significance among categorical variables. Ranking index was made for data including,

purpose of sheep keeping, trait preference, selection criteria for breeding ram and constraints of sheep production in the study area.

RESULTS AND DISCUSSION

House hold characteristics

Most of the households were male headed in both districts and the mean age of the respondent was (40.48±0.01 in Gode 41.98±0.93 in Adadile). Family size of the house hold was (7.77±0.27 in Gode and 7.39±0.28 in Adadile). The result showed that most of the respondents were illiterates which contribute for the management condition to be almost traditional. The highest proportion respondent's educational status next to illiterate was religious educations (34.92 in Gode and 26.19 in Adadile).

Current trend of sheeps

The reports of households on the population status of sheep for the last ten years in the study area are summarized in Table 1. The majority of the households reported an increasing trend for sheep population. The respondent reported that reasons for an increasing trend of sheep population in the study area is due to their use as major source of cash income; as there is ever increasing price of sheep in the local market and cross-border market. Similar to this study, ^[6] indicated that the population of livestock was increasing in Metema district. It was related to the increasing human population due to resettlement, availability of extensive grazing land and attractive price for livestock due to cross-border market. Similar reasons were reported by ^[2] for Shinille zone black head Somali sheep and ^[7] for Harerge highland sheep.

Table 1: Population trend of sheep for the last ten years in the study area.

	Gode district		Adadile district		Overall	
	N	%	N	%	N	%
Increasing	80	63.5	100	79.4	180	71.4
Decreasing	38	30.2	22	17.4	60	23.8
Stable	8	6.3	4	3.2	12	4.8
$\chi^2 = 10.07^*$						
N=Number of households; *significantly difference, ns not significantly different at $p < 0.05$.						

Flock size and structure

Flock size and structure of sheep in Gode and Adadile districts is shown in Table 2. In this study there was higher proportion of breeding ewe than other flocks. A study by ^[8] indicated that breeding ewes represent the largest proportion of the flock next to the male and female

lambs in both low lands and highlands. Larger proportion of breeding ewes, imply the production of larger number of lambs which has direct impact on selection intensity. The ratio of breeding ram to ewe in this study was 1:2.1. Maintaining the correct ratio of fertile rams and ewes (one ram to 20-25 ewes or 3:100 in year round mating) is important as it can affect the overall reproductive efficiency.^[9]

Table 2: Average sheep flock size per household and structure.

	Gode district		Adadile district		Overall	
	N	%	N	%	N	%
Breeding ewe	5.8	51.8	8.6	46.5	7.2	48.5
Breeding ram	2.4	21.4	4.3	22.8	3.4	22.6
Ewe lamb	1.1	9.8	2.2	11.9	1.7	11.1
Ram lamb	0.9	8.1	1.9	10.3	1.4	9.4
Lambs < six months	1.0	8.9	1.5	8.1	1.3	8.4
N=Number of households						

Purpose of keeping sheep

The purpose / reason for keeping sheep in the study area according to the response of households are presented in Table 3. The primary reason for keeping sheep in Gode and Adadile sheep owners was to generate income, wealth and tail fat. Functions like meat, ceremony received relatively low ranking among the reasons for keeping sheep in both areas. The results of this survey revealed that sheep play multi-functional roles in both study districts with similar production objectives. Similar multi-purpose functions of sheep rearing were reported for sheep keepers in the central highlands of Ethiopia.^[10]

The cash obtained from the sale is used for school items for children, clothing, and to cover other household supplies. Sheep meat is not used for household consumption but used for special occasions and ceremonies in the study area. Similarly^[11] reported that income generation was the main reason of keeping sheep.

Compared to larger animals, sheep are easily sold at market. This makes them suitable commodity to mobilize in times of compelling and urgent financial needs. In case of prolonged drought, pastoralists are forced to sell (de-stock) some of their sheep in order to overcome possible losses. When better conditions prevail it is equally easy to restock due to short reproduction cycle and higher prolificacy for peoples who leave in Gode town) and wedding ceremonies. Sheep for social payments such as dowry (to encourage mirage relation sheep in the community) is also common in the study districts. Pastoralist and agro-pastoralist who have no camel, goat, and cattle use their sheep to strength their social activities

(supporting relatives, dowry, slaughtering the sheep to accept guests and other cultural ceremonies) and compensation were also frequently mentioned especially for economically poor people in both Gode and Adadile districts.

Table 3. Ranked purpose of keeping sheep and their index.

purpose of keeping sheep	Gode district				Adadile district			
	Rank 1	Rank 2	Rank 3	Index	Rank 1	Rank 2	Rank 3	Index
Income	54.8	37.4	7.8	0.41	58.1	34.7	7.3	0.42
Wealth	34.7	34.7	30.7	0.29	31.4	25.7	42.9	0.26
Meat	11.1	33.3	55.6	0.08	13.9	36.2	48.9	0.10
Tail fat	27.7	32.3	40.0	0.15	18.0	42.6	39.3	0.14
Ceremony	9.8	24.6	65.57	0.07	7.3	31.7	60.9	0.08

Index = sum of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for particular purpose divided by sum of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for all purpose.

Feed resources and availability

Almost all farmers reported that they faced feed shortage year round due to the arid type agro-ecology of the area (Table 4). The main feed resource reported in both districts were natural pasture and established pasture is available in irrigated land following Wabe Shebelle River. Farmers in both district reported that vegetation accumulation is better during the wet season of the year. There is accumulation of natural vegetation following the two rainy seasons, the main rainy season extends from April to June and the short rainy season stretches from October to December. The farmers move their animal when they are facing feed shortage for their livestock.

The corn of maize and sorghum were used and conserved in dry form to supplement feed shortage during the dry season by few farmers in the study area; whereas natural pasture is a common feed resource for sheep's of all farmers in both districts. Farmers move their livestock to neighboring district during the dry season.

Table 4. Feed resources of sheep in the study area.

Feed resource	Gode		Adadile	
	N	%	N	%
Wet season^{ns}				
Natural pasture	116	92.1	91	72.2
Established pasture	10	7.9	35	27.8
$X^2=0.45$				
Dry season^{ns}				
Natural pasture	91	72.2	86	68.4
Established pasture	21	16.7	23	18.3
Crop residue	14	11.1	17	13.5
$X^2=0.04$				

Water sources and availability

The main sources of water were rivers (Wabe Shebelle), dam/pond, and bore hole. The yields of these water sources decline in the dry season due to high temperature, livestock's and herder are forced to move long distance. River is the main source of water during dry season of the year followed by pond in both districts. Majority of the respondents took sheeps 1-5km and 6-10km during the wet and dry season, respectively, to search for water. The more frequent watering in the study area might be related to the high temperature of the area which enforces the herder and sheep to move distant area to search water. In general, water supply is one of the constraints for sheep production in both districts.

Housing

The type of house, materials used for house construction and the way how sheep house was built are shown in Table 5. It was reported that about 95.2% of the households in Gode and 91.2% in Adadile districts use corral type of house. The majority of respondent use bush/grass for construction of kraal and the remaining respondents uses wood to construct kraal. In this survey lambs are housed with adult sheep mostly. Majority of the respondents reported that sheep are housed with goat and no report of household that sheep are housed with cattle. The pastoralists enclose their sheep and goats together at night. But where the number of animals is large, a separate pen is built for sheep.^[2]

Table 5. Reported housing systems for sheep.

Housing of sheep	Gode		Adadile	
	N	%	N	%
Type of house				
Kraal	120	95.2	115	91.2
Yard	6	4.8	11	8.7
Material for house construction				
Bush /grass	85	67.5	89	70.6
Wood	35	27.8	26	20.7
Earth and grass	6	4.7	11	8.7
Lambs housed with adult				
Yes	64	50.7	81	64.2
No	62	49.2	45	35.7
Sheep housed with				
Cattle	-	-	-	-
Goat	126	100	126	100
N= number of house hold in each districts				

Weaning and castration

According to respondent's response in the study area, the overall average weaning age of lambs was 3.4 months and suckling was totally unrestricted in all of the sample households. Lambs were naturally weaned when they are unable to get milk from their dam.

Castration of lambs was carried out by few households included in the study. In general, the proportion of households castrating their sheep was 30.16%. According to farmers, the appropriate seasons for castration ranged from November to December because, availability of natural pasture in this season is relatively good. Few farmers reported the feed which is supplemented for castrated animal include household grain by product, corn of maize and sorghum purchased from local market. The reported age of castration was 6-20 months for Gode and 8-18 months for Adadile district. The commonly used method of castration was reported to be traditional method. The traditional materials and tools used for castration included ropes, woods, and apply acacia tree on the wound after castration. Castration was usually done for better temperament; fattening a ram to get more incomes or used for home consumption but it has not been recognized as a method of preventing undesired breeding.

Breeding management

Majority of respondent reported that mating is uncontrolled in Table 6 (95.24% in Gode and 92.06% in Adadile). The primary reason for uncontrolled mating is mixed herding, trend of grazing and herding method is moving their animal together to long distance for water and searching feed. The mating system and management is similar in both study sites. This indicates that farmers in both districts follow the same trend in sheep husbandry. The major source of ram in the study area is own ram (87.30%), while the proportion for neighboring ram (10.32%) was low in Gode district whereas in Adadile district own ram accounts for about 88.98% while neighboring ram accounts for about 8.66%.

Table 6. Breeding method and source of ram in Gode and Adadile districts.

Breeding management	Gode		Adadile	
	N	%	N	%
Mating method				
Semi-controlled	6	4.8	10	7.9
Uncontrolled	120	95.2	116	92.1
Source of ram				
Own ram	110	87.3	113	88.9
Neighbor ram	13	10.3	11	8.7
Unknown ram	3	2.4	2	2.4
N=number of household				

Trait preference

Trait preference of sheep is presented in Table 7. Majority of respondents reported that more attentions are given for traits like growth rate, body size and drought tolerant in Gode district in order of their importance Whereas, the major traits preferred in Adadile district were growth rate, drought tolerant and body size with growth rate and drought tolerant having similar index value. The preferred traits are considered as important in both districts and given due emphasis in selecting breeding rams. The respondents in both study districts give priority for the top mentioned traits. Body size is important trait in the market and determines the price of sheep and attention of consumer and they prefer growth rate to reach marketable size in short period of time. Farmers also gave great attention to heat tolerant and drought resistant in sheep production; this might be due to the fact that the area is with stress of drought and heat.

Table 7. Trait preference of sheep in Gode and Adadile districts

Traits	Gode				Adadile			
	Rank1	Rank2	Rank3	Index	Rank1	Rank2	Rank3	Index
Body size	55.6	25.9	18.5	0.17	29.2	43.1	27.7	0.17
Fertility	22.0	28.0	50.0	0.12	49.1	21.1	29.8	0.16
Drought tolerant	21.7	45.0	33.3	0.16	26.8	42.2	30.9	0.18
Growth rate	39.1	34.4	26.6	0.19	18.8	43.5	37.8	0.18
Disease resistance	29.6	35.2	35.2	0.14	35.6	23.7	40.7	0.15
Heat tolerant	32.7	29.1	38.2	0.15	43.9	22.8	33.3	0.16
walk ability	34.6	34.6	30.8	0.07		-	-	-

Index = sum of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] of particular purpose divided by sum of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for all purpose.

Constraints to sheep production

Identifying the constraints of sheep production is a basis to solve the problems and to improve sheep genetic resource and sheep productivity. ^[12] Thus, major constraints challenging sheep production in the study area are presented in Table 8. This study demonstrated that the major constraints for sheep production were feed shortage, water shortage and drought in both districts. Feed shortage and water shortage are reported in the top rank as constraints of sheep and other livestock production and they cause decrease in the productivity. Arid agro-ecological condition of the study area might be aggravating the constraints mentioned in the order of their importance. Good understanding of the relative importance of the different constraints is fundamental prior to initiating any genetic improvement programmed. ^[12]

Table 8. Ranking of sheep production constraints in Gode and Adadile districts (%).

Constraints	Gode district				Adadile district			
	Rank 1	Rank 2	Rank 3	Index	Rank 1	Rank 2	Rank3	Index
Feed shortage	80.3	11.6	8.1	0.31	77.4	9.7	12.9	0.23
Water shortage	24.4	70.0	5.6	0.26	21.9	68.7	9.3	0.19
Drought	19.1	18.2	62.7	0.23	19.5	19.5	9.34	0.17
Predator	12.5	41.7	45.8	0.11	24.6	43.5	31.9	0.15
Disease	19.4	36.1	44.4	0.08	25.9	38.9	35.2	0.14
Market		25.0	75.0	0.01	34.0	29.8	36.2	0.12

Index = sum of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for particular constraints divided by sum of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for all constraints

Reproductive performance

Reproductive performance was obtained from sheep owners and the result is summarized in Table 9. According to the respondents, age at sexual maturity was 8.40 months for females and 8.13 months for males in Gode and the corresponding figures for Adadile were 8.15 and 7.95 months. There is a big variation among production systems and breeds for the trait age at first lambing (12-24 months). The reported average age at first lambing was 16.77 months in Gode and 16.24 in Adadile. Average lambing interval of 9.62 months for Gode sheep and 9.68 for Adadile sheep were recorded in this study.

In the present study, the average reproductive life span of ewes was 10.00 years for Gode and 8.04 years for Adadile. The results of this study showed that on average ewe could produce 7.43 in Gode and 7.74 lambs in Adadile in her life time.

Table 9. Reproductive performance of BHS sheep in Gode and Adadile districts.

Reproductive traits	Gode (N=126)	Adadile(N=126)	
	Mean±SE	Mean ±SE	Probability
Age at sexual maturity of male (month)	8.13±0.16 ^a	7.95±0.13 ^a	0.06
Age at sexual maturity of female (month)	8.40±0.17 ^a	8.15±0.14 ^a	0.11
Age at first lambing (month)	16.77±0.21 ^a	16.24±0.14 ^a	0.23
Average lambing interval (month)	9.62±0.18 ^a	9.68±0.19 ^a	0.07
Reproductive life time of ewe (year)	8.77±0.09 ^a	10.00±0.12 ^b	0.02
Average number of lambing	7.43±0.16 ^a	7.74±0.18 ^b	0.01

^{ab} means with different power are different P < 0.05; N = number of observation ;SE=standard error.

CONCLUSION

The results of this survey revealed that black head Somali sheep play multi-functional roles for economic and socio-cultural activities of the community. The harsh environmental condition of the area aggravates constraints of sheep production like feed shortage water

shortage, drought, disease. Herding sheep's of more than one household together on natural pasture causes breeding to be uncontrolled in the study area. Improving forage establishment program, developing other water to reduce long movement of sheep and their herder and strengthening of community based Animal health Workers is required to reduce loss of sheep productivity caused by major diseases

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