Phenotypic characteristics of Farta sheep in Amhara Region, Ethiopia

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Abstract

A study to describe the physical body characteristics of Farta sheep was undertaken in south Gonder zone of the Amhara Regional State, Ethiopia. Three districts (Estie, Farta and Lai-Gaint) were selected purposively based on sheep population and accessibility. Both qualitative and quantitative measurement data were collected on 920 (557 Female and 363 male) and 667 (634 Female and 33 male) sheep, respectively. The descriptive statistical procedures of SPSS version 16 was used to describe the qualitative traits. GLM procedure of SPSS version 16 was used to analyze body measurements. Three coat patterns (plain (54.9%), spotted (29.5%) and patchy (15.6%) were observed. White (35.38%), brown (13.94%), mixture of brown and white (Goseme; 16.19%) and mixture of white, brown and black (11.39%) were dominant coat color types. Straight head profile (73.2%) had high proportion followed by convex head profile types (26.4.51%). All Farta sheep in the study area (100%) had horizontal ear form. Most (57.6%) of the rams were horned while most females (91.6%) were polled. Out of the horned rams, 57.1% had curved horn shape with backward orientation. About 62.3% of the horned ewes had curved horn shape with back ward orientation. Farta sheep are short fat tailed (100%). The tail is curved up ward at the tip (55.6%) and the remaining was twisted (33.7%) and straight and tip down ward (10.6%). Almost all Farta sheep had no toggle (94.35%), no wattle (98.4%) and ruff (100%). The overall weight, height at withers, heart girth and body length obtained were 24.13kg, 61.69 cm, 70.39 cm and 54.32 cm, respectively. Results on body weight and linear measurements showed age-dependent sexual differences. Males appeared longer and heavier (P<0.001) than females at all age categories. The body measurements of younger animals were less than (P<0.001) those of older age groups.

Key words: Body weight, characterization, Farta sheep, phenotypic.

Introduction

Ethiopia's sheep population estimated at 23.6 million (CSA, 2004), is the third largest in Africa with more than 18 breeds or populations (DAGRIS, 2004). Major sheep breeds found in Ethiopia are Begayit, Farta, Horro, Abergelle, Menz, Begi-Degu, Arsi, Ille, Tukur,

Bonga, Afar, Dangila and Black Head Somali (formerly known as Black Head Ogaden) sheep breeds. Farta sheep breed is found in South Gondar Zone of Amhara Regional State.

Sheep contribute a substantial amount to the farm household as income, mutton and non-food products (manure, skins and coarse wool). The awareness in recognizing the value and the contribution of small ruminant production to a stable and sustainable food production in Tropical Africa has grown quite substantially in the last decade. Such positive development efforts need to be supported through appropriate research and development activities to enhance productivity of locally available breeds by minimizing the prevailing production constraints. Despite the wide traditional importance, availability of large population and genetic resource, the attention given to the improvement of this sub sector is inadequate.

There seems to be a greater awareness of the need to identify, characterize, preserve and improve indigenous breeds which are thought to have some valuable attributes that could be used at present or sometime in the future. Therefore, the objective of the study was to describe and document the phenotypic characteristics of Farta sheep in the study area.

Materials and methods

Site selection and description of the study area
The study was conducted in south Gondar, Amhara region. Three districts namely Esite, Farta and Lai-Gaint and six peasan associations (Pas), two PAs from each district, were selected purposively based on their high number of the targeted sheep population, potential of sheep production and road accessibility.

Farta district is located about 100 km north-east of Bahir Dar, capital of the Amhara National Regional State. Farta lies within an altitude range of 1920-4135 m a.s.l. The district receives an average annual rainfall of 900-1099 mm and a mean-range temperature of 9-25 ^{0}C (Farta District OoARD, annual report). The second district, Lai-Gaint, is located 175 km from Bahir Dar and lies between an altitude ranges 1300-3500 m.a.s.l. Lai-Gaint receives an annual average rainfall of 600-1100 mm and mean minimum and mean

maximum temperature of 9 and 19 ^{O}C, respectively. The third district, Esite district, is located 157 km North West of Bahir Dar city having an altitude range of 1500-4000 m a.s.l. The minimum and maximum mean annual rainfall perception of the area is 1307-1500 mm and the mean annual minimum and maximum temperature is 8.3 ^{O}C – 25 ^{O}C.

Data collection

For phenotypic characterization of Farta sheep, the following sampling procedures were used. For qualitative trait 667 mature Farta sheep of both sexes and for quantitative trait 920 sheep at all age stage were selected randomly from purposely selected PAs to obtain information on physical characteristics of the sampled sheep. This number of sheep was taken based on the minimum standard set by FAO (2005) to undertake characterization. For breed phenotypic characterization, a total of 48 variables were selected from the FAO (2005) sheep breed descriptor list. The selected qualitative characters included: sex, dentition, coat pattern, coat color type, hair type, head profile, horn shape, horn orientation, presence/absence of wattle, presence/absence of ruff, presence/absence of toggle, tail type, tail shape and ear form. The quantitative character include: body weight, body length, height at wither and heart girth.

Data analysis

The raw data collected from the formal survey were entered, cleaned, managed and analyzed using SPSS Version 16 for descriptive statics.

Results and discussion

Effect of sex and location on phenotypic traits

The phenotypic characteristics of Farta sheep in the study area were observed and recorded for female and male separately (Table 1).

The analysis of chi-square test of the phenotypic traits for the effect of sex and location showed that coat color pattern, coat color, hair type, head profile, ear form, horn shape, horn orientation, tail type and tail shape had no significant (P>0.05) variation due to sex

and location. This indicates that dilution of the breed with other type of breed was insignificant. However, the presence/absence of horn had significant ($P<0.05$) variation due to the difference in sex.

Table1. Chi-square test of the phenotypic traits for the effect of districts and sex.

Traits	Source of variation	P-value
	Districts	0.623
Coat color pattern	Sex	0.736
	Districts	0.431
Coat color	Sex	0.292
	Districts	0.321
Hair type	Sex	0.094
	Districts	0.135
Head profile	Sex	0.832
	Districts	0.724
Ear form	Sex	0.532
	Districts	0.083
Presence/absence of horn	Sex	0.724
	Districts	0.246
Horn shape	Sex	0.329
	Districts	0.573
Horn orientation	Sex	0.493
	Districts	0.634
Tail type	Sex	0.391
	Districts	0.215
Tail shape	Sex	0.342

Phenotypic characteristics

Coat pattern, coat color and hair type of Farta sheep

Screening was made for coat pattern (plain, spotted and patchy) and color (Black, white, spotty and brown) in 634 Farta sheep from Esite, Farta and Lay Gaint of the study areas (Table 2). Nearly 54.9% of the sheep in overall study area had plain coat pattern distribution which is followed by spotted and patchy coat pattern with proportion of 29.5% and 15.6%, respectively.

brown to the black color for which the farmers are exerting some kind of selection for the preferred ones. The mixture of brown and white (*Goseme)* and black and white (*Arbete*) accounted 16.19% and 4.79%, respectively. Brown with white or black head (*Yekeye bora*) and black with white or brown head (*Ytekure bora*) had a proportion of 7.8% and 3.29% respectively. A mixture of white, brown and black coat color of Farta sheep accounted 11.39% out of the total sampled size.

Head profile and Ear Form

In the study area, straight head profile (73.2%) had high proportion frequency than the other types of head profile which is followed by convex and concave head profile types with proportion of 26.4% and 0.4%, respectively. All Farta sheep in the study area (100%) had horizontal ear form.

Horn Sheep and orientation

The presence and the absence of horn in Farta sheep were dependent on sex variation. Most (57.6%) of the rams were horned whereas the rest (42.4%) were polled. Out of the horned rams, 57.1% had curved horn shape and the remaining 42.1% had spiral horn shapes. Out of the total horned, 85.7% of the rams had back ward oriented and the remaining 14.3% had laterally oriented horns. Most (91.6%) of the ewes were polled whereas the rest of the ewes (8.4%) were horned. Out of the horned ewes, 62.3% had curved horn shape and the remaining 22.6% and 15.1% had straight and spiral horn shape. Out of the total ewe having horn, 64.2% of the ewe had back ward oriented and the remaining 35.8% had laterally oriented horns.

Tail types and shape, toggle, ruff and wattle

Farta sheep breed is a fat tailed. All (100%) of the breed are short fat tailed. In more than half of the sampled sheep, the tail was curved up ward at the tip (55.6%) and the remaining was twisted (33.7%) and straight tip down ward (10.6%). Almost all Farta sheep had no toggle (98.4%), wattle (100%) and ruff (100%). Figures 1 and 2 showed Farta sheep grazing at communal grazing land.

Figure1. Farta sheep grazing on a communal grazing land.

Body weight and linear body measurements

The Mean ± Standard Deviation (SD) of body weight and linear body measurements of Farta sheep by sex and age groups are shown in Table 3.

Table 3. Body weight and Linear body measurements of Farta sheep by sex and age groups (Means ± SD).

Age group	Sex	n	BW(kg)	HW (cm)	BL(cm)	HG(cm)
0PPI	Male	93	17.8±5.41a	57.85±7.85a	49.71±6.81a	61.69±8.85a
	Female	136	14.4 ±6.88b	54.28 ±6.4b	46.49 ±6.41b	56.75 ±7.98b
1PPI	Male	64	25.00±4.64c	62.70±1.3c	55.60±5.9c	71.10±8.6c
	Female	103	20.46±4.49d	60.34±3.8d	51.17±4.11d	67.59 ±6.01d
2PPI	Male	73	28.22±3.9e	67.80±3.99e	58.5±3.17e	74.10±3.70e
	Female	91	23.7±2.89f	62.27±8.47f	55.42±2.88fh	71.34±5.06fh
3PPI	Male	51	31.07±5.71g	71.00±7.94g	61.00±3.00g	78.00±5.29g
	Female	97	26.47±3.33hj	64.36±3.39hj	56.56±3.96hfj	72.78±4.55hfj
4 PPI	Male	82	34.1±6.93i	74.00±4.24i	64.00±0.00i	81.00±4.24i
	Female	130	27.12±4.14jh	65.65±5.78jh	57.4±4.25jh	73.58±5.06jh
Overall	Pooled	920	24.13±4.63	61.69±5.32	70.39±4.61	54.32±5.97

HW = Height at withers; HG = Heart Girth BL = Body length; BW = Bodyweight; n =No. of observations, 0PPI = those with zero pairs of permanent incisor, 1PPI = those with one pairs of permanent incisor, 2PPI = those with two pairs of permanent incisor, 3PPI = those with three pairs of permanent incisor, 4PPI = those with four pairs of permanent incisor and wear out), Values within a column having different superscripts differ significantly (p<0.05).

Males were higher than females in terms of body weight, height at withers, girth length and body length across all age categories (P<0.05). This result agrees with the conclusion by Tobbo *et al. (*2004) stated that male sheep generally grow faster and are heavier with superior body conformational measurements than female sheep. Body weight and linear

body measurements were significantly (P<0.05) differed among the age group zero, one, two, three and four in male Farta sheep. In female Farta sheep, body weight and height at withers were not significantly (P>0.05) different between age groups three and four. In female Farta sheep body length and heart girth were not significantly (P>0.05) different between age groups two and three and also among three and four. The results obtained on body weight and linear body measurements of Farta sheep were higher than the report of Tesfaye (2008) for Menz sheep but lower than the report of Mengiste (2008) for Washera sheep. On the basis of body size and height at withers, Farta sheep can be classified as a medium sized breed according to one of the sheep description criteria suggested by FAO (1986).

Conclusion

Except the presence and the absence of horn, the other qualitative traits had no significant variation in Farta sheep due to differences in sex and districts. Farta sheep breed is a short fat tailed with a majority of curved up ward at the tip. The coat color pattern varied from plain, patchy and spotted with high proportion of plain coat. The major coat color types were plain white, a mixture of white and brown (*Goseme*) and plain brown. The majorities of Farta sheep have a long coarse hair. The predominant head profile observed is straight head with low proportion of convex. The ear form observed was horizontal. Almost all ewes were polled whereas the majorities of the rams were horned. The rams have a horn shape markedly from spiral through curve to straight. The predominant horn orientation was observed back ward which is followed by lateral. Almost all the sheep were not toggle. Ruff and wattle were not totally observed in the sampled Farta sheep. Males were higher than females in terms of body weight, height at withers, girth length and body length. In general, the Farta sheep can be classified as a medium size breed type.

Acknowledgement

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