

# Comparing Begait, Hararghe Highland and Somali Goat Productivity and Production for Better Utilization, Ethiopia

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## Abstract

Begait, Hararghe highland and Somali goats are known and economically important indigenous breed in Ethiopia. The objective of this study was to compare the traits of Begait, Hararghe high land and Somali goat for better utilization. Performance data also collected from 58 Hararghe highland and 58 Somali goats at Haramaya University goat farm. Total of 60 household were interviewed to access the status and performance of Begait goat at farmer level production system. Feed shortage, disease, vet facility and limitation of browsing area were the challenges in ascending order in the production area of Begait goat. The reproductive and production characteristics of Begait goat were:  $19.30 \pm 0.73$  kidding interval,  $4.76 \pm 0.119$  age at poverty,  $12.51 \pm 0.203$  age at first calving,  $6.11 \pm 0.129$  months weaning age,  $26.07 \pm 0.51$  kg yearling weight, and  $6.11 \pm 0.129$  kg weaning weight. Whereas for the Hararghe highland goats were:  $19.19 \pm 0.45$  kg Yearling weight,  $3.5 \pm 0.07$  months weaning age,  $12.69 \pm 0.28$  kg weaning weight,  $10.55 \pm 0.17$  months kidding interval and  $2.39 \pm 0.06$  kg birth weight. Somali goat reproductive and production performance characteristics were also:  $20.72 \pm 0.32$  kg yearling weight,  $3.63 \pm 0.070$  months weaning age,  $15.83 \pm 2.03$  kg weaning weight,  $9.88 \pm 0.13$  months kidding interval and  $2.99 \pm 0.14$  kg birth weight. The Begait goats were found as prolific breed area where there is shortage of feed and water, and high prevalence of disease. The productivity and Reproduction Performance of Somali goats were slightly higher than Hararghe highland goat. But, the Begait goat had good productivity and production performance than both breeds.

**Keywords:** Hararghe highland goat • Begait goat • Somali goat • Trait • Reproductive and production

## Introduction

Ethiopia has the largest livestock population in the Africa. The total goat population of the country is estimated to be about 24.06 million (CSA, 2013). The production coverage of goats is almost distributed to all agro ecological zone/regions of the country (ESGPIP, 2008). The country has good goat production potential and the product of goat like: milk, meat and skin are valued commodities (ESGPIP, 2008) Produces currently about 1,128 metric tons (MT) of meat. In the country indigenous breeds constitute over 99.77% of the production breeds (CSA, 2013).

Performance of indigenous goat breeds of Ethiopia is highly variable between different management systems. They are characterized by their low production, adaptable to harsh environment and resistance to disease (ESGPIP, 2008). The shortage of production environment, concurrent drought, disease, misuse of breed are the other contributing factors for their low productivity for Ethiopian indigenous local breed next to the genetics factors [1]. The breed performance level to survive in extreme environment has remarkable difference among the breed, however most of them are characterized as extreme environment tolerant [2]. They are genetically good enough to possess unique genetic traits to survive in harsh environment.

According to the finding of Hasen, et al, 2011 [3] there is a significant variation on body weight Gumuz goat (34.7 kg) heavier than Central Abergelle

(27.9 kg) and Abergelle goat (28.1 kg), linear body measurement of height at wither (Bergia-medir goat (71 cm) taller than all other ecotype in the amhara region) and heart girth of Gumuz, Agew and Bergia-medir was significantly larger than Bati, Abergelle and Central Abergelle goat ecotypes. Similarly Birhane and Eik, 2005 reported Begait kids were heavier than Abergelle kids under the study of hay supplementation on growth rate. So these difference produce need to compile their performance and make a selection from them to secure indigenous gene pool. To do so characterizing their productivity and production performance in different production system is very important for maximizing the good trait or breeds for economical utilizations. Therefore, the purpose of this study was to compile information on the economically important traits of Begait, Somali, and Hararghe Highland goat.

## Materials and Methods

### Study area

The study was conducted from November, 2016 February, 2018 Kafta Humera district of Tigray region and Haramaya University. Farm level production and productivity Performance evaluation study for Hararghe high land and Somali was done at Haramaya University goat farm, which is located at an altitude of 1800 m.a.s.l and 512 km from capital-city, Addis Ababa. But, farmer level productivity and production performance evaluation of Begait goat was done in Kafta Humera district of Tigray region. This study site Have semi-arid ecologic zone with a temperature range of 25°C and 42°C and an altitude level of about 530-1831 meters above sea level.

### Sampling and data collection procedures

The questionnaire survey was conducted in Kafta Humera district of Tigray region to access the productivity and production performance of Begait goat. Enumerators who are speakers of local language were train and used to collect the data from farmer. Three peasant associations (PA) were randomly selected from the district. From selected PA, 60 house hold were selected (20 household from each PA) randomly. And the head of house hold were chosen for) interview on the production, reproduction, selection criteria and unique characteristics of Begait goat. Group discussion comprise of (kebele level

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experts, research center experts, elders and women's) and field visit was also done in all 3 peasant association to access the perception of the community on selection criteria, social and cultural value of the Begait goat.

### Data collection for Hararghe highland and Somali goat at farm level

A one year monitoring was done at farm level on Somali and Hararghe Highland goat breeds on productivity and production performance like: Weaning weight (WW), Yearling weight (YW), Age at Puberty, Age at 1<sup>st</sup> calving, Kidding interval (KI), Weaning age (WA) and Average daily weight gains (ADWG).

### Data analysis

The collected data were subjected SAS (9.1.3). Weaning weight (WW), Yearling weight (YW), Age at Puberty, Age at 1<sup>st</sup> calving, Kidding Interval (KI), Weaning age (WA) and Average daily weight gains (ADWG). Indices were calculated for ranked data to provide ranking of major goat production constraints. Indices were calculated as Index = Sum of (3X number of household ranked first +2X number of household ranked second +1X number of household ranked third) given for an individual reason, criteria or preference divided by the sum of (3 X number of household ranked first +2X number of household ranked second +1X number of household ranked third) for overall reasons, criteria or preferences [4].

## Results and Discussion

### Trends of Begait goat population

In the study area dominant livestock species were cattle, sheep and goat. Goat production management system of area was extensive production system. In the study area the population of Begait goat have shown around 55.5% increasing over the past 10 years trend which is almost similar with the [4] report which was 53.33%. Livestock population and products is expected to increase more than this figure as a result of human population and urbanization; it is expected to feed 160 million of Ethiopian populations in 2050 (UN, 2009). As a result of this it is a basic to improve the production system of livestock to meet the required figure using genotype with environmental interaction. Limitations of browsing area, shortage of feed, high disease prevalence are the main goat production constant in the area. This finding is in agreement with [4] who have reported shortage of feed, high disease prevalence and illegal export as a big challenge for goat production in the area.

### Production and reproduction performance of Begait, Hararghe highland and Somali goat

Reproduction determines several aspects of sheep and goat production and high rate of reproductive efficiency is important for perpetuation of the species, production of meat, milk, skin, and replacement of breeding stock. For a better production and utilization, Growth rate and reproductive rate is the most important factor to be considered for the efficiency of production. The reproductive and productive performance of Begait, Somali and Hararghe Highland goats is summarized in Tables 1 and 2. Begait goats are preferable by their owner due to their fast growing and prolificacy. Averagely for a kidding interval, Age at puberty (month) Age at 1<sup>st</sup> calving (month), Yearling weight (kg), Weaning age (month) and weaning weight were 19.30 ± 0.73, 4.76 ± 0.119, 26.07 ± 0.51, 12.51 ± 0.203, 6.11 ± 0.129, 6.11 ± 0.129, and 6.04 ± 0.029 respectively. The study conducted at Tanqua Abergelle district stated that the yearling weight of Begait goat was 22.94 ± 1.45 kg which is less than current finding [5] (Table 1).

The Hararghe highland; Yearling weight, weaning age, weaning weight, kidding interval and birth weight were 19.19 ± 0.45, 3.5 ± 0.07, 12.69 ± 0.28, 10.55 ± 0.17 and 2.39 ± 0.06 respectively. But, the mean range for Somali goats; Yearling weight, weaning age, weaning weight, kidding interval and birth weight were 20.72 ± 0.32, 3.63 ± 0.070, 15.83 ± 2.03, 9.88 ± 0.13 and 2.99 ± 0.14 respectively. These finding revealed that, the Performance of Somali goats is higher than Hararghe highland goat under the same management practice and environment except for a weaning age. These variations among

the goat breed indicate as there are huge genetic resource in the country which can be used as a tool for improvement which is in agreement with [4] (Table 2).

The performance result for yearling weight, weaning weight, and kidding interval indicated that as Begait goats were higher than Hararghe Highland and Somali goats. [5] as well as [1] indicated the higher performance of Begait goat when it compared with Abergelle goat.

### Characteristics of Begait goat and perception of farmers

Almost all of the farmers and elders have good attitude about Begait goat breed by revealing about the breed better performance in ability to adapt the harsh environment, disease resistance, prolificacy, good milk producer and fast grower. Large body size was one of the morphological characteristics of Begait goats revealed by this study. The farmers of humera district were subjected to correlate the Dropping ear characteristics of Begait goat with milk production, while this scenario needs further study to see the association of ear size with milk production. The udder size of Begait goat was slightly larger than Somali and Hararghe high land goats which is in line with the previous findings [6]. The size of udder is most of the time has direct relationship with the level of milk production. The udder size is different within and among breeds are all having direct relationship with the level of milk breed. The back horn orientation, long hair in their thigh, white color with slightly black spot of body coat are other descriptive morphology characteristics for the breed [7].

Besides they considered as this goat is their backup and their goat reflects their community way of life and social value. Regarding to the origin of Begait goat some elders reported that this breed came from Eretria which is called 'Hassan'.

### Constraints for goat production in the study area

Here under in the constraints for goat production is identified depending on the ranking of farmers (Table 3). Feed shortage (0.273) was the major constraint complained by farmers for Begait goat production followed by Disease (0.246), vet facility (0.19) and limitation of browsing area (0.156) in the

Table 1. Growth and reproduction performance of Begait goat.

Production and Productivity Traits	Mean ± SE
Kidding interval (month)	6.04 ± 0.029
Age at puberty (month)	6.11 ± 0.129
Age at 1 <sup>st</sup> calving (month)	12.51 ± 0.203
Yearling weight (kg)	26.07 ± 0.51
Weaning age/month	4.76 ± 0.119
Weaning weight (kg)	19.30 ± 0.73

Table 2. Growth and reproduction performance of Hararghe Highland and Somali goat

Production	Hararghe Highland Mean ± SE	Somali Mean ± SE
Yearling weight	19.19 ± 0.45	20.72 ± 0.32
Weaning age	3.5 ± 0.07	3.63 ± 0.070
Weaning weight	12.69 ± 0.28	15.83 ± 2.03
Kidding interval	10.55 ± 0.17	9.88 ± 0.13
birth weight	2.39 ± 0.06	2.99 ± 0.14

Table 3. Constraints for goat production.

Item	Peasant Association			Overall
	Bereket Index	Maykadira Index	Rawiyan Index	
Feed shortage	0.22	0.29	0.31	0.273
Disease	0.3	0.22	0.22	0.246
Vet Facility	0.2	0.2	0.17	0.19
Limitation of browsing area	0.13	0.18	0.16	0.156
Water	0.1	0.09	0.119	0.103
Illegal export	0.05	0.02	0.021	0.03

study area (Table 3). This result is in agreement with Gebrekiros et al., 2016 who reported feed shortage as major constraint for Begait goat production. The farmers of study area were used to feed their animals like residue/cane of sorghum and sesame; local brewery by products like atela and finally they will reduce their animal by selling male and older goat during prolonged dry season mostly if it is extended from May to June [8-12].

## Conclusion

Begait goat on its habitat (Humera) has the ability to adapt to the harsh environment (feed and water scarcity), disease resistance, twins/triple birth which is their first criteria of goat selection, possible to say they are a good milk producer, has fast growth followed by milking, growth and appearance performance. Shortage of feed is the main constraints of goat production, to cope up with this problem; farmers of Begait goat use a mechanism of feeding residues/cane of sorghum and sesame, left over, local brewery by products and if it exceeds more they will decrease the number of livestock by selling male goat and older.

Growth and reproductive of Somali goats is slightly higher than Hararghe highland goat by the same management and environment except for a weaning age. Additionally Begait goats were found to be out performers than Hararghe Highland and Somali goats for their fast growing, yearling weight, weaning weight and kidding interval. This could be an indicator that we have a genetic resource with a diversity which is a tool to bring significant improvement.

## Conflict of Interest

The authors declare no conflict of interest.

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## References

1. Luginbuhl JM. Breeds and Production Traits of Meat Goats Animal Science Facts. NC State Extension Publications. (2015)
2. Wuletaw, Z., Maria Wurzinger, T. Holt, Tadelles Dessie, and Johann Sölkner. "Assessment of physiological adaptation of indigenous and crossbred cattle to hypoxic environment in Ethiopia." *Livestock Sci* 138 (2011): 96-104.
3. Hassen, Halima, Michael Baum, Barbara Rischkowsky, and Markos Tibbo. "Phenotypic characterization of Ethiopian indigenous goat populations." *African J Biotech* 11 (2012): 13838-13846.
4. Kosgey, Isaac Sanga. "Breeding objectives and breeding strategies for small ruminants in the tropics." Wageningen University and Research, 2004.
5. Yami, Alemu, Ethiopia Sheep, and R. C. Merkel. "Sheep and goat production handbook for Ethiopia." (2008).
6. Berhane G, Erik LO. "Effect of vetch (*Vicia sativa*) hay supplementation to Begait and Abergelle goats in northern Ethiopia II Reproduction and growth rate." *Small Rumi Res* 64 (2006):233-240.
7. Hagos, Hailai, Minister Brihene, Gebru Brhane, Gebresslassie Gebru and Mulalem Zeneb et al. "Demonstration and evaluation of Begait goat breed in comparison of Abergelle goat breed under farmer's management system in Tanqua Abergelle district." *Livestock Res Rural Dev* 30 (2018): 01-09.
8. Hassen, Halima, Michael Baum, Barbara Rischkowsky, and Markos Tibbo. "Phenotypic characterization of Ethiopian indigenous goat populations." *African J Biotech* 11 (2012): 13838-13846.
9. Merkhan, K.Y and J.E. Alkass. "Influence of udder and teat size on milk yield in Black and Meriz goats." *Res Opin Anim Vet Sci* 1(2011): 601-605.
10. Kosgey, Isaac Sanga. "Breeding objectives and breeding strategies for small ruminants in the tropics." Wageningen University and Research, 2004.
11. United Nations (2009): World Population Prospects. The 2008 Revision. New York.
12. Wuletaw, Z., Maria Wurzinger, T. Holt, Tadelles Dessie and Johann Sölkner. "Assessment of physiological adaptation of indigenous and crossbred cattle to hypoxic environment in Ethiopia." *Livestock Sci* 138 (2011): 96-104.

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