

The Determination of Some Morphological Characteristics of Honamlı Goat and Kids, Defined as A New Indigenius Goat Breed of Turkey ^[1]

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Summary

The aim of this study was to determine the growth, testicular dimensions, body measurements of kids until the weaning age and mature goats in the recently defined Honamlı goat breed in Turkey. This study has been carried out on 7 different Honamlı herds that consist of 207 kids, 174 goats and 22 goat bucks that have been breed in the Burdur, Antalya and Konya provinces under extensive conditions. The average of some important measurements such as withers height, rump height, body length, chest girth, tail length, nose length, distance between two horns, neck length, left front wrist girth and left back wrist girth on the 90th day at Honamlı herd kids were determined to be 62.3 cm, 62.4 cm, 64.4 cm, 62.2 cm, 19.4 cm, 19.2 cm, 2.2 cm, 26.7 cm, 8.3 cm and 8.3 cm, respectively. The average live weights of the Honamlı goats and bucks were determined to be 63.5 kg and 77.3 kg. The withers height, rump height, body length, chest girth, tail length, nose length, distance between two horns, neck length, left front wrist girth and left back wrist girth of mature goats were 83.0 cm, 83.3 cm, 88.3 cm, 91.0 cm, 20.8 cm, 25.9 cm, 2.2 cm, 36.2 cm, 10.2 cm and 10.2 cm, respectively. The scrotal circumference, right testicular length, left testicular length, right testicular diameter, left testicular diameter and the testis volume of Honamlı male kids on the 120th day were 19.8 cm³, 7.1 cm³, 7.0 cm³, 3.2 cm³, 3.2 cm³ and 115 cm³ respectively.

Keywords: *Honamlı Goat, Weaning age, Body measurement, Testicular characteristics*

Türkiye’de Yeni Bir Yerli Irk Olarak Tanımlanan Honamlı Keçi ve Oğlaklarının Bazı Morfolojik Özelliklerinin Belirlenmesi

Özet

Bu araştırmanın amacı, Türkiye’de yeni tanımlanan Honamlı Keçisi ırkı oğlakların sütten kesim yaşına (105. gün) kadar büyümeleri, bazı vücut ölçüleri ile erkek oğlakların testis özellikleri ve erginlerin vücut ölçülerini belirlemektir. Araştırma, Burdur, Antalya ve Konya illerinde ekstansif şartlarda yetiştirilen 7 farklı Honamlı keçi sürüsünde 207 baş oğlak, 174 baş keçi ve 22 baş teke üzerinde gerçekleştirilmiştir. Honamlı Keçisi oğlaklarında 90. günlük yaşta cidago yüksekliği, sağrı yüksekliği, vücut uzunluğu, göğüs çevresi, kuyruk uzunluğu, burun uzunluğu, iki boynuz arası mesafe, boyun uzunluğu, sol ön incik çevresi ve sol arka incik çevresi gibi önemli ölçülerin ortalamaları sırasıyla 62.3 cm, 62.4 cm, 64.4 cm, 62.2 cm, 19.4 cm, 19.2 cm, 2.2 cm, 26.7 cm, 8.3 cm ve 8.3 cm olarak saptanmıştır. Honamlı keçileri ve tekelerinin ergin canlı ağırlık ortalaması sırasıyla 63.5 kg ve 77.3 kg olarak belirlenmiştir. Ergin keçilerin cidago yüksekliği, sağrı yüksekliği, vücut uzunluğu, göğüs çevresi, kuyruk uzunluğu, burun uzunluğu, iki boynuz arası mesafe, boyun uzunluğu, sol ön incik çevresi ve sol arka incik çevresi ortalamaları sırasıyla 83.0 cm, 83.3 cm, 88.3 cm, 91.0 cm, 20.8 cm, 25.9 cm, 2.2 cm, 36.2 cm, 10.2 cm ve 10.2 cm olarak tespit edilmiştir. Honamlı erkek oğlakların 120 günlük skrotum çevresi, sağ testis uzunluğu, sol testis uzunluğu, sağ testis çapı, sol testis çapı ve testis hacmi ortalamaları ise sırasıyla 19.8 cm³, 7.1 cm³, 7.0 cm³, 3.2 cm³, 3.2 cm³ ve 115 cm³ olarak tespit edilmiştir.

Anahtar sözcükler: *Honamlı Keçisi, Süt kesim yaşı, Vücut ölçüleri, Testis özellikleri*



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INTRODUCTION

In Turkey, 97% of goats, encompassing all regions, are Turkish Hair goats (Kil goats). They are mostly raised inside and near forests. On the other hand, Angora goats (Tiftik goat) make up only the 3% of whole goat population in Turkey. Dairy breeds and their crossbreeds like Malta, Kilis and Saanen are mostly being breeding on the Western Anatolian Coast, but they are fewer in number compared to Hair and Angora goats ^{1,2}.

While the number of goats in Turkey in 1970 was 20 267 008, the population went down to 6 293 233 in 2010. According to 2010 data, 11 675 tons of goat meat and 272 811 tons of goat milk were produced ³.

Honamlı goats are usually bred by Turkish nomads in Antalya, Burdur, Isparta and Konya, located on the hillside of the Taurus Mountains in the Mediterranean region. Not enough scientific research has been carried out on these herds, which are important gene sources, and the migratory life-style of nomads is the biggest barrier for research ⁴.

The withers height and body length of Norduz does and bucks in Turkey had 73.86 cm and 65.84 cm, 75.60 cm and 66.38 cm, respectively ⁵. Saanen x Kil (F₁) and Saanen x Kil (G₁) crossbred on the 90th day had a withers height of 45.1 and 47.8 cm, a body length of 43.4 cm and 46.4 cm and a chest girth of 54.1 cm and 54.9 cm respectively ⁶. The kids of Kil and Saanen x Kil (F₁) crossbred on the 30th day had a withers height of 45.1 cm and 45.3 cm, a body length of 43 cm and 43.4 cm and a chest girth of 53.5 cm and 55 cm respectively ⁷.

This study has been carried out in order to determine the morphologic structure of Honamlı goats, which are different than the other local goat breed, that are being breed in Turkey in terms of morphologic and physiologic characteristics.

MATERIAL and METHODS

This study has been carried out on different Honamlı goat herds that are being breed pure in Antalya (2 herds), Burdur (4 herds) and Konya (1 herd). The 1st and 2nd herds were from the Antalya province, 3rd, 4th, 5th and 6th herds were from the Burdur province and the 7th flock was from the Konya province. The study has been carried out on kids born in 2010 and mature does and bucks. The experiment was carried out on random sample of 174 does (average of 3.5 years), 22 bucks (average of 2.1 years) and 207 kids (123 male and 84 female). The herds were pastured on open range fields and forests from early in the morning until noon. Then the herds rested in a shaded area during noon and in the afternoon they continued to graze when the effect of the heat disappeared. In the evening the herds returned to their folds. In general, this district is poor in

terms of amount and quality of pasture. Kids were suckling in the morning and at night and when they were 3 months old started to go out to the graze with their dams. The kids' weaning age was 105 days old. The live weights of the kids on the 30th and 90th were recorded. Body measurements (withers height, rump height, body length, chest circumference, tail length, nose length, the distance between two horns, front wrist girth, back wrist girth) of kids on the 30th and 90th day were measured. In addition, live weights and body measurements of does and bucks were recorded only once.

Project has been approved by Suleyman Demirel University Local Ethical Committee on Animal experiments (7.7.2009, meeting number: 16, resolution number: 1).

The testicular dimensions (scrotal circumference, right testicular length, left testicular length, right testicular diameter, left testicular diameter and testis volume) of male kids on the 90th and 120th day were measured. Each testis was moved into the distal part of the scrotum and its circumference was measured with a flexible cloth tape. The length and diameter of each testis were measured with a calliper after forcing it against the scrotum ⁸. The volume of the testes was calculated according to formula ⁹.

Testis volume (cm³) = 0.0396 x (average testis length) x (scrotal circumference)²

Descriptive statistics were calculated on the data. Since the kids were born at different times, live weights are calculated by the interpolation method. All statistical analyses were carried out with Minitab version 16 statistical software ¹⁰.



Fig 1 Honamlı does, white forehead and the body is black
Şekil 1. Honamlı dişi keçi, burun beyaz ve vücut siyahtır

RESULTS

It is well known that the Honamlı goat is different than other native goat breeds in Turkey. Nose length, neck length, body length, tail length and the height from the

Table 1. Mean±SE body measurements and live weight of Honamli kids in different ages (30 and 90 days)

Tablo 1. Farklı yaşlardaki Honamli oğlakların ortalama canlı ağırlık ve vücut ölçümleri ile standart hataları (30 ve 90 günlük)

| Age (day) | n | Live Weight (kg) | Withers Height (cm) | Rump Height (cm) | Body Length (cm) | Chest Girth (cm) | Tail Length (cm) | Nose Length (cm) | Distance Between Two Horn (cm) | Neck Length (cm) | Left Front Wrist Girth (cm) | Left Back Wrist Girth (cm) |
|-----------|--------|------------------|---------------------|------------------|------------------|------------------|------------------|------------------|--------------------------------|------------------|-----------------------------|----------------------------|
| 30 | Male | 10.4±0.18 | 47.5±0.30* | 48.4±0.30* | 49.7±0.30 | 46.2±0.35* | 14.2±0.13* | 15.5±0.12* | 3.7±0.05 | 22.7±0.19 | 7.0±0.06* | 6.9±0.06 |
| | Female | 9.5±0.20 | 46.5±0.34 | 47.4±0.35 | 48.8±0.36 | 45.1±0.41 | 13.7±0.19 | 14.8±0.15 | 3.7±0.08 | 22.4±0.23 | 6.8±0.07 | 6.7±0.07 |
| | Total | 207 | 10.0±0.14 | 47.1±0.23 | 48.0±0.23 | 49.4±0.23 | 45.8±0.27 | 14.0±0.11 | 15.2±0.10 | 3.7±0.04 | 22.6±0.15 | 6.9±0.05 |
| 90 | Male | 26.9±0.43 | 63.3±0.42* | 63.3±0.40* | 65.3±0.43* | 63.0±0.43* | 19.8±0.17* | 19.5±0.14* | 2.0±0.07* | 26.7±0.18 | 8.5±0.07* | 8.4±0.07* |
| | Female | 23.4±0.41 | 60.8±0.40 | 61.0±0.40 | 63.1±0.44 | 60.9±0.40 | 18.8±0.21 | 18.8±0.16 | 2.4±0.09 | 26.5±0.18 | 8.1±0.07 | 8.1±0.07 |
| | Total | 207 | 25.5±0.33 | 62.3±0.31 | 62.4±0.30 | 64.4±0.32 | 62.2±0.31 | 19.4±0.13 | 19.2±0.11 | 2.2±0.06 | 26.7±0.13 | 8.3±0.05 |

* Overall average mark, where the group is statistically much higher than the other (P<0.05)

Table 2. Mean (±S.E.) testicular dimensions until weaning age of Honamli male kids (90 and 120 days)

Tablo 2. Honamli erkek oğlakların süt kesim yaşına kadar ki ortalama testis ölçümleri ile standart hataları (90 ve 120 günlük)

| Age (day) | n | Scrotal Circumference (cm) | Right Testicular Lengths (cm) | Left Testicular Lengths (cm) | Right Testicular Diameters (cm) | Left Testicular Diameters (cm) | Testicular Volumes* (cm ³) |
|-----------|-----|----------------------------|-------------------------------|------------------------------|---------------------------------|--------------------------------|--|
| 90 | 109 | X±Sx | X±Sx | X±Sx | X±Sx | X±Sx | X±Sx |
| | | | 15.2±0.21 | 6.0±0.11 | 5.9±0.12 | 2.5±0.05 | 2.6±0.05 |
| 120 | 109 | X±Sx | 7.1±0.12 | 7.0±0.11 | 3.2±0.06 | 3.2±0.05 | 115.0±4.38 |

* Testicular volumes (cm³) = 0.0396 x (average testicular length) x (scrotal circumference)²

Table 3. Mean±SE the body measurements and live weight of doe and bucks in Honamli goat herds

Tablo 3. Honamli keçi sürülerindeki keçi ve tekelilerin ortalama canlı ağırlık ve vücut ölçümleri ile standart hataları

| Sex | n | Age (year) | Live Weight (kg) | Withers Height (cm) | Rump Height (cm) | Body Length (cm) | Chest Girth (cm) | Tail Length (cm) | Nose Length (cm) | Distance Between Two Horn (cm) | Neck Length (cm) | Left Front Wrist Girth (cm) | Left Back Wrist Girth (cm) |
|------|-----|------------|------------------|---------------------|------------------|------------------|------------------|------------------|------------------|--------------------------------|------------------|-----------------------------|----------------------------|
| Doe | 174 | 3.5 | 63.5±0.84 | 83.0±0.41 | 83.3±0.35 | 88.3±0.37 | 91.0±0.50 | 20.8±0.19 | 25.9±0.13 | 2.2±0.06 | 36.2±0.37 | 10.2±0.07 | 10.2±0.07 |
| Buck | 22 | 2.1 | 77.3±4.35* | 91.2±1.54* | 90.1±1.41* | 93.0±1.51* | 94.7±2.21 | 24.0±0.50* | 26.4±0.46 | 2.2±0.23 | 40.4±1.25* | 12.9±0.43* | 12.8±0.41* |

* Overall average mark, where the group is statistically much higher than the other (P<0.05)

ground are some of these characteristics. The body is mostly black. The pure breed Honamlı goats that are being bred in the Antalya region have white or brown foreheads and legs and the body is black. Sometimes grey spotting occurs. The most important morphological characteristic of the Honamlı Goat is the arched nose

The body measurements and the average live weights of male and female Honamlı kids on the 30th and 90th days were presented in [Table 1](#). The average of withers height, rump height, body length, chest girth, tail length, nose length, the distance between two horns and neck length on the 90th day were 62.3 cm, 62.4 cm, 64.4 cm, 62.2 cm, 19.4 cm, 19.2 cm, 2.2 cm and 26.7 cm, respectively. The body measurements of male kids are higher than female kids. In general, the distance between the two horns decreases as the age increases. The effect of sex on the withers height, rump height, chest circumference, tail length, nose length, and left wrist girth on the 30th day was found to be significant.

The testicular dimensions of male kids on the 90th and 120th days were presented in [Table 2](#). The average of scrotal circumference and testis volume on the 90th and 120th days of the herds were 15.2 and 19.8 cm and 57.5 and 115 cm³ respectively.

The live weights and morphologic body measurements of the Honamlı bucks and does have been given in [Table 3](#). The average live weight of Honamlı does and bucks were 63.5 kg and 77.3 kg respectively.

The average of withers height, rump height, body length, chest circumference, tail length and nose length of does were 83.0 cm, 83.3 cm, 88.3 cm, 91.0 cm, 20.8 cm and 25.9 cm, respectively. The same values for the bucks were 91.2 cm, 90.1 cm, 93.0 cm, 94.7 cm, 24.0 cm and 26.4 cm respectively. The effect of sex on body measurements of does and bucks was statistically significant. These body measurements were withers height, rump height, body length, tail length, neck length, left front wrist girth and left back wrist girth ($P < 0.05$).

DISCUSSION

When body measurements of Honamlı kids on the 30th and 90th days are compared with a different breed, Şimşek et al.⁶ reported that the withers height of the Saanen x Kil (F_1) and Saanen x Kil (G_1) crossbred were 45.1 cm and 47.8 cm, the body lengths were 43.4 cm and 46.4 cm and the chest circumferences were 54.1 cm and 54.9 cm on the 90th day. Şimşek and Bayraktar⁷ reported that the withers heights of the Kil and Saanen x Kil (F_1) crossbred kids on were 45.1 cm and 45.3 cm, the body lengths were 43 cm and 43.4 cm, the chest circumferences were 53.5 cm and 55 cm the 30th day; the withers heights were 52.6 cm and 53 cm, the body lengths were 50.8 cm and 52.6 cm, the

chest circumferences were 62.4 cm and 62 cm on the 60th day; the withers heights were 55.1 cm and 54.9 cm, the body lengths were 55.5 cm and 56.6 cm, the chest circumferences were 67.6 cm and 67.3 cm on the 90th day. Uludağ¹¹ reported that the withers heights were 39.1 cm and 44.7 cm respectively, the body lengths were 32.1 cm and 37.4 cm respectively, the chest circumferences were 43.6 cm and 49.6 cm respectively, rump heights were 39 cm and 43.1 cm respectively of the Akkeçi (Saanen x Kilis G_1) male kids on the 30th and 60th days. Body measurements of the Honamlı kids determined by this study were higher than the values reported by the literature.

The average of scrotal circumference, right testicular length, left testicular length, right testicular diameter, left testicular diameter and testis volume of Honamlı male kids on the 120th day were 19.8 cm, 7.1 cm, 7 cm, 3.2 cm, 3.2 cm and 115 cm³ respectively. Türk et al.¹² reported that the scrotal circumference, right testicular length, left testicular length, right testicular diameter, left testicular diameter and testis volume of 8 months old Kil (Hair) goats were 24.5 cm³, 10.3 cm³, 10.3 cm³, 4.7 cm³, 4.9 cm³ and 323.1 cm³ respectively. Keith et al.¹³ reported that the live weight, withers height, body length, chest circumference and scrotal circumference of 8-9 months old Boer male kids were 34.9 kg, 62.6 cm, 64.5 cm, 75.9 cm and 26.3 cm respectively. Even though there is an age difference compared to Honamlı goats, the withers height and body length parameters were close values at both studies. These results show that the growth and body measurements of Honamlı goats show similarity with the Boer breed. Almeida et al.¹⁴ reported that the live weights and scrotal circumferences of Boer goat bucks (6-8 months of age) were 28 kg and 17.8 cm respectively. These values were lower than the values obtained from the Honamlı goats on the 120th day, which were 19.8 cm. Bezerra et al.¹⁵ reported that the live weights and scrotum circumference for dry season and rainy season of Boer male kids at weaning age (90 day) were 11.3 kg - 16.2 kg and 11 cm - 15.2 cm, respectively. These values were lower than the values obtained in this study.

Cam et al.¹⁶ reported that the live weight, rump height, withers height, body length and chest circumference of female Kil goats were 50.2 kg, 73.5 cm, 73.1 cm, 74.2 cm and 88.2 cm respectively. The same parameters of male bucks were 64 kg, 81.8 cm, 81.8 cm, 81.7 cm and 98.8 cm respectively. Bingöl et al.⁵ reported that the withers height, chest girth and body length of Norduz does were 65.84 cm, 88.58 and 66.38 cm respectively. These results show that the live weight and morphological body measurements Honamlı does and bucks were higher than the Kil goats that were being bred in Turkey. Wang et al.¹⁷ reported that the live weight, withers height, body length and chest circumference of the Tianfu Goat breed that is being bred in China is defined as the new breed with the blood of Saanen, Toggenburg, Nubian and Boer goats were 54.1

kg, 67.9 cm, 74.2 cm and 81.5 cm, respectively. When the characteristics of this breed (that can be defined as a cultivation breed) were compared with the data obtained from the Honamlı mature female goats, it is determined that Honamlı goats have superior values.

The morphological body measurements of kids and mature goats, the testicular dimensions of male kids and live weights were higher with Honamlı goats compared to most of the other breeds which exist in Turkey but are similar to the Boer breed.

The present study is the first study that describes the morphologic body measurements and the breed of Honamlı kids and goats that are being bred extensively. Thus, characteristics such as the nose length, neck length, body length, tail length and the distance from the ground of this breed have been determined for the first time. Further studies that would compare these morphologic characteristics with other local and common breeds would help to define the real characteristics of Honamlı goats.

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