# Some Reproductive Characteristics of Honamlı Goats

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| ARTICLE INFO | ABSTRACT |
|---|---|
| | This study was carried out to investigate the some reproduction characteristics of Honamlı goat breed that are rearing commonly in Taurus Mountains in the Mediterranean region of Turkey. The materials of the study was formed with the five years records from 2011 to 2016 of 27 flocks (average 220 bucks and 4400 does) chosen from 36 flocks within the scope of National Public Small Ruminant Improvement Project, which was raised under extensive conditions in Beyşehir and Derebucak districts of Konya. At the end of the research; kidding rate, survival rate, twin birth rate, fecundity, litter size and the averages for birth weight, weaning weight and daily weight gains for the five consecutive years were found as 85%,87%,15%,0.94,1.10,3.64 kg,19.14 kg,0.180 kg, respectively. Effects of farm, birth type and gender on live weights and daily weight gains were found to be statistically significant (P<0.01). |

## 1. Introduction

The plenty number of the goat are constituting by the Hair goat (more than 90%) in Turkey, and these are reared near the forested land. On the other hand, the Angora goats are composing 2.3% of the number of goats in Turkey, for the rests are constituting Norduz, Honamlı, Malta, Kilis, Saanen, and some types of Hair goats. The breeds raised for milk production are Malta, Kilis and a tiny amount of Saanen goats and its crossbreeds which are becoming prevalent in west Anatolia. On the other hand, there were a tiny amount of some goats' breeds and different genotypes which adapted well into the different places in Turkey. This difference is providing an advantage in the search for productivity and improvement of our indigenous breeds.

The Honamlı goat is the breed that only raised in Taurus Mountains among Antalya, Burdur, and Konya, and takes attention for having products such as milk, meat, and fecundity. The most important sign of pure-blooded Honamlı goats is 2 cm of distance between their horns. Their noses' frame is roman type (hooked). Dağ & Zulkadir (2005) reported the mature live weights for bucks and does, litter size, birth weight for single and twins, lactation period, milk yield and hair yield as 80-95 kg, 50-70kg, 1.8, 3-4 kg, 2.5-3 kg, 270 days, 135-216 L and 500-600 g respectively.

Honamlı goats are going to extinct like the other kind of goats because of some policies of the government that applied in the past such as; goats are destroying and giving harm to the forests. However, goats are both eating the greens that are not consumed by the other animals and they have transmuted them into meat and milk, then they are fertilizing the soil with their feces, and they prune the branches of the old trees which are close to the land by eating them. Furthermore, scrub is the land cover of the Taurus Mountains and that land cover has to be pruned, otherwise, it disappears and dries in 30 years. There are only some researches about these kinds of goats that are a very important local source of income for Turkey until today, pure breeding and the possibility of being distributed are going to down day by day because of hybridization with the other goats. Because of that reason, the breed characteristics should be determined by the researches for Honamlı goats which are more productive for meat and milk according to the other kinds of goats in our country, these qualities should protect and use in scientific fields. From this point of view with this study, some reproductive traits of Honamlı goats are examined and it is thought that the findings obtained

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from this study will contribute to the identification of this breed and the subsequent studies.

## 2. Materials and Method

This study was carried out for 5 years between 2012 and 2016 within the scope of the National Public Small Ruminant Improvement Project in districts of Beyşehir (10 flocks) and Derebucak (17 flocks) of Konya province. The distribution of data collected from the 27 flocks remaining in the project for five years with an average of 4620 head goats (220 bucks and 4400 does) were given in Table 1.

Table 1
The Number of the goats and kids through the years

| Years | Breeding does | Bucks | Viviparous does | Weaned kids |
|-------|---------------|-------|-----------------|-------------|
| 2012 | 3200 | 200 | 2639 | 2124 |
| 2013 | 5000 | 230 | 4204 | 4325 |
| 2014 | 4650 | 225 | 3957 | 3736 |
| 2015 | 4400 | 220 | 3770 | 3875 |
| 2016 | 4750 | 225 | 4153 | 4091 |
| Average | 4400 | 220 | 3744 | 3360 |

The flocks of the study are grazing in open areas and forests from early morning until noon during the grazing season. Then the flocks are taken under any shadowy places at noon and rested in there because of decreasing grazing desire of goats due to the hot weather. In the afternoon, with the disappearance of the temperature stress factor, the grazing starts again in the mountainous forest areas and the flocks returns and is put into the shelters in the evening. In general, these regions vary in terms of pasture and forest quality and are available in high quality places where spruce, larch and oak trees are dense, as well as there are insufficient areas with the amount of pasture and quality of forest. Kids are nursed in the morning and in the evening and they are weaned at the age of 90 days. Young goats selected as breeder are put on to the forest land and non-breeder kids after weaning are sold until 120 days of age or they fatten up to the period of sacrifices festival to provide economic gain. For each year in this study; the records related to kid birth weight, gender, dam ear tag number, birth type, weaning weight (at 90 days) are kept and the averages such as kidding rate, survival rate, twin birth rate, fecundity, litter size, birth weight, weaning weight and daily weight gain were analyzed from these records by the years.

*Determination of goat reproductive traits*

Kidding rate (%) = Number of the viviparous does/Number of the breeding does

Twin birth rate (%) = Number of the does which gave birth to twins /Number of the viviparous does

Litter size = The number of the newborn kids/ Number of the viviparous does

Fecundity = The number of the newborn kids /Number of the breeding does

Survival rate (%) = The number of the living kids until the 90 days of age/the number of the live newborn kids

Weaning weight was determined at the day of 120.

In 2012, but the other years it was determined in the 90. day. After the 90th day some of the kids are sold, that's why they didn't use for determining their survival rate.

*Determination of the kids' growth*

The kids were weighed and enumerated in the first 24 hours after birth. The birth weight of the kids, type of birth, gender and their mother ear tag numbers were registered. There were little amount of oak trees and spruces leafy branches given to the kids as forage during the suckling period in some farms. The kids' live weights at the weaning were weighed with precision scales. Weaning weights at the 90 days of age were calculated from the daily live weight gains by using interpolation method.

*Statistical Analyses*

General Linear Model (GLM) was used to determine the effect of birth type, farm and gender on live weight and growth. The following mathematical model was used to analyze the factors affecting the birth weight of the kids.

$$Y_{ijklm}: \mu + a_i + b_j + c_k + d_l + e_{ijklm}$$

Symbols of the models;

$Y_{ijklm}$ = i. type of birth, k. gender, j. the effect of farm, m. kids' birth weight.

$\mu$ = Population average,

$a_i$ = the effect of the type of birth (i= single, twin;1,2),

$b_j$ = the effect of gender (j= male, female; 1,2),

$c_k$ = the effect of farm (k= 27 different flocks),

$d_l$ = the effect of the year (l=2012,2013,2014,2015,2016),

$e_{ijklm}$ = random error.

This model also was used for 90. days weight and daily live weight gain from birth to weaning by adding the regression of weaning weight according to birth weight;

$$Y_{ijklm} = \mu + a_i + b_j + c_k + d_l + b_1 (X_{ijklm} - \bar{x}) + e_{ijklm}$$

$\mu$, $a_i$, $b_j$, $c_k$, $d_l$ and $e_{ijklm}$ are the same with the equation above,

$b_1$: regression coefficient (partial regression of weaning weight according to birth weight)

$X_{ijklm}$: i. type of birth, k. gender, j. the effect of farm, m. kids' birth weight, $\bar{x}$: Average birth weight

Minitab package program was used for calculation (MINITAB, 2010).

## 3. Results and Discussion

Some fertility traits examined in the research flocks are given in Table 2. Kidding rate, survival rate, twin

birth rate, fecundity, litter size, the birth weight, weaning weight and average daily weight gain were found as 85%, 87%, 15%, 0.94, 1.10, 3.64 kg,19.14 kg, 0.180 kg, respectively. The differences between the years for the survival rates are found important (P<0.01).

Table 2

Some reproductive traits by the years

| Years | Kidding rate (%) | Survival rate (%) | Twin birth rate (%) | Fecundity | Litter size |
|---|---|---|---|---|---|
| 2012 | 82% | 74% | 15% | 0.89 | 1.08 |
| 2013 | 84% | 94% | 18% | 0.92 | 1.10 |
| 2014 | 85% | 90% | 10% | 0.89 | 1.05 |
| 2015 | 86% | 87% | 16% | 1.02 | 1.19 |
| 2016 | 87% | 90% | 18% | 0.96 | 1.10 |
| Mean | 85% | 87% | 15% | 0.94 | 1.10 |

1: $\chi^2$ P<0.01

Karadağ & Soysal (2018) have stated in their study on the determination of some reproductive, growth and morphological characteristics of Honamlı goats, birth, infertility, single and twin birth rates were determined as 87%, 13%, 71% and 28%, respectively. Litter size and fecundity were reported as 1.28 and 1.11. They have stated the survival rate as %80 from birth to weaning. It seemed that similar studies in the same

breed goats have been found to have different fertility rates. The main reasons for the difference between twin birth rate, litter size and fecundity in the same breed may be explained the duration of the research (5 years), number of the materials, management, nutrition, flushing and the differences of regional climatic conditions.

Differences in the values of similar studies in goat breeds reveal breed differences and the birth rate compared to similar studies; Şengonca et al. (2003)'s Hair goats (79%), Abbasoğlu (1998)'s Damascus goats (84.5%), Ceyhan & Karadağ (2009)'s Saanen goats (81.7%) higher than their values, Karadağ & Soysal (2018)' Honamlı Goats' (%87), Keskin (1995)'s Hatay goats (%94.3), Özcan (1977)'s Kilis goat (%100) was found to be lower than the values were obtained.

The birth weight and weaning (90th day) live weights of kids were obtained by interpolation method and given in Table 3. Birth weight, weaning weight, and daily weight gain was 3.64 kg, 19.5 kg, and 0.180 kg, respectively, as the average of five years.

The differences in terms of farm, birth type and gender in mean live weights and average daily weight gains were found to be statistically significant (P <0.01).

Table 3

Birth and weaning weights and daily weight gains by the years

| Years | Live born kids number | Average birth weight (kg) | Weaned kids number | Average weaning weight (kg) | Average daily weight gain (g) |
|---|---|---|---|---|---|
| 2012 | 2855 | $3.52 \pm 0.015^C$ | 2124 | $17.24 \pm 0.100^D$ | $0.152 \pm 0.0011^E$ |
| 2013 | 4612 | $3.61 \pm 0.011^B$ | 4325 | $19.06 \pm 0.070^C$ | $0.212 \pm 0.0008^A$ |
| 2014 | 4157 | $3.73 \pm 0.012^A$ | 3736 | $18.90 \pm 0.075^C$ | $0.169 \pm 0.0008^D$ |
| 2015 | 4472 | $3.63 \pm 0.012^B$ | 3875 | $20.05 \pm 0.074^B$ | $0.182 \pm 0.0008^C$ |
| 2016 | 4561 | $3.71 \pm 0.011^A$ | 4091 | $20.43 \pm 0.072^A$ | $0.186 \pm 0.0008^B$ |
| | 20657 | $3.64 \pm 0.005$ | 3630 | $19.14 \pm 0.035$ | $0.180 \pm 0.0004$ |

A, B: P<0.01

As can be seen from Table 4, a total of 20.657 goats used in this study, single and twin born kids' birth weights are given as 3.32 kg and 3.70 kg, weaning weights were 18.45 and 19.49 kg and average daily live weight gains throughout suckling period were found

0.179 and 0.185 kg, respectively. In male and female kids' birth weights were 3.53 kg and 3.76 kg, weaning weights were 17.97 kg and 20.65 kg, and average daily live weight gains throughout suckling period were found to be 0.169 kg, and 0.197 kg respectively.

Table 4

Weaning weights through birth, sex, and birth type

| Traits | N | Birth weight (kg) | N | Weaning weight (kg) | N | ADLWG* (kg) (birth-90th day) |
|---|---|---|---|---|---|---|
| Birth type | | ** | | ** | | ** |
| Twin | 3167 | $3.330 \pm 0.012^B$ | 2726 | $18.45 \pm 0.090^B$ | 2726 | $0.179 \pm 0.0009^B$ |
| Single | 17490 | $3.706 \pm 0.0059^A$ | 15425 | $19.49 \pm 0.038^A$ | 15425 | $0.185 \pm 0.0004^A$ |
| Sex | | ** | | ** | | ** |
| Female | 10165 | $3.532 \pm 0.0074^B$ | 8919 | $17.97 \pm 0.043^B$ | 8919 | $0.169 \pm 0.0004^B$ |
| Male | 10492 | $3.762 \pm 0.0078^A$ | 9232 | $20.65 \pm 0.052^A$ | 9232 | $0.197 \pm 0.0005^A$ |
| Regression coefficient (regression of weaning weight according to birth weight) | | | | | $1.81 \pm 0.043^{**}$ | |

A,B, ** : P<0.01; *:Average daily live weight gain

Karadağ & Soysal (2018) 's daily live weight gains in the period of sucking was 0.180 kg in twins and 0.205 kg in singles; birth weights 3.65 and 3.86 kg for male and female kids respectively. If the weaning weights of the present study adjusted for the 120th day, they were found to be lower than the values reported in the twins as 24.80 kg and 28.82 kg in the singles. The

reason for this is that Karadağ & Soysal's flock is a conservation herd and the breeding capability is made up of better animals, furthermore, the number of materials for our study is high and it can be explained as variable management conditions of 27 different flocks in a different pasture and forest quality under variable climatic conditions for five years.

Differences in the values of similar studies performed in goat breeds reveal breed differences and the present study when compared with similar studies Şimşek et al. (2007) for the birth weight of Saanen X Hair goat $F_1$ and $G_1$ Hybrids 2.18 and 2.82 kg, respectively; and for the weaning weights 14.07, and 15.62 kg; 0.131 for daily live weights gains during the suckling period, and again; Şimşek & Bayraktar (2006) reported the average birth weights lower than this study as 2.77 kg and 2.95 kg for Hair Goat and Saanen X Hair Goat (F1) hybrids respectively.

Tuncel (1977) revealed the birth weights and weaning weights of Saanen X Kilis hybrids dairy goats (Akkeçi) as 3.1 kg and 15.8 kg, respectively and Cengiz et al. (1982) reported Saanen X Kilis hybrids' weights at birth and 3 months of age as 2.96 kg, 15.14 kg and they revealed the daily growth rate from birth to weaning as 138.2 g. In a similar study, Özcan & Güney (1983) reported the average birth weights of Damascus goats in single-born females, single-born males, twins born females, twins born males 4.0 kg, 3.45 kg, 3.90 kg, 3.75 kg and weaning weights with the same row were found as 13.6 kg, 12.0 kg, 8.83 kg, 10.05 kg respectively. Although the values obtained for birth weight in Honamlı kids have been found to be lower than those of Damascus kids, weaning weights were found to be higher than the values reported above.

## 4. Result and Conclusion

In this study, some reproductive traits of Honamlı goats that is one of the local genetic resources were examined. Although the values of fertility are generally affected by factors such as; breed, age, management, nutrition and regional conditions, the results that obtained from findings of this study are important because of being limited studies on this breed.

When the data obtained from this study were evaluated; in the terms of productive performance and growth characteristics, the use of Honamlı goat breed, which have superior characteristics than other domestic goat breeds will contribute to the studies about meat and dairy goat breeding in our country. It can be said that genetic heritage should be protected due to its being.

## 5. Acknowledgments

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