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Body Weight and Body Measurement Traits of Hair, Alpine x Hair F1 and Saanen x Hair F1 Crossbred Does Raised at Rural Conditions in Konya Province

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ABSRACT

The aim of this study was to determine the pre-mating period live weights and body measurements of 216 head of Hair, 232 head of Alpine x Hair F1 (AHF1) and 167 head of Saanen x Hair F1 crossbred does (SHF1) were raised at three different herds in the Selçuklu, Konya provinces under semi intensive conditions. Average live weights of Hair, AHF1 and SHF1 crossbred does were found 50.8 kg, 50.1 kg and 48.9 kg respectively. The effects of genotype, parity, herd and year on the live weight ($P<0.01$) were significant. In this study, the average withers height, rump height, body length, hearth girth, leg girth, left wrist girth, chest width, rump width and chest depth of Hair, AHF1 and SHF1 crossbred does were measured as 71.7 cm, 71.3 cm and 70.8 cm; as 72.4 cm, 71.9 cm and 71.5 cm; as 69.1 cm, 68.8 cm and 68.3 cm; as 83.0 cm, 82.2 cm and 81.9 cm; as 56.4 cm, 56.0 cm and 55.5 cm; as 11.4 cm, 11.3 cm and 11.2 cm; as 16.6 cm, 16.6 cm and 16.4 cm; as 17.0 cm, 17.0 cm and 16.8 cm; as 32.5 cm, 32.4 cm and 32.2 cm respectively. The effect of genotype (except for hearth girth and chest depth), parity, herd and year on the all examined traits ($P<0.01$; $P<0.05$) were significant. As a result, İt can be said that the live weight traits of Hair goats were higher than SHF1 crossbred does under the rural conditions, while live weight of SHF1 crossbred does may be succeed through adaptation and selective breeding programmers.

1. Abbreviations

AHF_1 : Alpine x Hair F_1
SHF_1 : Saanen x Hair F_1

2. Introduction

Hair goat is the most common indigenous goat breed of Turkey. Total number of goat in Turkey is 10.4 million heads and approximately composed of 90% of the Hair goat and their crossbred (TUİK 2015).

Hair goats, generally a combined productive breed for production of meat and milk, have adapted on conditions of climate and environment of Turkey. These animals are mostly located in the mountainous regions of Western Turkey, the Taurus and Anti-Taurus mountains of Southern Turkey, (Mediterranean and Aegean Regions) although, it widely distributed throughout Turkey (Akman et al. 1997; GDARP 2011; Gürsoy, 2005). Saanen and Alpine goat has been exported to many countries of the world so that it is the most widely distributed of the improved breeds (Mason 1981). In the selection study to be done by live weight, at least, determination of the relationship between live weight and other body measurements have been increased the success of the selection. It is desired that determination as easy and inexpensive way of the taken in the yield and affecting factors to them in animal husbandry (Boztepe and Dağ 1995). It can be used as for meat production indirect selection method (Karabacak et al. 2010). However, according to the development ability of the breed, by prepared enlargement programs is provided the opportunity to use the early selection breeding (Zülkadir et al. 2008).

The material of the study was formed a total data of 216 head of Hair, 232 head of AHF_1 and 167 head of SHF_1 crossbred does that were between 1 and 4 parity

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mating period at 3 different private herds in Selçuklu district of Konya province in the Central Anatolia Region of Turkey.

3. Materials and Methods

Present study was conducted on the three private goat farms located in Konya province in the Central Anatolia Region of Turkey. It is located in 38º06´ N latitude and 32º14´ E east longitudes, between 1393-1527 m above sea levels, with continental terrestrial climate, and a approximately of 491 mm average precipitation.

The live weights of Hair, AHF_1 and SHF_1 crossbred does on the mating period were recorded. Nine morphological variables were measured in these animals as follows: withers height, rump height, body length, hearth girth, leg girth, left wrist girth, chest widths, rump widths and chest depth. The length and width data were measured by stick, the girth was measured by tape.

The birth of kids began at the end of February and lasted until March. The kids weaned approximately at 3 months of age. The herds were pastured on range lands and forests from early in the morning till noon. The herds were then allowed to rest under the shade during the noon, thereafter they were allowed to graze after the blaze of the sun subsided. The does were fed on 400 g d^{-1} concentrate feed (16% crude protein and 2500 kcal ME energy kg^{-1} dry matter) in addition to the natural pasture that was often included from rocky, complex of grassland steep sloping, open wooded pastures, shrub land, stubbles and broadleaves forest areas. All data were analyzed by using a General Linear Model procedure. The differences among the factor levels were determined by using the Duncan multiple comparison test (Düzgüneş 1993). Statistical analysis was performed with the JMP 11 computer based program (SAS 2013).

4. Results and Discussions

Descriptive statistics and least squares means for live weight traits of genotype, parity, herd and year are presented in Table 1. The effect of genotype, parity, herds and year on mating period of live weight were significant ($P<0.01$) in this study. The average of live weight of Hair, AHF_1 and SHF_1 crossbred does were 50.8 kg, 50.1 kg and 48.9 kg respectively. These parameters varied from 37.4 kg to 65.9 kg for Hair does, 34.9 kg to 67.4 kg for AHF_1 crossbred does and 35.3 kg to 68.4 kg for SHF_1 crossbred does.

Least squares means for body measurements traits of genotype, parity, herd and year are in Table 2. The effect of genotype, parity, herds and year on mating period of body measurements (except genotype on hearth girth and chest depth) were significant level ($P<0.01$) and ($P<0.05$) in this study. In the current study, the mean of withers height, rump height, body length, hearth girth, leg girth, left wrist girth, chest width, rump width chest depth of Hair, AHF_1 and SHF_1 crossbred does were measured as 71.7 cm, 71.3 cm and 70.8 cm; as 72.4 cm, 71.9 cm and 71.5 cm; as 69.1 cm, 68.8 cm and 68.3 cm; as 83.0 cm, 82.2 cm and 81.9 cm; as 56.4 cm, 56.0 cm and 55.5 cm; as 11.4 cm, 11.3 cm and11.2 cm; as 16.6 cm, 16.6 cm and 16.4 cm; as 17.0 cm, 17.0 cm and 16.8 cm; as 32.5 cm, 32.4 cm and 32.2 cm respectively. In this study, by the mean of data Hair does have the biggest both live weight and body measures while In every live weight and body measures SHF_1 crossbred does have the lowest mean. Besides Hair and AHF_1 crossbred does were of equal sizes.

Table 1

Descriptive statistics and least squares means for live weights at mating of Hair, AHF_1 and SHF_1 crossbred does (kg)

Traits	n	Live Weight Mean ± S	Min.	Max.
Genotype				
Hair	216	50,8 ± 0,35 [a]	37,4	65,9
AHF_1	232	50,1 ± 0,34 [ab]	34,9	67,4
SHF_1	167	48,9 ± 0,40 [b]	35,3	68,4
Parity				
1	148	45,0 ± 0,42 [d]	34,9	62,5
2	163	49,3 ± 0,40 [c]	37,9	67,4
3	198	51,5 ± 0,36 [b]	38,4	68,4
4	106	53,9 ± 0,55 [a]	40,7	65,9
Herd				
1	199	49,0 ± 0,37 [b]	36,3	65,9
2	193	48,2 ± 0,37 [b]	34,9	64,0
3	223	52,6 ± 0,35 [a]	39,7	68,4
Year				
2014	290	51,4 ± 0,34[a]	37,4	68,4
2015	325	48,4 ± 0,29[b]	34,9	67,2
Overall	615	49,9 ± 0,22	34,9	68,4

[ab]: Means in the same column with different superscripts differ significantly, ($P<0.01$), S: Standard errors.

Table 2

Least squares mean for some body measurements Hair, AHF_1 and SHF1 crossbred does (cm)

		Withers Height	Rump Height	Body Length	Hearth Girth	Leg Girth	Left Wrist Girth	Chest Widths	Rump Widths	Chest Depth
Traits	n	Mean ± S	Mean ± S	Mean ± S	Mean ± S	Mean ± S	Mean ± S	Mean ± S	Mean ± S	Mean ± S
Genotype		*	*	*	NS	*	*	*	*	NS
Hair	216	71,7±0,21[a]	72,4±0,21[a]	69,1±0,21[a]	83,0±0,35	56,4±0,23[a]	11,4±0,05[a]	16,6±0,05[a]	17,0±0,06[a]	32,5±0,16
AHF_1	232	71,3±0,21[ab]	71,9±0,21[ab]	68,8±0,21[ab]	82,2±0,35	56,0±0,22[ab]	11,3±0,05[ab]	16,6±0,05[a]	17,0±0,06[ab]	32,4±0,15
SHF_1	167	70,8±0,24[b]	71,5±0,24[b]	68,3±0,24[b]	81,9±0,41	55,5± 0,26[b]	11,2±0,05[b]	16,4±0,06[b]	16,8±0,07[b]	32,2±0,18
Parity		**	**	**	**	**	**	**	**	**
1	148	69,0±0,25[c]	69,7±0,25[c]	66,5±0,25[c]	78,6±0,43[d]	53,9±0,27[c]	10,9±0,06[b]	16,0±0,06[c]	16,3±0,07[d]	30,7±0,19[d]
2	163	71,2±0,24[b]	71,9±0,25[b]	68,6±0,24[b]	81,9±0,41[c]	55,6±0,26[b]	11,3±0,06[a]	16,4±0,06[b]	16,8±0,07[c]	31,9±0,18[c]
3	198	72,2±0,22[a]	72,9±0,22[a]	69,7±0,22[a]	83,4±0,37[b]	56,4±0,24[b]	11,5±0,05[a]	16,7±0,05[a]	17,1±0,06[b]	32,7±0,16[b]
4	106	72,6±0,33[a]	73,3±0,33[a]	70,1±0,33[a]	85,5±0,56[a]	57,9±0,36[a]	11,5±0,08[a]	16,9±0,08[a]	17,5±0,09[a]	34,1±0,25[a]
Herd		**	**	**	**	**	**	**	**	**
1	199	70,6±0,22[b]	71,2±0,22[b]	68,0±0,22[b]	81,3±0,37[b]	55,4±0,24[b]	11,3±0,05[b]	16,4±0,06[b]	16,8±0,06[b]	32,3±0,17[b]
2	193	70,6±0,22[b]	71,3±0,23[b]	68,0±0,22[b]	81,4±0,38[b]	54,9±0,24[b]	11,1±0,05[c]	16,3±0,06[b]	16,7±0,06[b]	31,7±0,17[b]
3	223	72,6±0,21[a]	73,3±0,21[a]	70,1±0,21[a]	84,5±0,35[a]	57,5±0,23[a]	11,6±0,05[a]	16,8±0,05[a]	17,3±0,06[a]	33,1±0,16[a]
Year		**	**	**	**	**	*	**	**	**
2014	290	70,1±0,20	70,7±0,21	67,8±0,20	83,6±0,34	57,5±0,22	11,2±0,05	16,9±0,05	17,3±0,06	33,3±0,15
2015	325	72,4±0,17	73,2±0,18	69,7±0,17	81,1±0,29	54,4±0,19	11,4±0,04	16,1±0,04	16,6±0,05	31,5±0,13
Overall	615	71,3±0,13	71,9±0,13	68,7±0,13	82,4±0,22	55,9±0,14	11,3±0,03	16,5±0,03	16,9±0,04	32,4±0,10

[abc]: Means in the same column with different superscripts differ significantly, *P<0.05 **(P< 0.01), NS: Not significant: Standard errors.

In the current study, the highest descriptive statistics for live weights were attain SHF_1 crossbred does and third parity while the lowest occurred AHF_1 crossbred does and first parity. When this live weight of Hair, AHF_1 and SHF_1 crossbred does on mating was compared to results of previous studies. (Darcan 2000) reported that Damascus, Hair, Damascus crossbred, Çukurova, Toros, Improved German Fawn x Hair G_1 crossbred does were 46.8 kg, 44.1 kg, 39.5 kg, 29.2 kg, 29.6 kg, 33.0 kg, respectively, (Browning and Leite-Browning 2009) reported that Spain does were 44.5 kg, (Çam et al. 2010) reported that Hair does were 47.4 kg, (Alızadehasl and Ünal 2011) reported that Kilis and Norduz does were 36.3 kg and 32.0 kg, respectively. (Nemeth and Kukovics 2016) that reported Hungarian Milking White (HMW), Hungarian Milking Multicolor (HMM) 46.3 kg and 46.6 kg, respectively. Live weight of the genotypes determined by this study were higher than the values reported by the literature. The live weight obtained in this study genotypes were lower than (Nemeth and Kukovics 2016) reported that Saanen does were 56.1 kg, (Elmaz et al. 2012) reported that Honamlı does 63.5 kg and slightly similar to those of (Browning and Leite-Browning 2009) reported that Boer and Kiko does 52.4 kg and 51.9 kg, (Nemeth and Kukovics 2016) reported that Hungarian Milking Brown (HMB) and Alpine does 48.9 kg and 52.6 kg, Elmaz et al (2016) reported that Hair does 51.2 kg.

When this body measurements were compared with those of native and improved genotypes in Turkey and in other countries. (Darcan 2000) reported that the withers height and body length of Damascus, Hair, Damascus crossbred, Çukurova, Toros, Improved German Fawn x Hair G_1 crossbred does were 68.4 cm, 65.6 cm, 64.6 cm, 64.2 cm, 64.2 cm and 64.8 cm; 68.6 cm, 70.1 cm, 67.6 cm, 55.8 cm, 67.8 cm and 67.4 cm, respectively. (Çam et al. 2010) reported that withers height, rump height, body length, chest width and heart girth of Hair does were 72.5 cm, 73.1 cm, 73.0 cm 18.1 cm and 86.2 cm, respectively. (Alızadehasl and Ünal 2011) reported that withers height, rump height, body length, heart girth, chest depth and wrist girth of Kilis, Norduz and Honamlı does were 64.6 cm, 63.1 cm and 77.4 cm; 64.7 cm, 63.5 cm and 77.7 cm; 64.5 cm, 62.8 cm and 75.9 cm; 78.2 cm, 82.7 cm and 89.9 cm; 28.9 cm, 29.3 and 32.3 cm; 9.5 cm, 9.9 cm and 9.7 cm, respectively, (Elmaz et al. 2012) reported that withers height, rump height, body length, and heart girth of Honamlı does were 83.0 cm, 83.5 cm, 88.3 cm and 91.0 cm, respectively. Elmaz et al (2016) reported that withers height, chest girth, rump height, body length of Hair does were 74.8 cm, 86.8 cm, 75.8 cm and 80.6 cm respectively. These results show that the body measurements of Hair, AHF1 and SHF1 crossbred does were generally within the range of the native and crossbreed does that were be-

ing genotype in Turkey. In other study (Nemeth and Kukovics, 2016) reported that withers height, body length chest depth, chest width and rump width of HMW, HMB, HMW, Alpine and Saanen were 64.6 cm, 65.2 cm, 64.7 cm, 67.6 cm and 66.2 cm; 69.2 cm, 70.5 cm, 69.3 cm, 73.7 cm and 73.2 cm; 30.5 cm, 31.21 cm, 30.7 cm, 32.2 cm and 31.80 cm; 18.1 cm, 18.7 cm, 18.0 cm, 19.62 cm and 20.62 cm; 16.2 cm, 16.3 cm, 15.9 cm, 17.0 cm and 17.69 cm, respectively. These values of the wither height and chest depth were slightly lower than Hair, AHF_1 and SHF_1 crossbred does while these values of the chest width were higher than our findings. Also these values of the body length and rump with were the range of the genotypes. (Maksimovic et al. 2015) reported that Alpine goats 67.9 cm for wither height, 71.9 cm for body length, 81.8 cm for hearth girth, 32.9 for chest depth, 21.5 cm for chest width and 17.6 cm for pelvic width. This value of the wither height lower than our findings for while the values of body length and chest width higher than our findings. Furthermore the hearth girth and pelvic width were slightly similar as well.

In this study, the highest live weight and body measurements was obtained in the fourth parity, whereas the lowest occurred in the first parity. Also live weight and body measurements were increased with parity. These findings are in agreement with the observation of (Cam 2010; Tölü et al. 2009) live weight of third herd was better ($P<0.01$) than the first and second herds. Also live weight of 2014 year was better ($P<0.01$) than 2015 year. These values of live weight body measurements showed differences among genotype, parity, herd and year may have resulted from the variations in maternal effect, digestive capacity of does, management, pasture and climatic conditions. Live weight of the goat herds has a major impact on the sustainability and profitability of a commercial meat goat enterprise in Turkey.

As a conclusion of the present study SHF_1 crossbred does were not as live weight as Hair does. Live weight of AHF_1 crossbred does were better than SHF_1 crossbred does under the semi intensive conditions of this farms. But live weight of SHF_1 crossbred does may be win through adaptation and selective breeding programmers.

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