

Comparative Macroanatomical Study of the Testis in Hasak Crossbreed Type, Akkaraman and Konya Merinos Hoggets

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SUMMARY

This study was carried out to investigate the specific anatomical features of the testis of the Hasak (31.25% Hampshire Down (HD) + 31.25% German Black Headed Mutton (GBM) + 37.50% Akkaraman), Akkaraman and Konya Merinos hoggets. Fifteen animals that they were about same ages (five from each species) were used. In this study, testis length and width, epididymis (caput, corpus and cauda) length and width was measured. It was determined that there were significant differences between these species with regard to testis weight, testis and epididymis length, width, size and appearance. Besides, another aim of this study was to determine the effect on structure of testis of the hybridization. Therefore, it was compared macroanatomical structure of testes of Akkaraman, Konya Merinos hoggets and Hasak type hoggets which is the hybrid of Hampshire Down, German Black Headed Mutton and Akkaraman. And it was observed that Hasak had the biggest and the heaviest testis. The smallest and the lightest testis belonged to Konya Merinos. And it was determined that effect of hybridization on testis size and structure was significant and so Hasak crossbreed type had the biggest testis.

Key Words

Akkaraman, Epididymis, Hasak, Hogget, Konya Merinos, Testis

Hasak, Akkaraman ve Konya Merinos Toklularında Testisin Karşılaştırmalı Makroanatomik İncelenmesi

ÖZET

Bu çalışma Hasak (%31.25 Hampshire Down (HD) + %31.25 Alman Siyah Baş (GBM) + %37.50 Akkaraman), Akkaraman ve Konya Merinosu toklularının bazı testis özelliklerini incelemek amacıyla yapıldı. Yaklaşık aynı yaşta olan 15 adet toklu (her türden 5'er adet) kullanıldı. Çalışmada testis uzunluğu ve genişliği, epididymis (caput, corpus, cauda) uzunluğu ve genişliği ölçüldü. Ve bu türler arasında testis ağırlığı, testis ve epididymis uzunluğu, genişliği, boyutu ve görünüşü bakımından önemli farklar tespit edildi. Bunun yanında bu çalışmanın bir diğer amacı melezlemenin testis yapısı üzerine etkisini saptamaktır. Dolayısıyla Hampshire Down, Alman Siyah Baş ve Akkaraman melezli olan Hasak tipi toklularla Akkaraman ve Konya Merinos ırkı tokluların testis yapıları karşılaştırıldı. Ve Hasak tipi tokluların daha büyük ve daha ağır testis yapısına sahip olduğu gözlemlendi. En küçük ve en hafif testis ise Konya merinosuna aitti. Hibridizasyonun testis boyutu ve yapısı üzerine önemli bir etkisinin olduğu ve böylece Hasak melez tipinin en büyük boyutlu testise sahip olduğu tespit edildi.

Anahtar Kelimeler

Akkaraman, Epididymis, Hasak, Konya Merinos, Testis, Toklu

INTRODUCTION

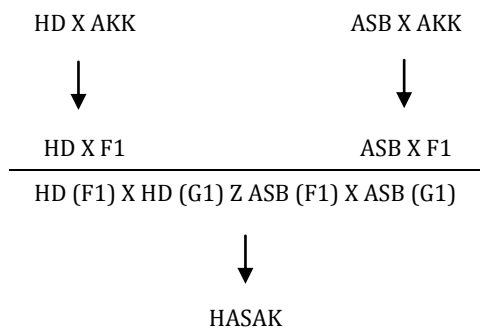
It was studied effects of hybridization on testis morphology in this study. And it was aimed to be compared of testis structure of HASAK which is a hybrid type with Akkaraman and Konya Merinos.

The number of species that could be used as patrilineage or fattening (nutritional) material in breeding butchery lamb in our country is almost non-existing. In particular, the HASAK genotype, which was obtained by crossbreeding native races with low fattening and carcass quality with broiler types with high meat yield and quality in Bahri Dagdas International Agricultural Research Institute, is one of the candidate types for the meat type in question in order to increase out of season lamb production.

During the crossbreeding selection studies between 1989

and 2000, the F1s, ASB G1s and HD G1s were obtained from the crossbreeding of the Akkaraman race (AKK) with the German Black Head (GBH) and Hampshire Down (HD) broiler types. According to the results obtained from projects conducted with these crossbreeds, no significant difference was observed between the crossbreeding of Akkaraman with GBH and HD. Moreover, the cross breeds obtained from these two lines resembles each other morphologically. On the other hand, HD also exists in the genotype of GBH. Therefore, a single type was formed by implementing a balanced insemination on the cross breeds that come from these two patrilineages. According to this, the new type consists of 31.25% HD, 31.25% GBH and 37.50% Akkaraman genotypes. This new type was named HASAK by taking H from HD, AS from ASB (initials of the Turkish phrase Alman Siyah Bas for German Black Head) and AK from Akkaraman.

The percentages of genotypes that participated in the formation of the HASAK type



HD X AKK, F1	%50 HD + %50 Akkaraman
HD X HD X AKK	%75 HD + %25 Akkaraman
ASB X AKK, F1	%50 ASB + %50 Akkaraman
ASB X ASB X AKK, G1	%75 ASB + %25 Akkaraman

The ram and sheep genotypes used in the insemination programme

Ram genotype	X	Sheep genotype
1-HDF1	X	HDF1, HDG1, ASBF1, ASBG1
2-HDG1	X	HDF1, HDG1, ASBF1, ASBG1
3-ASBF1	X	HDF1, HDG1, ASBF1, ASBG1
4-ASBG1	X	HDF1, HDG1, ASBF1, ASBG1
150/400, %37.50 Akkaraman		
HASAK	125/400,	%31.25 HD
	125/400,	%31.25 ASB

The testes are two glandular organs, which secrete the semen; they are suspended in the scrotum by the spermaticcords. They produce sperm and the male hormone, testosterone (Bascom 2005). Differences among domestic sheep breeds for reproductive characteristics have been described by Glimp (1968), Sidwell and Miller (1971), Laster et al. (1972), Southam et al. (1971), Bradley et al. (1972) and Sidwell et al. (1964). Likewise the effects of crossbreeding on production efficiency in sheep are reasonably well documented (Sidwell and Miller 1971; Bradley et al. 1972; Sidwell et al. 1964). The effects of crossbreeding on testis morphology have not been thoroughly investigated. The objectives of the present study were to examine the effects of crossbreeding on testis morphology. Therefore, morphological structures of the testes of Hasak crossbreed sheep type with Konya Merinos and Akkaraman sheep were compared.

MATERIALS and METHODS

A total of fifteen animals including five Hasak, five Akkaraman, five Konya Merinos were used without sexual distinction in this study. The animals were one years old. The materials of testes were bought in the Feast of the Sacrifice from Bahri Dagdas International Agricultural Research Institute. The testes were fixed in 10% formalin and they were investigated morphologically. The observation was carried out by the naked eye, and photographs were taken as required. Testis measurements

were taken. Length and width of testis and epididymis were measured. Their structural features and sizes were compared. It was figured out standard deviation as statistical analysis. And it was tried to determine the effect on structure of testis of the hybridization.

“Nomina Anatomica Veterinaria” (NAV) was used as guide book in the spelling of anatomic terms in this investigation.

RESULTS

It was studied effects of hybridization on testis morphology and following findings were obtained.

Weight, length and width rates of testes and epididymes of Hasak, Akkaraman and Konya Merinos hoggets have been displayed in Table 1.

As is seen at Table 1, Hasak body weight was 75-90 kg, Akkaraman body weight was 50-60 kg, Konya Merinos body weight was 65-75 kg.

Weight of testis was about 110.3 gr in Hasak, 109.2 gr in Akkaraman and 95.8 gr in Merinos. Length of testis was about 10.6 cm in Hasak, 10.4 cm in Akkaraman and 9.3 cm in Konya Merinos. Thickness of testis was about 5.2 cm in Hasak, 4.4 cm in Akkaraman and 3.5 cm in Konya Merinos. So, the heaviest, longest and thickest testis belonged to Hasak crossbreed type. Width of testis was about 6.1 cm in Hasak, 6.2 cm in Akkaraman and 4.5 cm in Konya Merinos. Hasak and Akkaraman testes were about the same width. So, the widest testes belonged Hasak and Akkaraman. It was indicated front, middle and cauda width of testis at Table 1. According to table 1; front width of testis was about 4.3 cm in Hasak, 4.2 cm in Akkaraman and 3.5 cm in Konya Merinos. Middle width of testis was about 6.2 cm in Hasak, 6.1 cm in Akkaraman and 4.9 cm in Merinos. Cauda width of testis was about 4.1 cm in Hasak, 3.4 cm. Akkaraman and 3.2 cm in Merinos.

Length of epididymis was about 14.6 cm in Hasak, 16.8 cm in Akkaraman and 10.2 cm in Konya Merinos. So, the longest epididymis belonged to Akkaraman. Width of epididymis was about 1.2 cm in Hasak, 1.1 cm in Akkaraman and Konya Merinos. So, width of epididymis was about same in all species. It was indicated length and width of caput, corpus and cauda epididymis at Table 1. According to this; width of caput epididymis was about 2.5 cm in Hasak, 2.1 cm in Akkaraman and Konya Merinos. Width of corpus epididymis was about 1.1 cm in Hasak and Akkaraman, 1.2 cm in Merinos. Width of cauda epididymis was about 2.2 cm in Hasak, 2.5 cm in Akkaraman and 2.1 cm in Konya Merinos. Length of caput epididymis was about 2.1 cm in Hasak and Konya Merinos, 4.3 cm in Akkaraman. Length of corpus epididymis was about 10.2 cm in Hasak, 9.2 cm in Akkaraman and 5.1 cm in Konya Merinos. Length of cauda epididymis was about 2.5 cm in Hasak, 3.3 cm in Akkaraman and 3.5 cm in Konya Merinos.

As is seen at Table 1 and Fig 1; it was determined that morphological structure of testes of Hasak, Merinos and Akkaraman was different from each other. Hasak testis had a bulgy corpus. Caput epididymis of Hasak was smaller and shorter than the others. Akkaraman testis was depressed dorsoventrally and it had a big, long and wide caput epididymis. Merinos testis was depressed dorsoventrally and lateromedially and it had the smallest and lightest testis. Caput epididymis had extended to middle of the testis in Akkaraman and Konya Merinos. But In Hasak, caput epididymis was shorter than Akkaraman and Merinos. And it hadn't extended to the middle of the testis.

Table 1. Testis measurements and standard deviation of Hasak, Akkaraman and Merinos**Tablo 1.** Hasak, Akkaraman ve Merinos'un testis ölçüleri ile standart sapmaları

Features	Hasak	Akkaraman	Merinos
Body weight (kg)	75-90	50-60	65-75
Weight of testis (gr)	110.3±1.53	109.2±2.11	95.8±4.35
Length of testis (cm)	10.6±2.45	10.4±2.13	9.3±2.47
Width of testis (cm)	6.1±0.24	6.2±0.27	4.5±0.12
Front width of testis (cm)	4.3±0.15	4.2±0.81	3.5±0.71
Middle width of testis (cm)	6.2±0.23	6.1±0.37	4.9±1.16
Cauda width of testis (cm)	4.1±0.44	3.4±0.27	3.2±0.18
Thickness of testis (cm)	5.2±0.12	4.4±0.21	3.5±0.17
Length of epididymis (cm)	14.6±0.51	16.8±2.4	10.2±0.25
Width of epididymis (cm)	1.2±0.43	1.1±0.41	1.1±0.52
Length of caput epididymis (cm)	2.1±0.14	4.3±0.17	2.1±0.13
Width of caput epididymis (cm)	2.5±0.17	2.1±0.19	2.1±0.15
Length of corpus epididymis (cm)	10.2±1.24	9.2±0.28	5.1±0.34
Width of corpus epididymis (cm)	1.1±0.38	1.1±0.23	1.2±0.29
Length of cauda epididymis (cm)	2.5±0.41	3.3±0.27	3.5±1.21
Width of cauda epididymis (cm)	2.2±0.64	2.5±0.93	2.1±0.10

At table 1, it was indicated testis measurements and standard deviation of Hasak, Akkaraman and Merinos.

As a result, body weight of hoggets affects testis weight, length and width significantly. And effect of hybridization on testis size and structure is significant. So, Hasak crossbreed type has the biggest dimensional testis. Hasak has the biggest and the heaviest testis, because its body weight more than others.

**Figure 1.** A. Hasak B. Akkaraman C. Merinos**Şekil 1.** A. Hasak B. Akkaraman C. Merinos

DISCUSSION

It was reported that length of testis was 6.26 cm in Norduz male lambs. This value was higher than the value of Karakas (5.33, 5.21 cm) and Konya Merinos (5.70 cm). (Aygün and Karaca 1995; Öztürk et al. 1995; Aygün and Karaca 2000). On the other hand, this value was lower than the values of Morkaraman (7.38 cm), Kıvırcık (9.45 cm), Dağlıç (9.45 cm), İvesi (11.95 cm) and Karayaka (14.4 cm) genotypes. (Odabaşoğlu et al. 1992; Öztürk et al. 1996; Taşkın and Kaymakçı 1996; Gündoğan 1999). According Koyuncu et al (2005), testis length was

2.99±0.099 cm in Kıvırcık lambs. Testis diameter in Acıpayam and Kıvırcık lambs was 3.85 and 4.40 cm. (Kaymakçı et al. 1988; Taşkın and Kaymakçı 1996). In this study, it was observed that length of testis was average 10.6 cm in Hasak crossbreed type, 10.4 cm in Akkaraman and 9.3 cm in Konya Merinos. So Hasak had longer testis than Akkaraman and Merinos. Besides it was observed that testis width 6.1 cm in Hasak, 6.2 cm in Akkaraman and 4.5 cm in Konya Merinos. Length of epididymis was about 14.6 cm in Hasak, 16.8 cm in Akkaraman and 10.2 cm in Konya Merinos. Width of epididymis was about 1.2 cm in Hasak, 1.1 cm in Akkaraman and Konya Merinos.

It was determined that body weight was impressive on testis features ($p<0.01$). All of the correlation coefficients between body weight and testis measurements in Kıvırcık lambs was found important ($p<0.01$). Similarly, correlations between body weight and testis measurements in Morkaraman, Konya Merinos and Akkaraman yearling sheep was found important (Odabaşoğlu et al. 1992; Öztürk et al. 1995; Öztürk et al. 1996) and correlations between body weight and testis diameter in Dormer and South Afrika Merinos and Border Leicester sheep was found important (Kritzinger et al. 1984; Barwick et al. 1985).

In a study that was made in Ile-de-France sheep, it was determined that fathers importantly affects the testis diameters of their children (Colas et al. 1990). In this study, it was obtained same findings. It was observed that body weight affects testis diameters. So Hasak, which had the biggest body weight, had the biggest, heaviest, longest and widest testis.

Besides, all of testis features is related to age. So these results alter in lambs, hoggets and rams.

As a result of body weight affects testis diameters. Body weight and testis diameter increase together. Effects of hybridization on testis size and structure were significant and so Hasak crossbreed type had the biggest and heaviest testis.

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