



COMPARATIVE MORPHOLOGICAL AND ANATOMICAL STUDY TO DEVELOPMENT OF TESTES AND EPIDIDYMIS IN MALES OF ARRABI AND AWASSI SHEEP

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Abstract

The study was carried out in postgraduates labs of Agriculture college/ Al-Muthanna University from 20 / 9 / 2016 to 20 / 4 / 2017 to investigated the comparative morphological and anatomical structure associated with development of testis and epididymis in males of two breeds of local sheep (Arrabi and Awassi) , in study were used 48 samples (testes) which brought out from Al-Muthanna slaughters, the slaughtered animals (testes samples) were submitted to hygienic examination and were detected the species and animals age which studied (2 , 4 , 6 and 8 months) .The results were showed that studied criteria which included (body weight and relative testis weight to body weight , anatomical measurements of testes and all parts of epididymis) of Arrabi and Awassi rams at study periods in same breed were significantly increased at (P <0.05) monthly with age progressive, the Awassi breed revealed significant superiority at (P <0.05) on Arrabi in all studied criteria, while the differences between right and left testes and all parts of epididymis were non significant. In conclusion, the Awassi breed was the best breed in breeding, reproduction and fertility criteria.

Key words : Testis, epididymis, Awassi, Arrabi, development.

Introduction

The male reproductive system is formed by two milky white testes, each one consists of anterior and posterior portion separated anteriorly and fused posteriorly, the seminiferous tubules in testis started to developed and take an identical property and it was easy to describe the complete structure in stage of collecting duct system formation (Ibrahim, 2006). Nickel *et al.* (1999) claimed the testis of Donkey is elliptical in shape has caudal extremity which directed to the anal opening and situated in the perineal region , the tunica vascularis occupied the tunica dartus and the caudal part (tail) of epididymis is large in volume and formed funal process and the orientation of the testis is located horizontally. AL-Samarrae and Sawad (1996) showed that testis of male camel (*Camelus dromedarius*) composed from two surface which concave from side to side and it has two extremities, cranial extremity appeared flattened and convex in length while caudal was rounded, average

length of testis 9 cm and diameter 4.5 cm, epididymis was attached to cranial and caudal ends and formed epididymal sinus but tail of epididymis project by 3 - 4 cm from caudal testis end. Wrobel *et al.* (1995) showed that the structure of Ovine sheep testis postnatal still un active until the puberty to beginning of activation and production the mature sperms and sexual hormones and there are four stages of bovine testicular development are infantile, proliferation, prepubertal and pubertal phase. Nickel *et al.* (1999) showed that the greater part of Donkey testis surface covered by serous membranous visceral layer in the cord part and separated from testis to allow the blood vessels and nerves in the spermatic cord region to be entered to testis. The testis of mature local rabbit (*Oryctolagus cuniculus*) at postnatal 150 days of age seem as elongated oval pinkish - white in color form and has a round cranial and pointed caudal extremities with average weight of right and left testis (2.32 ± 0.049 and 2.34 ± 0.045 gm) respectively (Al-Saadi, 2013). Makay *et al.* (2004) described the development of the gonads and gonadal descent in grey short tailed Opossum

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(*Didelphis virginiana*) and that at birth the gonad were elongated in shape then onwards the testis became more rounded, then at 15 days of age the testes started their caudal migration together with mesonephros and then the testes reach the inguinal canals, in 24 days, the testes had reached the neck of scrotum and gubernaculum cord had almost disappeared then the testes were descent in the scrotal sac. Praksh *et al.* (2008) found when studied the anatomical structure and development of testes of Bonnet Monkey that the epididymis in adult male were longer in size than in younger testes and were scrotal position during sitting position, the development of epididymis and testes were gradually with studied month.

Materials and Methods

Collection of study samples

This study was carried out in postgraduates labs of Agriculture College, Al-Muthanna University from 20 / 9 / 2016 to 20 / 4 / 2017 to investigate comparative morphological features and anatomical structure development in testis and epididymis in males of two breeds of local sheep (Arrabi and Awassi), in study were used 48 samples of male genital system (testes) which brought out from Al-Muthanna slaughters, samples were examined to ensure the slaughtered animals safety and not presence of any diseases and were detected the species and animals age which studied (second, fourth, sixth and eighth months) and the study animals were weighted before slaughtered.

The morphological and anatomical technique

In the slaughter, the study animals were hygienic examined and detected the breeds of sheep (Arrabi or Awassi) depending on general properties of each breed, then detected the age of Ram depending on the teeth equation and the owner data for (2, 4, 6 and 8 months), then Ram were weighted by the electronic balance (macroscopic large electronic sensitive balance capacity 50 kg, sartorius, Tokyo, Japan) for detected the whole body weight for Ram, then the study animals were slaughtered and samples (testes) were brought out by cutting the spermatic cord and blood and nerve supply from body directly and getting the testis and washed it to cleaned from any suspensions, then we recorded the physical examination of testis and epididymis which including (shape, color, location and blood and nerve supply) and recording normal form and alterations occurred with age progressive, then we calculated the anatomical measurements of testis monthly which including testicular weight with epididymis (TWE), testicular weight without epididymis (TW), testicular

length (TL), testicular width (TW), testicular thickness (TT) and testicular volume (TV) for right and left testis and then we separated the epididymis by sharp plade and recorded the physical description and calculated the epididymal weight (EW), epididymal length (EL), epididymal width (EW), epididymal thickness (ET) and epididymal volume (EV) for right and left epididymis, testis length was taken from cranial pole to caudal pole, while the width was taken at extremities and testis middle, volume of testis was calculated from ellipsoid equation by (water displacement methods). The measurements were carried out by electronic caliper vernier.

Statistical analysis

All data were analyzed using the method factorized experiments analysis by Complete Random Design (CRD) and statistical program SPSS version 17 (SPSS Inc., Chicago, IL, USA, A computerized program Statistical Package for the Social Science) for windows. One way analysis of variance was used to detected the effect of age and breed on dimensions and diameters of testis and epididymis anatomically, the results were expressed as mean \pm SE. The results were regarded as significant when $P \leq 0.05$. To compare between means of values by used Duncan Multiple test (Duncan, 1955).

Results and Discussion

Body weight

The body weight of Arrabi and Awassi sheep in study period 2, 4, 6 and 8 month were described in table 1, which showed that body weight in same breed significantly increased ($P < 0.05$) with age progressive and development, this results agreed with (Akpan *et al.*, 2005), who showed that body weight increased with age development in true mountain deer, and (Nosratollah *et al.*, 2012), who revealed that age progression and sex which effected on body weight increasing in Arrabi sheep in khoustan and Awassi sheep revealed significant superiority at ($P < 0.05$) on Arrabi sheep in body weight in same age period, this results agreed with Omran *et al.* (2012), who showed that age and breed which effecting on body weight increasing in young male rabbit and Al-Janabi *et al.* (2000), who revealed that Awassi sheep revealed significant superiority on Hamdani sheep in body weight and testis development, the reason of body weight increasing may belong to body development as indicator to anabolism and body growth as revealed (Al-Tarabany *et al.*, 2015) in Egyptian sheep, or to hormonal effect which represented by the growth hormone and other body hormones which associated with body mass development as (Baber *et al.*, 2006) in Indian Arrabi sheep.

Table 1 : Effect of breed and age in body weight and relative right and left testes with epididymis weight to body weight (mean \pm SE).

Breed	Age	Body weight (kg)	Relative weight of right testis to body weight (%)	Relative weight of left testis to body weight (%)
Awassi sheep	2	7.70 \pm 0.15 dA	180.73 \pm 0.02 dA	185.89 \pm 0.03 dA
	4	15.80 \pm 0.17 cA	198.77 \pm 0.01 cA	205.80 \pm 0.02 cA
	6	22.50 \pm 0.16 bA	220.25 \pm 0.03 bA	224.65 \pm 0.03 bA
	8	32.60 \pm 0.18 aA*	232.55 \pm 0.02 aA*	238.75 \pm 0.02 aA*
Mean		19.65 \pm 0.13	208.58 \pm 0.02	213.77 \pm 0.02
Arrabi sheep	2	6.50 \pm 0.13 dB	175.30 \pm 0.02 dB	179.93 \pm 0.03 dB
	4	14.30 \pm 0.15 cB	190.90 \pm 0.01 cB	197.80 \pm 0.02 cB
	6	20.60 \pm 0.14 bB	205.88 \pm 0.03 bB	210.55 \pm 0.04 bB
	8	30.80 \pm 0.16 aB	220.40 \pm 0.02 aB	228.60 \pm 0.03 aB
Mean		18.25 \pm 0.12	197.52 \pm 0.02	203.72 \pm 0.02

The (a, b, c) different small letters refer to significant differences at ($p \leq 0.05$) among different age means in same breed.

The (A, B) different capital letters refer to significant differences at ($p \leq 0.05$) among different breeds means in same age.

*refers to presence of significant superiority of interference between breed and age in same column at ($p \leq 0.05$). Values represent mean \pm S.E.

Table 2 : Effect of breed and age in Right testis dimensions (Mean \pm SE).

Breed	Age	Weight of testis with epididymis (gm)	Weight of testis without epididymis (gm)	Testis length (mm)	Testis width (mm)	Testis thickness (mm)	Testis volume (cm ³)
Awassi sheep	2	12.70 \pm 0.45dA	8.80 \pm 0.18dA	45.60 \pm 0.12dA	27.20 \pm 0.13dA	25.40 \pm 0.14dA	10.00 \pm 0.08dA
	4	27.40 \pm 0.42cA	18.60 \pm 0.15cA	53.40 \pm 0.15cA	33.20 \pm 0.12cA	31.50 \pm 0.12cA	21.00 \pm 0.07cA
	6	49.50 \pm 0.35bA	33.30 \pm 0.22bA	64.40 \pm 0.17bA	39.40 \pm 0.14bA	37.40 \pm 0.13bA	31.00 \pm 0.11bA
	8	75.80 \pm 0.44aA*	49.60 \pm 0.20aA*	79.60 \pm 0.18aA*	50.70 \pm 0.15aA*	48.60 \pm 0.16aA*	42.00 \pm 0.12aA*
Mean		41.60 \pm 0.42	27.58 \pm 0.19	60.50 \pm 0.16	37.38 \pm 0.13	35.45 \pm 0.13	26.00 \pm 0.09
Arrabi sheep	2	11.73 \pm 0.42dB	8.30 \pm 0.16dB	42.30 \pm 0.11dB	25.20 \pm 0.12dB	23.40 \pm 0.10dB	8.00 \pm 0.06dB
	4	25.60 \pm 0.41cB	17.40 \pm 0.13cB	50.40 \pm 0.12cB	30.60 \pm 0.15cB	28.60 \pm 0.11cB	19.00 \pm 0.07cB
	6	47.70 \pm 0.40bB	31.80 \pm 0.14bB	62.20 \pm 0.14bB	37.50 \pm 0.14bB	35.50 \pm 0.12bB	29.00 \pm 0.09bB
	8	73.60 \pm 0.40aB	47.60 \pm 0.17aB	76.60 \pm 0.16aB	47.70 \pm 0.16aB	46.30 \pm 0.13aB	40.00 \pm 0.08aB
Mean		39.55 \pm 0.40	25.54 \pm 0.17	57.40 \pm 0.14	35.30 \pm 0.12	33.42 \pm 0.12	24.00 \pm 0.07

The (a, b, c) different small letters refer to significant differences at ($p \leq 0.05$) among different age means in same breed .

The (A , B) different capital letters refer to significant differences at ($p \leq 0.05$) among different breeds means in same age .

*refers to presence of significant superiority of interference between breed and age in same column at ($p \leq 0.05$). Values represent mean \pm S.E.

The relative testis weight to body weight in study period 2, 4, 6 and 8 month were described in table 1 which showed that relative testis weight to body weight in same breed which significantly increased ($P < 0.05$) with age progressive and Awassi sheep revealed significant superiority at ($P < 0.05$) on Arrabi sheep in relative testis weight to body weight in same age period , this results agreed with Al-Hello *et al.* (2007), who

showed that relative testis weight to body weight was agreed with body weight and age progressive and larger than in Awassi rams, the reason of relative testis weight body weight increasing may belong to activity of testosterone hormone increasing, which agreed with body and testis development as indicator to growth in body as revealed (Ayse *et al.*, 2007) in Bull testis or to activity of spermatogenesis lineage increasing which agreed with

Table 3 : Effect of breed and age in Left testis dimensions (Mean \pm SE).

Breed	Age	Testis weight with epididymis (gm)	Testis weight without epididymis (gm)	Testis length (mm)	Testis width (mm)	Testis thickness (mm)	Testis volume (cm ³)
Awassi sheep	2	13.90 \pm 0.09d A	9.50 \pm 0.08d A	46.80 \pm 0.09d A	28.70 \pm 0.09d A	26.60 \pm 0.07d A	12.00 \pm 0.08d A
	4	28.80 \pm 0.10c A	19.60 \pm 0.07c A	54.80 \pm 0.08c A	34.70 \pm 0.08c A	32.50 \pm 0.09c A	22.00 \pm 0.07c A
	6	50.45 \pm 0.08b A	33.30 \pm 0.06b A	65.70 \pm 0.08b A	40.80 \pm 0.06b A	38.60 \pm 0.08b A	32.00 \pm 0.11b A
	8	77.80 \pm 0.12a A*	50.40 \pm 0.07a A*	80.70 \pm 0.07a A*	51.70 \pm 0.07a A*	49.80 \pm 0.07a A*	43.00 \pm 0.12a A*
Mean		42.70 \pm 0.09	28.60 \pm 0.07	61.75 \pm 0.08	38.72 \pm 0.07	37.65 \pm 0.13	26.00 \pm 0.09
Arrabi sheep	2	12.97 \pm 0.08d B	8.85 \pm 0.07d B	43.60 \pm 0.11d B	26.50 \pm 0.07d B	24.50 \pm 0.08d B	10.00 \pm 0.06d B
	4	26.80 \pm 0.09c B	18.20 \pm 0.06c B	51.70 \pm 0.12c B	31.80 \pm 0.09c B	29.40 \pm 0.05c B	20.00 \pm 0.07c B
	6	48.60 \pm 0.07b B	32.80 \pm 0.05b B	62.20 \pm 0.14b B	38.60 \pm 0.08b B	35.50 \pm 0.07b B	30.00 \pm 0.09b B
	8	74.90 \pm 0.10a B	48.60 \pm 0.06a B	77.80 \pm 0.16a B	48.70 \pm 0.07a B	47.60 \pm 0.08a B	41.00 \pm 0.08a B
Mean		40.60 \pm 0.08	26.50 \pm 0.06	58.60 \pm 0.07	36.60 \pm 0.08	34.55 \pm 0.07	25.00 \pm 0.07

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The (A, B) different capital letters refer to significant differences at ($p \leq 0.05$) among different breeds means in same age .

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Table 4: Effect of breed and age in some of right epididymis properties (Mean \pm SE).

Breed	Age	Epididymis weight (gm)	Epididymis Length (mm)	Epididymis volume (cm ³)
Awassi sheep	2	7.70 \pm 0.15 d A	180.73 \pm 0.02 d A	185.89 \pm 0.03 d A
	4	15.80 \pm 0.17 c A	198.77 \pm 0.01 c A	205.80 \pm 0.02 c A
	6	22.50 \pm 0.16 b A	220.25 \pm 0.03 b A	224.65 \pm 0.03 b A
	8	32.60 \pm 0.18 a A*	232.55 \pm 0.02 a A*	238.75 \pm 0.02 a A*
Mean		19.65 \pm 0.13	208.58 \pm 0.02	213.77 \pm 0.02
Arrabi sheep	2	6.50 \pm 0.13 d B	175.30 \pm 0.02 d B	179.93 \pm 0.03 d B
	4	14.30 \pm 0.15 c B	190.90 \pm 0.01 c B	197.80 \pm 0.02 c B
	6	20.60 \pm 0.14 b B	205.88 \pm 0.03 b B	210.55 \pm 0.04 b B
	8	30.80 \pm 0.16 a B	220.40 \pm 0.02 a B	228.60 \pm 0.03 a B
Mean		18.25 \pm 0.12	197.52 \pm 0.02	203.72 \pm 0.02

The (a, b, c) different small letters refer to significant differences at ($p \leq 0.05$) among different age means in same breed .

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body and testis development as indicator to beginning of puberty in body as revealed (Brown *et al.*, 2013) in Guinea pig testis development.

Anatomical description and dimensions of testis

The results showed that testis of Awassi and Arrabi rams at second month age have elongated heart or bean-shaped with transparent yellowish-pink color placed in a vertical direction in a little cranial to inguinal region. The two testes of Awassi rams were symmetrical in shape and has two surface (Medial and Lateral surface), two

border (Posterior and Anterior borders) and two extremities (Distal and Proximal extremities). The lateral surface is convex and medial surface was flattened. The anterior border is convex and free while posterior border closely attached to epididymis. Distal extremity is slightly thicker than proximal one covered by epididymis tail. Testis was suspended from proximal extremity to spermatic cord. This results agreed with Barnes *et al.* (1998), who studied effect of some factors on testis development in bulls and rams and with Bavi *et al.* (2011),

Table 5 : Effect of breed and age in some of Left epididymis properties (Mean \pm SE).

Breed	Age	Epididymis weight (gm)	Epididymis length (mm)	Epididymis volume (cm ³)
Awassi sheep	2	7.70 \pm 0.15 dA	180.73 \pm 0.02 dA	185.89 \pm 0.03 dA
	4	15.80 \pm 0.17 cA	198.77 \pm 0.01 cA	205.80 \pm 0.02 cA
	6	22.50 \pm 0.16 bA	220.25 \pm 0.03 bA	224.65 \pm 0.03 bA
	8	32.60 \pm 0.18 aA*	232.55 \pm 0.02 aA*	238.75 \pm 0.02 aA*
Mean		19.65 \pm 0.13	208.58 \pm 0.02	213.77 \pm 0.02
Arrabi sheep	2	6.50 \pm 0.13 dB	175.30 \pm 0.02 dB	179.93 \pm 0.03 dB
	4	14.30 \pm 0.15 cB	190.90 \pm 0.01 cB	197.80 \pm 0.02 cB
	6	20.60 \pm 0.14 bB	205.88 \pm 0.03 bB	210.55 \pm 0.04 bB
	8	30.80 \pm 0.16 aB	220.40 \pm 0.02 aB	228.60 \pm 0.03 aB
Mean		18.25 \pm 0.12	197.52 \pm 0.02	203.72 \pm 0.02

The (a, b, c) different small letters refer to significant differences at ($p \leq 0.05$) among different age means in same breed.

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Table 6 : Effect of breed and age in Right and Left Epididymis head dimensions (Mean \pm SE).

Breed	Age	Testis type	Epididymis head weight (gm)	Epididymis head length (mm)	Epididymis head width (mm)	Epididymis head thick (mm)	Epididymis head volume (cm ³)	
Awassi sheep	2	Right	1.50 \pm 0.03 dA	13.90 \pm 0.04 dA	9.30 \pm 0.03 dA	8.20 \pm 0.05 dA	1.40 \pm 0.03 dA	
		Left	1.90 \pm 0.04 dA	14.50 \pm 0.03 dA	9.90 \pm 0.04 dA	8.80 \pm 0.03 dA	1.80 \pm 0.05 dA	
	4	Right	2.60 \pm 0.04 cA	15.60 \pm 0.03 cA	16.30 \pm 0.05 cA	15.60 \pm 0.03 cA	2.30 \pm 0.07 cA	
		Left	2.90 \pm 0.03cA	15.90 \pm 0.03cA	16.90 \pm 0.03cA	15.80 \pm 0.03cA	2.90 \pm 0.09cA	
	6	Right	5.40 \pm 0.03 bA	18.30 \pm 0.04 bA	23.50 \pm 0.05 bA	23.40 \pm 0.02 bA	3.20 \pm 0.11 bA	
		Left	6.50 \pm 0.04bA	18.80 \pm 0.03bA	24.80 \pm 0.03bA	23.80 \pm 0.03bA	3.80 \pm 0.12bA	
	8	Right	8.20 \pm 0.04 aA*	23.20 \pm 0.02 aA*	35.40 \pm 0.05 aA*	34.50 \pm 0.04 aA*	4.80 \pm 0.10 aA*	
		Left	8.80 \pm 0.03aA*	23.80 \pm 0.03aA*	36.80 \pm 0.03aA*	35.80 \pm 0.03aA*	5.70 \pm 0.12aA*	
	Mean	Right	4.40 \pm 0.03	17.70 \pm 0.03	21.70 \pm 0.07	20.50 \pm 0.13	2.90 \pm 0.09	
		Left	5.10 \pm 0.03	18.40 \pm 0.03	22.30 \pm 0.03	21.20 \pm 0.13	3.30 \pm 0.08	
	Arrabi sheep	2	Right	1.30 \pm 0.02 dB	13.20 \pm 0.03 dB	8.20 \pm 0.04 dB	6.30 \pm 0.02 dB	0.80 \pm 0.11 dB
			Left	1.50 \pm 0.03 dB	14.30 \pm 0.04 dB	9.80 \pm 0.02 dB	8.90 \pm 0.03 dB	1.70 \pm 0.13 dB
4		Right	2.30 \pm 0.02 cB	14.50 \pm 0.04 cB	14.80 \pm 0.02 cB	13.20 \pm 0.05 cB	1.70 \pm 0.09 cB	
		Left	2.80 \pm 0.04cB	15.60 \pm 0.02cB	16.70 \pm 0.04cB	15.70 \pm 0.02cB	2.50 \pm 0.11cB	
6		Right	5.20 \pm 0.03 bB	17.20 \pm 0.03 bB	21.30 \pm 0.04 bB	20.10 \pm 0.02 bB	2.80 \pm 0.08 bB	
		Left	6.50 \pm 0.04bB	18.60 \pm 0.05bB	24.30 \pm 0.02bB	23.20 \pm 0.02bB	3.30 \pm 0.10bB	
8		Right	7.40 \pm 0.02 aB	21.50 \pm 0.04 aB	33.70 \pm 0.02 aB	32.60 \pm 0.04 aB	4.20 \pm 0.11 aB	
		Left	8.20 \pm 0.02aB	23.30 \pm 0.02aB	36.20 \pm 0.02aB	35.30 \pm 0.02aB	5.00 \pm 0.13aB	
Mean		Right	4.50 \pm 0.02	16.60 \pm 0.07	19.40 \pm 0.08	18.30 \pm 0.07	2.20 \pm 0.07	
		Left	5.10 \pm 0.03	17.30 \pm 0.06	20.20 \pm 0.07	19.50 \pm 0.06	3.30 \pm 0.06	

The (a, b, c) different small letters refer to significant differences at ($p \leq 0.05$) among different age means in same breed.

The (A, B) different capital letters refer to significant differences at ($p \leq 0.05$) among different breeds means in same age.

* refers to presence of significant superiority of interference between breed and age in same column at ($p \leq 0.05$). Values represent mean \pm S.E.

Table 7 : Effect of breed and age in Right and Left Epididymis Body dimensions (Mean \pm SE).

Breed	Age	Testis type	Epididymis body weight (gm)	Epididymis body length (mm)	Epididymis body width (mm)	Epididymis body thick (mm)	Epididymis body volume (cm ³)	
Awassi sheep	2	Right	0.80 \pm 0.03 d A	28.40 \pm 0.04 d A	5.40 \pm 0.03 d A	4.30 \pm 0.04 d A	1.00 \pm 0.02 d A	
		Left	1.10 \pm 0.04 d A	28.80 \pm 0.03 d A	5.90 \pm 0.04 d A	4.90 \pm 0.03 d A	1.40 \pm 0.03 d A	
	4	Right	1.60 \pm 0.04 c A	32.40 \pm 0.05 c A	10.20 \pm 0.03 c A	9.20 \pm 0.04 c A	1.80 \pm 0.02 c A	
		Left	1.80 \pm 0.05 c A	32.90 \pm 0.03 c A	10.90 \pm 0.03 c A	9.90 \pm 0.03 c A	2.00 \pm 0.03 c A	
	6	Right	2.30 \pm 0.03 b A	38.20 \pm 0.04 b A	10.80 \pm 0.04 b A	10.20 \pm 0.02 b A	2.80 \pm 0.03 b A	
		Left	2.80 \pm 0.03 d A	38.80 \pm 0.03 b A	11.10 \pm 0.03 b A	10.80 \pm 0.03 b A	3.20 \pm 0.03 b A	
	8	Right	5.30 \pm 0.04 a A*	46.40 \pm 0.05 a A*	27.50 \pm 0.03 a A*	26.70 \pm 0.03 a A*	3.20 \pm 0.02 a A*	
		Left	5.80 \pm 0.03 a A*	46.80 \pm 0.03 a A*	27.80 \pm 0.03 a A*	26.80 \pm 0.03 a A*	3.80 \pm 0.03 a A*	
	Mean	Right	2.50 \pm 0.03	36.45 \pm 0.04	13.50 \pm 0.03	12.60 \pm 0.03	2.20 \pm 0.03	
		Left	2.90 \pm 0.03	37.50 \pm 0.03	14.50 \pm 0.03	12.50 \pm 0.03	2.80 \pm 0.03	
	Arrabi sheep	2	Right	0.60 \pm 0.03 d B	27.20 \pm 0.05 d B	4.20 \pm 0.04 d B	3.30 \pm 0.03 d B	0.50 \pm 0.02 d B
			Left	1.00 \pm 0.03 d B	28.20 \pm 0.03 d B	4.80 \pm 0.03 d B	3.80 \pm 0.03 d B	1.00 \pm 0.03 d B
4		Right	1.40 \pm 0.04 c B	31.20 \pm 0.03 c B	9.30 \pm 0.03 c B	8.30 \pm 0.05 c B	1.30 \pm 0.02 c B	
		Left	1.60 \pm 0.03 c B	31.90 \pm 0.03 c B	9.90 \pm 0.03 c B	8.80 \pm 0.03 c B	1.80 \pm 0.03 c B	
6		Right	2.10 \pm 0.03 b B	37.40 \pm 0.04 b B	10.60 \pm 0.03 b B	9.20 \pm 0.04 b B	2.20 \pm 0.05 b B	
		Left	2.70 \pm 0.03 b B	38.20 \pm 0.03 b B	9.20 \pm 0.03 b B	9.90 \pm 0.03 b B	3.20 \pm 0.03 b B	
8		Right	4.70 \pm 0.04 a B	44.30 \pm 0.03 a B	25.70 \pm 0.05 a B	24.60 \pm 0.03 a B	3.90 \pm 0.08 a B	
		Left	5.10 \pm 0.04 a B	45.70 \pm 0.04 a B	26.70 \pm 0.04 a B	25.70 \pm 0.04 a B	4.20 \pm 0.04 a B	
Mean		Right	2.30 \pm 0.03	36.60 \pm 0.03	14.60 \pm 0.03	12.55 \pm 0.03	1.70 \pm 0.02	
		Left	2.50 \pm 0.03	36.90 \pm 0.03	15.50 \pm 0.03	13.50 \pm 0.03	2.10 \pm 0.03	

The (a, b, c) different small letters refer to significant differences at ($p \leq 0.05$) among different age means in same breed .

The (A, B) different capital letters refer to significant differences at ($p \leq 0.05$) among different breeds means in same age .

*refers to presence of significant superiority of interference between breed and age in same column at ($p \leq 0.05$). Values represent mean \pm S.E.

who studied the testis development in different breeds of Indian wild and grass bulls. The testis development in fourth , sixth and eighth month of age were recorded significant increasing at ($P < 0.05$) as a range twice , three times and five times respectively as in second month of age , the anatomical dimensions of Awassi and Arrabi sheep testes were described in table 2 for right testis and table 3 for left testis.

From anatomical results and measurements in tables 2 and 3, which showed the interference between breeds and age and the presence of significant difference between studied values and showed that Awassi Rams recorded significant superiority at ($p \leq 0.05$) on Arrabi Rams for same age period and older periods showed significant superiority at ($p \leq 0.05$) on younger periods in same breed and the differences between right and left were non significant, these results agreed with Mclaughlin *et al.* (1990) in farm animals and Marty *et al.* (2003) in

bovine and buffalos bulls and Marian *et al.* (2008) in male rabbits, results disagreed with Makay *et al.* (2004) in grey short tailed opossum (*Didelphis virginiana*) and with Magda *et al.* (2013) in Rhinoceros (*Dicerohinus sumatrensis harrissoni*), the reason of these differences may belong to the differences between studied breeds in properties or to testosterone activity increasing which agreed with body and testis development as indicator to growth in body as revealed Ayse *et al.* (2007) in Bull testis or to activity of spermatogenesis lineage increasing which agreed with body and testis development as indicator to beginning of puberty in body as revealed (Brown *et al.*, 2013) in Guinea pig testis development.

Anatomical description and dimensions of Epididymis

The results showed that epididymis of Awassi and Arrabi rams at second month age have a convoluted fine



Fig. 1 : The right and left testes of Arrabi sheep at two months showed the anatomical structure in which : A) the testis with epididymis, the left testis length 43.6 mm and right testis width 25.2 mm, B) the testis without epididymis, C) the epididymis which composed from head and body and tail.

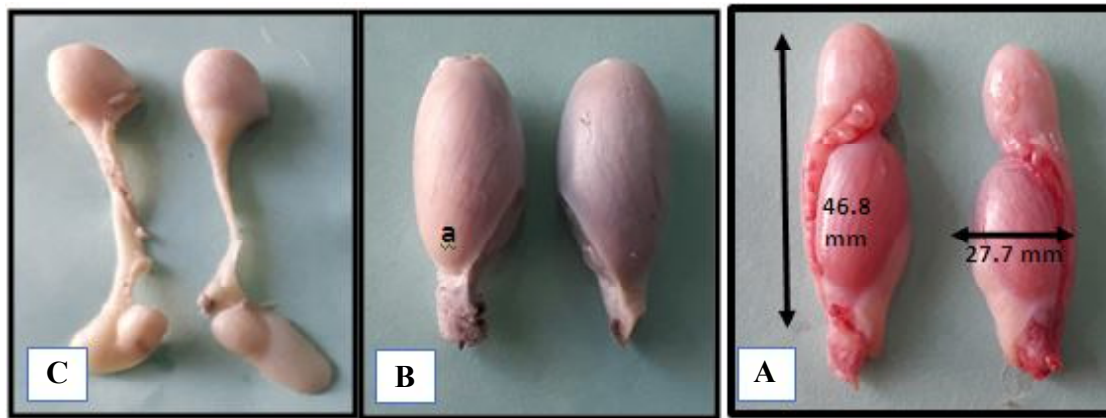


Fig. 2 : The right and left testes of Awassi sheep at two months showed the anatomical structure in which : A) the testis with epididymis, the left testis length 46.8 mm and right testis width 27.7 mm, B) the testis without epididymis, C) the epididymis which composed from head and body and tail, a) the proximal caudal end of testis which tightly attached with head of epididymis.

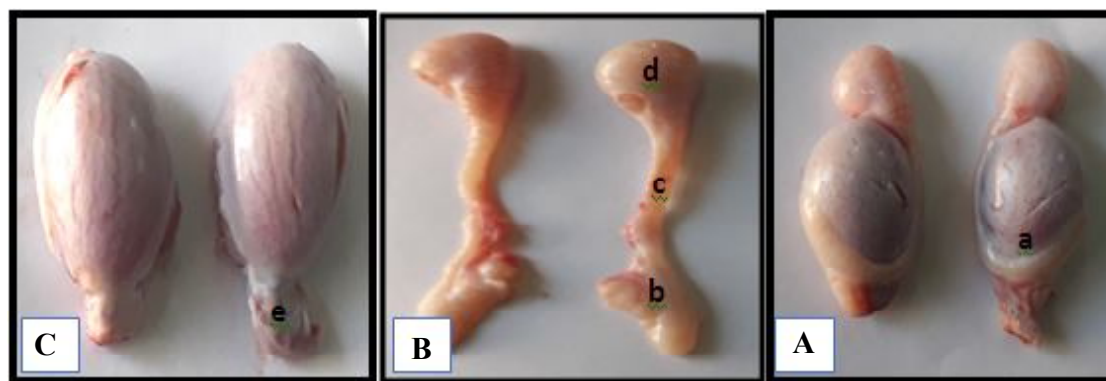


Fig. 3 : The right and left testes at four months showed the anatomical structure in which : A) the testis with epididymis in Awassi Ram showed : a) the proximal caudal end of testis which tightly attached with head of epididymis, B) the right and left epididymis of Awassi Ram revealed : b) head, c) body and d) tail of epididymis, C) Testis of Arrabi Ram without epididymis revealed : e) spermatic cord.

long tube with lobulated form attached with testis cranially by rete testis while the caudal part with vas deference, which divided to head, body and tail, epididymis developed were showed with age months progressive, while anatomical measurements of Awassi and Arrabi rams epididymis in second, fourth, sixth and eighth months of

right and left testis were explained in tables 4 and 5.

While anatomical measurements of epididymis head, body and tail of Awassi and Arrabi rams in second, fourth, sixth eighth months of right and left testis were explained in tables 6, 7 and 8.

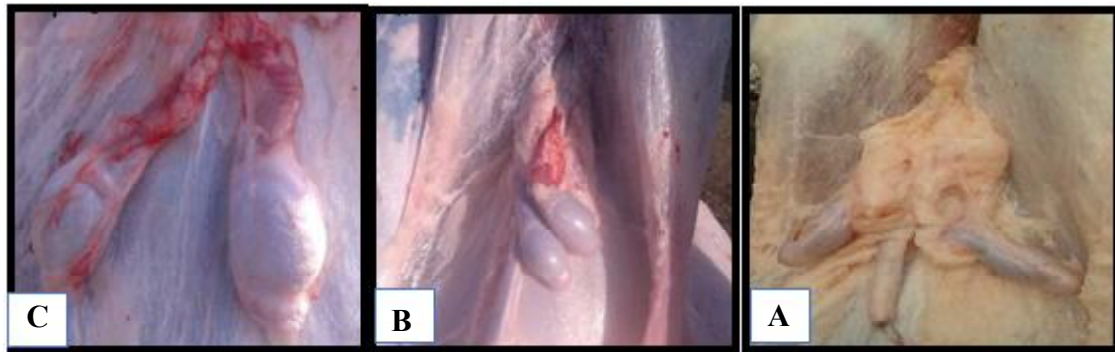


Fig. 4 : The anatomical structure and location of right and left testes showed : A) the right and left testis with epididymis in Arrabi Ram at 4 months, B) the right and left testis with epididymis in Awassi Ram at 4 months, C) the right and left testis with epididymis in Awassi Ram at 6 months.

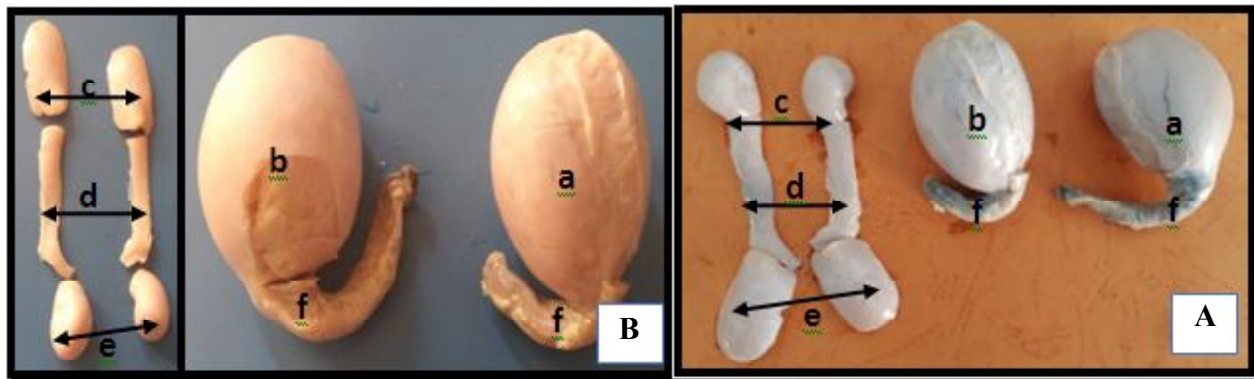


Fig. 5 : The right and left testes at 6 months showed the anatomical structure in which : A) the testis with epididymis in Awassi Ram showed : a) the proximal caudal end of testis which tightly attached with head of epididymis, B) the right and left epididymis of Awassi Ram revealed : b) head, c) body and d) tail of epididymis, C) Testis of Arrabi Ram without epididymis revealed : e) spermatic cord.

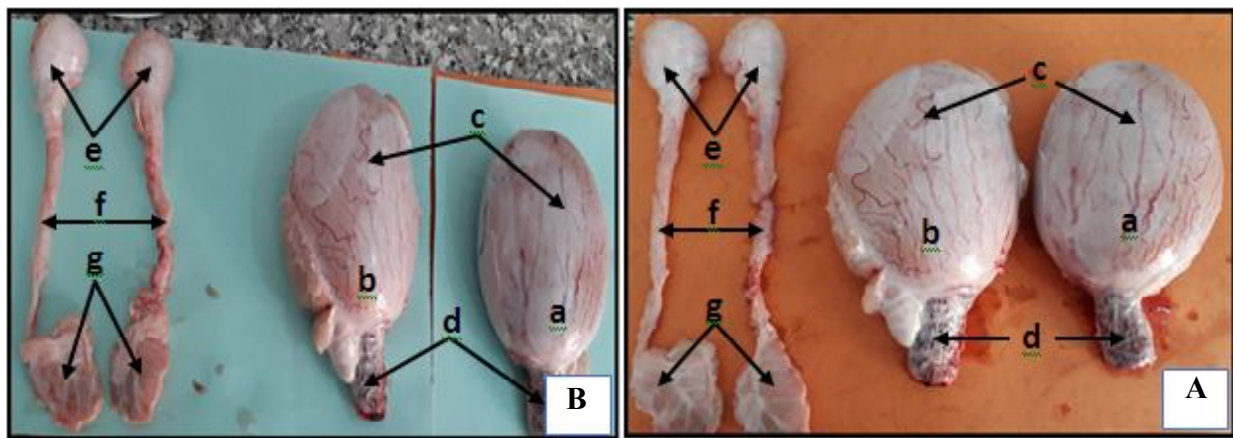


Fig. 6 : The right and left testes at 8 months showed the anatomical structure in which : A) the testis with epididymis in Awassi Ram showed : a) the right testis, b) the left testis, c) the blood supply of testis from testicular artery, d) spermatic cord, B) the right and left testis with epididymis of Arrabi Ram revealed : a) the right testis, b) the left testis, c) the blood supply of testis from testicular artery, d) spermatic cord.

From anatomical results and measurements in tables 2 and 3, which showed the interference between breeds and age and revealed the presence of significant difference between studied values and showed that Awassi sheep recorded significant superiority at ($p \leq 0.05$) on Arrabi sheep for same age period and the older periods

showed significant superiority at ($p \leq 0.05$) on younger periods in same breed and the differences between right and left were non significant, these results agreed with McLaughlin *et al.* (1990) in farm animals and Marty *et al.* (2003) in bulls of bovine and buffalos and with Marian *et al.* (2008) in male rabbits, while results disagreed with

Table 8 : Effect of breed and age in Right and Left Epididymis Tail dimensions (Mean \pm SE).

Breed	Age	Testis type	Epididymis tail weight (gm)	Epididymis tail length (mm)	Epididymis tail width (mm)	Epididymis tail thick (mm)	Epididymis tail volume (cm ³)
Awassi sheep	2	Right	13.90 \pm 0.09 d A	46.80 \pm 0.09 d A	28.70 \pm 0.09 d A	26.60 \pm 0.07 d A	12.00 \pm 0.08 d A
		Left					
	4	Right	28.80 \pm 0.10 c A	54.80 \pm 0.08 c A	34.70 \pm 0.08 c A	32.50 \pm 0.09 c A	22.00 \pm 0.07 c A
		Left					
	6	Right	50.45 \pm 0.08 b A	65.70 \pm 0.08 b A	40.80 \pm 0.06 b A	38.60 \pm 0.08 b A	32.00 \pm 0.11 b A
		Left					
	8	Right	77.80 \pm 0.12 a A*	80.70 \pm 0.07 a A*	51.70 \pm 0.07 a A*	49.80 \pm 0.07 a A*	43.00 \pm 0.12 a A*
		Left					
	Mean	Right	42.70 \pm 0.09	61.75 \pm 0.08	38.72 \pm 0.07	37.65 \pm 0.13	26.00 \pm 0.09
		Left					
Arrabi sheep	2	Right	12.97 \pm 0.08 d B	43.60 \pm 0.11 d A	26.50 \pm 0.07 d B	24.50 \pm 0.08 d A	10.00 \pm 0.06 d A
		Left					
	4	Right	26.80 \pm 0.09 c B	51.70 \pm 0.12 c A	31.80 \pm 0.09 c B	29.40 \pm 0.05 c A	20.00 \pm 0.07 c A
		Left					
	6	Right	48.60 \pm 0.07 b B	62.20 \pm 0.14 b A	38.60 \pm 0.08 b B	35.50 \pm 0.07 b A	30.00 \pm 0.09 b A
		Left					
	8	Right	74.90 \pm 0.10 a B	77.80 \pm 0.16 a A	48.70 \pm 0.07 a B	47.60 \pm 0.08 a A	41.00 \pm 0.08 a A
		Left					
	Mean	Right	40.60 \pm 0.08	58.60 \pm 0.07	36.60 \pm 0.08	34.55 \pm 0.07	25.00 \pm 0.07
		Left					

The (a, b, c) different small letters refer to significant differences at ($p \leq 0.05$) among different age means in same breed .

The (A , B) different capital letters refer to significant differences at ($p \leq 0.05$) among different breeds means in same age .

* refers to presence of significant superiority of interference between breed and age in same column at ($p \leq 0.05$). Values represent mean \pm S.E.

Makay *et al.* (2004) in grey short tailed apposom (*Didelphis virginiana*) and with Magda *et al.* (2013) in Rhinoceros (*Dicerohinus sumatrensis harrissoni*), the reason of these differences may belong to the differences between studied breeds in all properties or to testosterone activity increasing which agreed with body and testis development as indicator to growth in body as revealed (Ayse *et al.*, 2007) in bull testis or to spermatogenesis lineage increasing which agreed with body and testis development as indicator to beginning of puberty in body as revealed (Brown *et al.*, 2013) in Guinea pig testis development.

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