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Research Article

Relationships between Body Size and Testicular Morphometric Traits of Mature Rams of Djallonke and Ouda Breeds Reared in North Benin

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ABSTRACT

The study aims to determine the correlations between testicular and body morphometric traits of Djallonke and Ouda sheep breeds reared on natural pasture in Benin. Data were collected on 70 mature rams including 45Djallonke rams and 25Ouda rams, from January 2015 to September 2016. These data were analyzed with SAS software (2006). It appears that in Djallonke rams, apart from scrotal length, mean testes density and mean epididymal density the all other testicular morphometric parameters were strongly and positively associated with the live weight ($0.45 \leq r \leq 0.90$; $P<0.001$). The whither's height was fairly and positively correlation with the chest circumference and the pelvis length ($r=0.45$ and 0.49 $P<0.01$), but strongly and positively associated with the scapulo-ischium length, shoulder width, scrotal length, scrotal circumference, paired testes weight, mean testes length, testes diameter, mean testes volume, paired epididymal weight, mean epididymal length and mean epididymal volume ($0.55 \leq r \leq 0.71$; $P<0.001$). Furthermore, the scrotal length was very highly and positively associated with the scrotal circumference, paired testes weight, mean testes length, testes diameter, mean testes volume, paired epididymal weight, mean epididymal length and mean epididymal volume ($0.73 \leq r \leq 0.78$; $P<0.001$). The scrotal circumference was strongly and positively associated with the paired testes weight, mean testes length, testes diameter, mean testes volume, paired epididymal weight, mean epididymal length and mean epididymal volume ($0.68 \leq r \leq 0.93$; $P<0.001$).
As for Ouda sheep breed, the whither's height was weakly and positively with pelvis length, paired testes weight, mean testes length and mean epididymal density ($0.20 \leq r \leq 0.39$; $P<0.05$), but strongly and positively associated with the mean epididymal length and mean epididymal volume ($r=0.15$ and 0.27; $P<0.001$). Scrotal circumference, paired testes weight, mean testes length, testes diameter, mean testes volume, paired epididymal weight, mean epididymal length and mean epididymal volume were strongly and positively associated with the scrotal length ($0.66 \leq r \leq 0.74$; $P<0.001$). Scrotal circumference was strongly and positively correlated with the paired testes weight, mean testes length, testes diameter, mean testes volume, paired epididymal weight, mean epididymal length and mean epididymal volume ($0.74 \leq r \leq 0.93$; $P<0.001$). Furthermore, the paired testes weight was strongly and positively associated with the mean testes length, testes diameter, mean testes volume, paired epididymal weight, mean epididymal length and mean epididymal volume ($0.81 \leq r \leq 0.99$; $P<0.001$). Therefore, improve body size will improve the reproductive organ traits as a correlated response.

Key words: Benin, Djallonke, Ouda, Correlations, Sheep gonads, Morphometric traits

INTRODUCTION

Djallonke and Ouda breeds are the main sheep breeds met in Benin with a predominance of Djallonke breed (Gbangboche *et al.*, 2004) because of its perfect adaptation to the local climatic conditions and its resistance (Mawuena 1987; Gbangboché *et al.*, 2005a, Gbangboché *et al.*, 2005b). As ruminants, they plays a very vital role in the livelihood of rural populations as sales of the animals and their products help to stabilize household income.

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The characteristics of WAD sheep found all over West and Central Africa of 14° south latitudes have been described by several authors (Rombaut, 1980; Pagot, 1985; Larrat, 1989; Fournier, 2006; Gbangboché *et al.*, 2005a; Koutinhouin *et al.*, 2016). It is a compact breed with a small mature size and short horizontal lop ears. Coat colour varies from spotted black and white to solid black or white. Some have tan or brown coat colour and black bellies. Rams are horned and females usually polled. WAD sheep are capable of limiting parasite multiplication and remain productive in tsetse-infested areas where other breeds can't survive without treatment (Ayuk*et al.*, 2014).However, West African dwarf sheep have low productivity (Yapi, 1994) and weak reproduction and growth performance (Adjibodè, 2012) varying with latitude from north to the south of Benin (Gbangboché *et al.*, 2005b; Youssao *et al.*, 2008).

Found in northern Nigeria, southern Niger, Northern Benin, central Tchad, northern Cameroon and western Sudan, the Ouda sheep breed is one of the hairy sheep breeds of the Sahel type (Mason, 1996). It is a meat breed with distinctive markings. The front half of the body is black or brown and the back half is white. The rams of the Ouda are horned and the ewes are usually polled. When compared to the West African Dwarf the main difference is that the Sahel-type sheep are taller, heavier, of poor mutton conformation and rams do not have a throat ruff or mane. The Sahel-type are usually white, white and brown, or white and black with lop ears. The males display a long twisting pattern to the horns and the females are usually polled. It is adapted to extensive grazing and survival under hot and dry environment. In general the Ouda sheep inhabit the semi-arid mono-modal rainfall lowlands and adjoining arid areas of southern Niger, northern Benin, northern Nigeria, central Chad, western Sudan and parts of Cameroon. It does not survive well outside its ecological zone.

Due to their relative simplicity compared to the rearing of large animals (Valler and and Blanckaertr, 1975; London and Weninger, 1996), sheep rearing in Benin increase over the years with a national herd increasing from 690,000 heads in 2003 to 860,000 heads in 2013 (County Stat, 2016). However, the productivity of those sheep breed in Benin is low (Gbangboché *et al.*, 2005b; Youssao *et al.*, 2008), amongst others, due to a low fertility rate in the breeding herds. Thus to keep up with the increasing demand of meat production and the productivity of sheep, there is a need for sustainable improvement strategies. Improvement of sheep reproductive performance requires effective actions on its various components, with prolificacy being one of the most important (Yakubu and Musa-Azara, 2013) such as body and gonads morphometric traits.

Morphometric traits are continuous parameters describing aspects of animal body conformation (Riva et al., 2004; Cervantes *et al*., 2009) and are an essential component of breed characterization (Gizaw *et al.,* 2007). Morphological parameters such as chest circumference, wither's height and scapulo-ishium length can be used for rapid selection of large size animals for constitution of elite herds (Dossa *et al.,* 2007). Variations in morphometric traits between different sheep populations can provide a soundness basis for livestock management.

Testicular measurements and live weight were reported to generally indicate the production of viable spermatozoa by the male (Agga *et al.,* 2011). The morpho-biometrical analysis of testicular development is of great importance since it is significantly correlated with reproductive activity (Emsen, 2005).

The variability of body and testicular morphometric traits of Djallonke sheep of Benin according to the ecotype was studied by Adjibode *et al.* (2016). The body and testicular morphometric traits of Djallonke sheep of Benin were compared to those of Ouda sheep breed by Koutinhouin *et al.* (2016) and it comes out from their study the sheep breed affects both body and gonads morphometric traits.

The aim of this study was to determine the correlations between testicular and body morphometric traits of Djallonke and Ouda sheep breeds reared on natural pasture under traditional sheep breeding in Benin.

MATERIALS AND METHODS

Study area

The study was thus conducted in the department of Borgou in the North of Benin. Situated between the latitudes of 6°20' and 12°30' north and between the longitudes of 1°30' and 3°45 East, the republic of Benin covers an area of 113440 km ^{2} with a population of 10448647 inhabitants (INSAE, 2015) and a density of 60 hab./km^2.

The department Borgou exhibits climatic conditions of Sudan type, characterized by only one rainy season (from April to October) and one dry season (November to March). Average rainfall varies between 900 and 1300 mm per year while the average annual temperature is 26°C with a maximum of 32°C in March and a minimum of 23°C from December to January. The relative humidity varies between 30 and 70%. Vegetation of Borgou department is a diversified savannah where tree density decreases towards the North.

Data collection

Data on testicles and body morphometric parameters were then collected on 45Djallonke rams and 25Ouda rams of 12 months old, from January 2015 to September 2016. These animals were all raised in a traditional system. Feeding was mainly based on natural pasture. The animals were put on pasture at about 7.30 a.m. and returned to the barns in the afternoon. They were then fed ad libitum a supplementary diet consisting of crop residues according to the traditional system. The sheep were treated for ectoparasites, drenched once every three months and given other veterinary attention when the need appeared.

Reproductive tracts of those 70 matured rams of 12 months old were obtained after slaughter within the department of Borgou in the North of Benin. The reproductive tracts were then immediately brought to the laboratory covered in ice and were processed on the same day.

The material used for data collection was composed of a data file for recording the testicular and body morphometric traits and usual morphometric traits recording materials.

The body weight of the rams was recorded using a scale of 40 kg of capability and 20g of accuracy. Scrotal circumference was measured using a tape at the broadest part of the scrotum. Shoulder width was determined with the aid of a tape measure, as the horizontal distance between the processes on the left shoulder and those of the right shoulder blade. Chest circumference was measured by using a measuring tape around the chest, just behind the front legs; body length was measured from the sternum to the aitch bone and hip or pelvis width was measured using a plastic measuring tape, while height at wither was measured vertically from thoracic vertebrae to the ground using a metal ruler.

The epididymis was carefully excised from the testis along the physiological joints. The testes and epididymis was separated free of adhering connective tissues and fats before the records of morphometric parameters. The following parameters were taking: Testicular length, Testicular diameter, Testicular volume, Testicular weight, Epididymal weight.

Testicles length was measured with the use of flexible tape in cm; testicles diameter was taken with the use of Vernier caliper; testicle volume was measured by the use of water displacement technique according to Alexandrou (2001). Testicular and Epididymal weights were recorded in grams with the use of digital weighing balance. Also the testicular density was obtained by dividing the testicular weight by the testicular volume as the following formula:

Testicular density ($g.cm^{-1}$) = Testes weight (g)/Testes volume (cm^3).

Statistical analysis

Data collected were analyzed bybreed (Ouda and Djallonke) using the software Statistical Analysis System (SAS, 2006). The correlations between the different variables were determined by sheep breed using *Proc corr* procedure of SAS (SAS 2006).

RESULTS

Relationships between body morphometric and testicular traits in Djallonke sheep of Benin

The table 1 show the relationships between body and testicular morphometric traitsin Djallonke sheep of Benin. It appears that apart from scrotal length, mean testes density and mean epididymal density the all other testicular morphometric parameters were strongly and positively associated with the live weight ($0.45 \leq r \leq 0.90$; P<0.001). The whither's height was fairly and positively correlation with the chest circumference and the pelvis length (r =0.45 and 0.49 P<0.01), but strongly and positively associated with the scapulo-ischium length, shoulder width, scrotal length, scrotal circumference, paired testes weight, mean testes length, testes diameter, mean testes volume, paired epididymal weight, mean epididymal length and mean epididymal volume ($0.55 \leq r \leq 0.71$; P<0.001). Furthermore, the scrotal length was very highly and positively associated with the scrotal circumference, paired testes weight, mean testes length, testes diameter, mean testes volume, paired epididymal weight, mean epididymal length and mean epididymal volume ($0.73 \leq r \leq 0.78$; P<0.001). The scrotal circumference was strongly and positively associated with the paired testes weight, mean testes length, testes diameter, mean testes volume, paired epididymal weight, mean epididymal length and mean epididymal volume ($0.68 \leq r \leq 0.93$; P<0.001).

The head length was strongly and positively associated with the all parameters of body morphometric and testicular traits of this study ($0.56 \leq r \leq 0.68$; P<0.001), except the body weight which was fairly and positively associated with the head length (r=0.51; P<0.01).

Furthermore, the paired testes weight was weakly and positively associated with the mean epididymal density (r =0.33; P<0.05); but strongly and positively associated with the mean testes length, testes diameter, mean testes volume and mean epididymal volume ($0.62 \leq r \leq 0.97$; P<0.001); and proportional at the paired epididymal weight and mean epididymal length. As for the mean testes volume, it was weakly and positively associated with the mean epididymal density (r=0.35; P<0.05); but strongly and positively associated with the paired epididymal weight, mean epididymal length and mean epididymal volume ($0.59 \leq r \leq 0.97$; P<0.001).

Relationships between body and testicular morphometric traits in Ouda sheep breeding in Benin

The correlations between body and testicular morphometric traits in Ouda sheep reared in Benin are given in table 2. It comes out from this table that the live weight is weakly and positively associated with the head length, whither's height, shoulder or back width and pelvis length ($0.35 \leq r \leq 0.45$; P<0.05); fairly and positively associated with the scrotal length (r=0.60; P<0.01) and strongly and positively correlated with the scrotal circumference, paired testes weight, mean testes length, testes diameter, mean testes volume, paired epididymal weight, mean epididymal length and mean epididymal volume ($0.67 \leq r \leq 0.89$; P<0.001). However, the head length is weakly and positively with back with the scrotal circumference, paired testes weight, paired epididymal weight and mean epididymal length ($0.36 \leq r \leq 0.41$; P<0.05). The whither's height was weakly and positively with pelvis length, paired testes weight, mean testes length and mean epididymal density ($0.20 \leq r \leq 0.39$; P<0.05), but strongly and positively associated with the mean epididymal length and mean epididymal volume (r=0.15 and 0.27; P<0.001). The scapulo-ischium length was weakly and positively associated with scrotal circumference (r=0.40; P<0.05). Scrotal circumference, paired testes weight, mean testes length, testes diameter, mean testes volume, paired epididymal weight, mean epididymal length and mean epididymal volume were strongly and positively associated with the scrotal length ($0.66 \leq r \leq 0.74$; P<0.001). Scrotal circumference was strongly and positively correlated with the paired testes weight, mean testes length, testes diameter, mean testes volume, paired epididymal weight, mean epididymal length and mean epididymal volume ($0.74 \leq r \leq 0.93$; P<0.001). Furthermore, the paired testes weight was strongly and positively associated with the mean testes length, testes diameter, mean testes volume, paired epididymal weight, mean epididymal length and mean epididymal volume ($0.81 \leq r \leq 0.99$; P<0.001). Nevertheless,

Table 1: Relationships between body morphometric and testicular traits in Djallonke sheep in Benin

Variables	LW	HL	WH	SIL	CC	BW	PL	SL	SC	PTW	MTL	TD	MTV	MTD	PEW	MEL	MEV	MED
LW	1																	
HL	0.75***	1																
WH	0.77***	0.59***	1															
SIL	0.51**	0.56***	0.55***	1														
CC	0.56***	0.60***	0.45**	0.43**	1													
BW	0.56***	0.51**	0.55***	0.46**	0.13^{NS}	1												
PL	0.45***	0.24^{NS}	0.49**	0.24^{NS}	-0.06^{NS}	0.63***	1											
SL	0.87**	0.57***	0.67***	0.50**	0.45**	0.38*	0.44**	1										
SC	0.90***	0.68***	0.67***	0.48**	0.47**	0.67***	0.52**	0.78***	1									
PTW	0.81***	0.59***	0.58***	0.44**	0.38*	0.56***	0.49**	0.74***	0.93***	1								
MTL	0.80***	0.579***	0.57***	0.40*	0.32*	0.64***	0.58***	0.73***	0.91***	0.97***	1							
TD	0.80***	0.572***	0.57***	0.41**	0.31*	0.63***	0.58***	0.74***	0.92***	0.97***	0.99***	1						
MTV	0.80***	0.58***	0.57***	0.40*	0.32*	0.63***	0.58***	0.74***	0.91***	0.97***	1***	0.99***	1					
MTD	0.02^{NS}	0.03^{NS}	-0.01^{NS}	0.11^{NS}	0.23^{NS}	-0.36*	-0.44**	-0.08^{NS}	-0.01^{NS}	0.06^{NS}	-0.17^{NS}	-0.17^{NS}	-0.17^{NS}	1				
PEW	0.81***	0.59***	0.58***	0.44**	0.38*	0.56***	0.49**	0.74***	0.93***	1***	0.97***	0.97***	0.97***	0.06^{NS}	1			
MEL	0.81***	0.59***	0.58***	0.44**	0.38*	0.56***	0.49**	0.74***	0.93***	1***	0.97***	0.97***	0.97***	0.06^{NS}	1***	1		
MEV	0.88***	0.658***	0.71***	0.49**	0.59***	0.39*	0.25^{NS}	0.75***	0.68***	0.62***	0.59***	0.59***	0.59***	0.12^{NS}	0.62***	0.62***	1	
MED	-0.11^{NS}	-0.09^{NS}	-0.19^{NS}	-0.10^{NS}	-0.22^{NS}	0.15^{NS}	0.23^{NS}	-0.03^{NS}	0.21^{NS}	0.33*	0.35*	0.35^{NS}	0.35*	-0.13^{NS}	0.33*	0.33*	-0.51***	1

LW: Live weight (kg); HL: Head Length; HW: Whither's height (cm); SIL: Scapulo-Ischium length (cm); CC: Chest Circumference (cm); SL:Scrotal length (cm); SC: Scrotal circumference (cm); PTW: Paired testes weight (g); MTL: Mean testes length (cm); TD: Testes diameter (cm); MTV: Mean testes volume (ml); MTD: Mean testes density (g/cm3); PEW: Paired epididymal weight (g); MEL: Mean epididymal length (cm); MEV: Mean epididymal volume (ml); MED: Mean epididymal density (g/cm3). NS: P>0.05; *: P<0.05; **: P<0.01; ***: P<0.001.

Table 2: Relationships between body morphometric and testicular traits in Ouda sheep breeding in Benin

Variables	LW	HL	WH	SIL	CC	BW	PL	SL	SC	PTW	MTL	TD	MTV	MTD	PEW	MEL	MEV	MED
LW	1																	
HL	0.36*	1																
WH	0.35*	0.25^{NS}	1															
SIL	0.28^{NS}	0.31^{NS}	0.30^{NS}	1														
CC	0.06^{NS}	0.30^{NS}	0.03^{NS}	0.30^{NS}	1													
BW	0.40*	0.41*	0.27^{NS}	0.24^{NS}	-0.18^{NS}	1												
PL	0.45*	-0.12^{NS}	0.39*	-0.09^{NS}	-0.23^{NS}	0.11^{NS}	1											
SL	0.60**	0.09^{NS}	0.21^{NS}	0.21^{NS}	0.26^{NS}	-0.11^{NS}	0.37^{NS}	1										
SC	0.83***	0.36*	0.27^{NS}	0.40*	0.06^{NS}	0.50**	0.35^{NS}	0.66***	1									
PTW	0.89***	0.36*	0.28*	0.26^{NS}	0.01^{NS}	0.39*	0.51**	0.73***	0.92***	1								
MTL	0.85***	0.28^{NS}	0.25*	0.19^{NS}	-0.06^{NS}	0.40*	0.56**	0.70***	0.89***	0.97***	1							
TD	0.85***	0.29^{NS}	0.27^{NS}	0.19^{NS}	-0.06^{NS}	0.40*	0.55**	0.71***	0.89***	0.97***	0.99***	1						
MTV	0.85***	0.28^{NS}	0.26^{NS}	0.18^{NS}	-0.05^{NS}	0.40*	0.56**	0.71***	0.89***	0.97***	0.99***	0.99***	1					
MTD	-0.24^{NS}	0.21^{NS}	-0.01^{NS}	0.23^{NS}	0.30^{NS}	-0.25^{NS}	-0.43*	-0.16^{NS}	-0.19^{NS}	-0.26^{NS}	-0.48*	-0.46*	-0.47*	1				
PEW	0.87***	0.36*	0.28^{NS}	0.25^{NS}	0.01^{NS}	0.38^{NS}	0.50**	0.73***	0.92***	0.99***	0.97***	0.97***	0.97***	-0.25^{NS}	1			
MEL	0.87***	0.36*	0.27***	0.25^{NS}	0.01^{NS}	0.38*	0.50**	0.73***	0.93***	0.99***	0.97***	0.97***	0.97***	-0.26^{NS}	1***	1		
MEV	0.67***	0.18^{NS}	0.15***	0.15^{NS}	-0.03^{NS}	0.20^{NS}	0.32^{NS}	0.74***	0.74***	0.81***	0.84***	0.84***	0.84***	-0.34^{NS}	0.82***	0.82***	1	
MED	0.17^{NS}	0.26^{NS}	0.20*	0.18^{NS}	0.10^{NS}	0.24^{NS}	0.24^{NS}	-0.15^{NS}	0.12^{NS}	0.10^{NS}	0.03^{NS}	0.03^{NS}	0.03***	0.16^{NS}	0.09^{NS}	0.09^{NS}	-0.49***	1

LW: Live weight (kg); HL: Head Length;HW: Whither's height (cm); SIL: Scapulo-Ischium length (cm); CC: Chest Circumference (cm); SL:Scrotal length (cm); SC: Scrotal circumference (cm); PTW: Paired testes weight (g); MTL: Mean testes length (cm); TD: Testes diameter (cm); MTV: Mean testes volume (ml); MTD: Mean testes density (g/cm3); PEW: Paired epididymal weight (g); MEL: Mean epididymal length (cm); MEV: Mean epididymal volume (ml); MED: Mean epididymal density (g/cm3). NS: P>0.05; *: P<0.05; **: P<0.01; ***: P<0.001.

the mean testes volume was weakly and negatively associated with the mean testes density (r=-0.47; P<0.05) but strongly and positively associated with the paired epididymal weight, mean epididymal length, mean epididymal volume and mean epididymal density (0.03≤r ≤0.97; P<0.001).

DISCUSSION

Form the current study, it comes out that difference in relationships between body size and testicular morphometric traits existed among studied sheep breeds. Apart from scrotal length, mean testes density and mean epididymal density of rams of Djallonke breed, all their other testicular morphometric parameters were strongly and positively associated with the live weight (0.45≤r≤ 0.90; P<0.001); while in rams of Ouda breed, the live weight is strongly and positively correlated with the scrotal circumference, paired testes weight, mean testes length, testes diameter, mean testes volume, paired epididymal weight, mean epididymal length and mean epididymal volume (0.67≤ r ≤0.89; P<0.001). These differences could be due to the effect of genotype or breed.

Scrotal circumference is a good indicator of rams breeding ability. Schoenian (2011) had observed that ram lamb with scrotal circumference of less than 30 cm and adult rams with scrotal circumference of less than 32 cm are not recommended for breeding.

Testicles weight, a soundness index of semen production ability and quality was found to depend on the ecotype in the current study. The results observed herein are similar to those found in other breeds of sheep in West Africa (Siddiqui *et al.*, 2005; Ahemen and Bitto, 2007). Brito *et al.* (2004) have reported that heavier testes produce more spermatozoa than the smaller testes in breeding animals. The significant higher testes weight of sheep Ouda in the current study would mean that those testes could contain more seminiferous tubule, interstitial endocrine cells and possibly more spermatozoa than the rams of Djallonke breed.

In this study, it appears that the live weight is very strongly and positively associated with several testicular measurements of both surveyed breeds (Ouda and Djallonke). The similar results were presented by Agga *et al.* (2011). According to these author, body size and testicular measurements have been found to be important parameters for evaluating breeding soundness. Similarly, Karakus *et al.* (2010) reported that body weight significantly influenced testes length and testes density, respectively. As a result of the beneficial attributes and high heritability estimates (0.4-0.7) of testicular size (Coulter and Foote, 1979), measurements would be useful selection criteria for improvement of flock. Salhab *et al.* (2002), reported that the various testicular measurements were more correlated with body weight of growing lambs than age. Furthermore, Pochron and Wright (2002), showed the significant positive relationship between body size and testicles of animals in non-breeding season. Intra specific variation in testis size (ejaculate investment) has been implicated as an important factor in male reproductive success because larger testes produce higher quality ejaculates (number of sperm, ejaculate volume and motility) and have higher rates of sperm production (Gomendio *et al.,* 1998). Thus males with larger testes are assumed to have higher reproductive success than males with small testes in species with sperm competition.

Moreover, measuring scrotal circumference is particularly important examination of yearling bulls, and it is highly correlated with sperm production and semen quality Brito *et al.,* 2002. It has been shown that testicular diameter and along with scrotal circumference are excellent indicators of spermatogenic function, while body weight either alone or in combination with other variables, have been found to be related to semen volume (Marco-Jimenez *et al.,* 2005; Mekasha *et al.,* 2008; Elmaz *et al*., 2008). The positive association between scrotal circumference and body weight is an indication that improvement in both traits is possible through selection procedures, considering their high genetic correlations (Duguma *et al.,* 2002; Pourlis, 2011). This is an indication that genes that contributed to body weight had an influence in the reproductive ability of rams. Scrotal circumference is a simple repeatable method of measurement of testicular size which is highly correlated with testicular weight, semen quality, and with fertility (Waldner *et al.,* 2010).

The significant and positive correlations found between the testes weight and several body morphometric traits confirm the results obtained in goat (Bitto and Egbuinike, 2006), rams (Ahemen and Bitto, 2007), chicken (Orlu and Egbunike, 2010; Ibrahim, 2012). Similarly, scrotal circumference has been shown to correlates with epididymal weight, and testes volume. Similar observation was reported by Osinowo *et al.* (1977), Tegegne *et al.,* (1992), Ugwu (2009). Overall, the correlation results indicate that the increase in one testicular traits lead to an increase in the other and vice versa. The good and positive correlations between testes weight, scrotal circumference and morphometric characteristics indicates the possibility of predicting organs weight, since testes weight is known to be very highly correlates with testicular sperm reserves (Ogwuegbu *et al.,* 1985) and males with larger testes tend to produce more sperm (Okwun *et al.,* 1996). Also, Keith *et al.* (2009) suggested the use of scrotal size and testicular measurements to select for improved sperm production and breeding males.

Conclusion

Form the current study, it comes out that difference in relationships between body size and testicular morphometric traits exist among studied sheep breeds. Apart from scrotal length, mean testes density and mean epididymal density of rams of Djallonke breed, all their other testicular morphometric parameters were strongly and positively associated with the live weight; while in rams of Ouda breed, the live weight is strongly and positively correlated with the scrotal circumference, paired testes weight, mean testes length, testes diameter, mean testes volume, paired epididymal weight, mean epididymal length and mean epididymal volume. The good and positive relation between mean testicle weight, scrotal circumference and morphometric traits indicates the possibility of predicting organs weight, since gonads weight in rams is known to be highly associates with semen production and quality. Further studies could be carried out on the variability of semen quality in rams of Ouda and Djallonke breeds reared in Benin.

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