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Influence of Weight and Age on the Testicular Biometry of Native Goats in a Huambo Region of Angola

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Abstract

The aim of this study was to assess the influence of body weight and age on the testicular biometry of native goats in Huambo region of Angola. 45 male goats aged between 2 and 4 years and body weight between 20 and over 26 kg were studied and the testicular biometry measurements were scrotal circumference (SC), scrotal length (SL) and testicular weight (TWT). The goats had the following averages: 2 years and body weight of 16 kg, showed 7.7 cm of scrotal circumference, 4.21 cm of scrotal length and 62,11 g of testicular weight, 3 years and 19 kg of body weight showed 7.93 cm of scrotal circumference, 3.97 cm of scrotal length and 73.11 g of testicular weight, while goats of 4 years showed 8.54 cm of scrotal circumference, 4.60 cm of scrotal length and 85, 93 g of testicular weight. The study showed a correlation of 0.68 between body weight and scrotal circumference, 0.74 between body weight and testicular weight, and 0.64 between testicular weight and scrotal circumference. Considering that age and weight have a high influence on scrotal circumference and testicular weight.

Keywords: Native goats, scrotal circumference, testicular weight, scrotal length.

Introduction

The study of goat breeding is particularly important both in terms of family agriculture and increase production and productivity, because they involve easy handling animals in this activity and easily adaptable to any climate with few restrictions on these adaptation characteristics. In this way, goats develop internal characteristics that allow them to live and reproduce in captivity [16]. Currently, domesticated goats are the product of these adaptations, the artificial selection of matrices (for meat, milk and skin) and its effects characteristics of natural selection for production under varying conditions [9].

Over time, the study of mammalian reproduction, in general, has been extremely important for animal production [12]. Fundamental research and knowledge of the regulation of reproductive activity have led to the development of appropriate management techniques for better animal performance, as well as assisted reproduction methods that aim to increase the number of viable, healthy and better-quality young offspring [8].

The reproduction of goats has peculiar characteristics, and their knowledge is extremely important for a better understanding of this process, which can facilitate the management of the reproduction of these animals [3]. In the male, it is necessary to understand the composition of the semen and its reproductive behavior to assess its relevance in the context of reproductive activity [11].

[24] e [17] corroborate that the study of testicular biometry in goats is an extremely important issue in goat breeding whether it is meat or milk, as it allows by means of appropriate terminations to carry out the selection of breeders for a given herd, depending on the testicular morphometry it allows associate the other variables that will determine the choice of the best breeder for the herd. Many studies carried out describe the influence of weight and age on the testicular biometry of goats and which have a strong positive relationship between these parameters

[15] and in this study we present the influence of age and weight on the testicular biometry of native goats in the Huambo Region of Angola.

Material and Methods

The study was conducted with 45 native male goats slaughtered in the informal slaughterhouses in the city of Huambo and where the following measurements were determined: The age of the animals was determined by dentition as described by [26] by counting the number of permanent incisors that have erupted on the lower jaw of the mouth. The live body weight (BW, kg) of each animal was performed before slaughter using a portable balance. Scrotal circumference (SC) was measured using nonstretchable measuring tape, it was measured in centimeters (cm) as the largest diameter of the testes and scrotum after pushing the testes firmly into the scrotum. Scrotal length (SL) was measured with a pachymeter as the distance between the tip of the scrotal sack and its neck. Average testicular weight (TWT) expressed in grams (g) was measured together with a sensitive weighing balance calibrated in grams according the method described by Goyal and Memon [10]. Accordingly, for respective breed study goats were grouped into three age classes, that is, 1 to 2 years; 2 to 3 years and more than 3 years of age. The age, alive weight and testicular measurements were obtained separately; however, the average values of the paired organs were used in the analysis.

Statistical Analysis

The data obtained were summarized as mean \pm standard deviation, coefficient variation and were analyzed using statistical tools of Infostat for Windows version 2016.0. The effect of age, body weight (BW), and testicular measurements was analyzed by one-way analysis of variance (ANOVA) to find significant differences between

ages, the Tukey test with $P \leq 0.05$ were applied. Correlations between the different testicular parameters with body weight and age were analyzed.

Results and Discussion

The 45 native goats studied, the observed age of the animals were 1 to 2 years, 2 to 3 years and more than 3 years respectively, of which 16% of the animals were 1 to 2 years, 53% were 2 to 3 years and 31% were more than 3 years and an overall mean of 3 ± 0.61 . The body weight of all herds was 20 kg that represent 62% and more than 20 kg that represent 38 % and the overall mean of the body weight was of $20,13 \pm 4.05$ kg. Similar results of age and

weight was found by [6] and [20] who conducted studies on the influence of age and weight on the morphometric parameters of the lung, trachea, bladder and kidneys in the same study site found weight between 10 to 30 kg at ages 1 to 3.5 years of age, while [25] characterizing E Cunha's native goats observed ages 2,3,4, 5 and 6 years with averages of body weight 17 ± 0.8 ; 21.5 ± 1.4 ; 25 ± 0.8 ; 31.3 ± 0.6 and 32.5 ± 0.7 re-spectively.

The mean body weight, age, Scrotal circumference, Scrotal length, and Testicular weight are shown in table 1. The overall scrotal circumference (SC), Scrotal length (SL), Testicular weight (TWT) and body weight (BW) measurements according in all herds were 1 to 2 years : Body weight = 16.4 ± 1.43 Kg, Scrotal Circumference = 7.71 ± 0.76 cm, Scrotal length = 4.21 ± 0.81 cm, Testicular weight = 62.11 ± 10.86 g; 2 to 3 years : Body weight = 19.41 ± 3.36 Kg, Scrotal Circumference = 7.93 ± 1.24 cm, Scrotal length = 3.97 ± 0.37 cm , Testicular weight = 73.51 ± 10.86 g; more than 3 years : Body weight = 22.69 ± 3.53 kg, Scrotal Circumference = 8.64 ± 0.76 cm, Scrotal length = 4.60 ± 0.67 cm and Testicular weight = 85.93 ± 10.86 g.

Table -1. Mean of testicular biometry and effect of age in native goats.

1 to 2 years		2 to 3 years		more than 3 years	
Parameters	Mean	Parameters	Mean	Parameters	Mean
BW(kg)	$16,4 \pm 1,43$	BW(kg)	$19,41 \pm 3,36$	BW(kg)	$22,69 \pm 3,53$
SC(cm)	$7,71 \pm 0,76^A$	SC(cm)	$7,93 \pm 1,24^A$	SC(cm)	$8,64 \pm 0,48^A$
SL(cm)	$4,21 \pm 0,81^A$	SL(cm)	$3,97 \pm 0,37^A$	SL(cm)	$4,60 \pm 0,67^A$
TWT(g)	$62,11 \pm 4,1^B$	TWT(g)	$73,51, \pm 10,86^A$	TWT(g)	$85,93 \pm 7,76^A$

SC – Scrotal Circumference, SL - Scrotal length, TWT – Testicular weight, ^{A,B}Means in the same row and with different superscript have significant difference with $P > 0.05$.

Different results were reported by [22] when studying testicular biometry and its correlation with body weight and age in two breeds of indigenous goats in an arid region of Nigeria that obtained 23.37 ± 0.71 cm of scrotal circumference in animals of two years and 28.89 ± 0.28 cm in animals of three years, yet the same author obtained a scrotal length of 13.26 ± 0.17 cm in animals of two years and 15.41 ± 0.21 cm in animals of three years, whereas the scrotum weight was 77.28 ± 1.88 grams in animals of two years and 103.01 ± 2.23 grams in animals of three years whose same observed significant differences between ages and in the present study there were only significant differences with two years. Still different results were obtained by [18] when studying testicular and epididymal parameters of goats in a humid region of Nigeria, which obtained a testicular weight of 52.16 ± 10.29 and a scrotal circumference of 17.15 ± 1.14 . Results below these were

obtained by [5] when analyzing the testicular morphometric dimensions in a semi-arid region of Brazil in goats without defined breed.

In the correlation analysis performed using Pearson's correlation with a level of significance where $p < 0.01$, it was observed that the live weight has a significant correlation with the scrotal circumference (0.68) and the testicular weight (0.74) and the correlation between the testicular weight and scrotal circumference was 0.64. [22] and [18] found positive correlations between weight and morphometric parameters evaluated, in which they observed 0.67 correlation with scrotal circumference and 0.74 with testicular weight, using the same level of significance, which differs greatly from the correlations found in this study.

Age influences the morphometric measurements of testicular parameters up to 1 year and eight months in this

study the minimum age was 2 years, this should be one of the factors that influenced the non-significant correlation of some morphometric parameters of the testicular biometry. [21] reported in their studies that testicular morphometric measurements in goats are influenced by animal growth until a certain age, therefore much more related to animal weight, yet in males, the significant increase in scrotal circumference and other morphometric measurements according to age and body weight, can be considered normal, since the development of testicular size is significantly correlated with body growth and therefore and indirectly, with the age of the animal. [1] in his study on the correlation between testicular and epididymal parameters with the age and weight of the goat breed Red Sokoto Bucks attributes a low correlation to age because of the age difference observed in their studies corroborating the present study that performed with animals from 2 to 4 years. The low correlation that was verified can be attributed to the size of the sample used, according [13] attributes the same cause to the reduced number of observations, also [27] reported that the sexual organs in the male show allometric growth, that is, each one grows a different level, this depends, among other things, when the function of that organ is needed during ontogenesis. The study of these morphometric measures in goats provides important information for national goats, as these (scrotal circumference and testicular weight) are closely related to the ability of the testicles to produce sperm and define the right time to select a breeder [7], [14], [4] and [19].

Conclusion

The study of the influence of age and body weight on the testicular biometry has a predictive value of great importance in the reproduction of goats, especially when selecting the breeding male, these parameters are related to the scrotal circumference, the scrotal length and testicular weight, but among these scrotal circumference has been used as a parameter of greater prediction, however the beginning of an analysis of great importance in national goat farming, although studies of this nature in native goats are still necessary for the promotion of national goat farming.

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