

Testicular and Epididymal Parameters of Sahel Buck in the Humid Zone of Nigeria

Parámetros Testicular y Epididimal de Cabras Sahel en la Zona Húmeda de Nigeria

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SUMMARY: The testicular and epididymal parameters of Sahel bucks in the humid zone of Nigeria was investigated. Twenty goats (30-54 months) weighing 23.48-32.03kg were used for the experiment. The scrotal circumference of the buck was measured. The bucks were then slaughtered and the testicles as well as the epididymides collected. The testicular weight, testicular diameter, testicular length and epididymal length were measured using a non-stretchable measuring tape. These parameters were correlated with one another and the values of the right testis and epididymis were compared with those of the left. The scrotal circumference was positively correlated with the testicular weight ($r = 0.769$, $P < 0.01$), testicular diameter ($r = 0.827$, $P < 0.01$), testicular length ($r = 0.671$, $P < 0.05$) and the epididymal length ($r = 0.664$, $P < 0.05$). It was concluded that the scrotal circumference is a reliable guide in the selection of the sahel buck for breeding in the humid zone of Nigeria.

KEY WORDS: Testicular Parameter; Epididymal Parameter; Scrotal circumference; Reproduction; Sahel bucks.

INTRODUCTION

The Sahel goats are generally distributed in the Sahel zone of the Sahara Africa spreading from Chad to Senegal (Gall, 1996). Sahel goats in Nigeria are found in the semi-arid zones of the Northern part of the country (Igbokwe *et al.*, 1998). They are also known as West African long-legged goat and have good adaptation to this arid environment (Gall; Igbokwe *et al.*, 2009).

Goat reproduction in several tropical regions is influenced by seasonal changes including fluctuations in humidity (Maina *et al.*, 2006). This interferes with optimum production of goats (Ahmad & Noakes, 1996). Nonetheless, goat ranked high, after cattle in the production of meat, milk and hides in the tropic (Spedding, 1983). Their short gestation period and fecundity rate make them distinct for selection as a good source of animal protein (Osugwu & Apokodje, 1981).

Good understanding of the reproductive capabilities of the Sahel buck is one of the ways through which goat husbandry can be maximized in the tropics (Maina *et al.*). This begins with the understanding of the season-dependent semen characteristics of the buck (Ahmad & Noakes). Testicular parameters would suggest the level of sexual activity and semen production from the daily sperm

production potential (Hassan *et al.*, 2009; Leal *et al.*, 2004) and this is particularly important when considering genetic improvement through cross breeding with goats raised in the humid zones (Maina *et al.*).

Therefore, this study was designed to examine the testicular parameters of the Sahel bucks in the humid zone of Nigeria.

MATERIAL AND METHOD

Experimental animal. Twenty Sahel goats were obtained from the northern part of Nigeria and aged between 24 months and 48 months as at the time of acquisition. Ageing was done by dentition method as previously described (Macdonald & Low, 1985).

Management of Experimental Animal. The bucks were housed at the Small Ruminant Unit (SRU) of the Department of Veterinary Surgery and Reproduction, University of Ibadan. The design of the house allows for cross ventilation and the floor covered with concrete.

The bucks were routinely dewormed with Levamisol Hydrochloride (Levadez®) at a dose rate of 1.0 ml per 10-20kg body weight. They were also vaccinated against *pestes des petit ruminant (PPR)* virus using *PPR* vaccine by Nigerian Veterinary Research Institute (NVRI) Vom, Nigeria.

They were placed on maintenance ration (Table Ia and Ib) at the rate of 20g/kg/day and were also allowed to feed on dry cassava (*Manihot esculentum*) peelings and graze on pasture consisting of carpet grass (*Axonopus capresous*) and guinea grass (*Penniselum purpurem*). Water was given *ad libitum*.

Table Ia. Composition of the Ration.

Ingredient	Percentage of Component
Corn meal	20
Wheat offal	20
Palm kernel cake	16
Brewer's dry grain	40
Groundnut cake	3.5
Salt	0.4
Minerals/Premix	0.1

Table Ib. Proximate Analysis of the Ration. Source: Oyeyemi & Akusu (2002).

Chemical Composition	Proportion of Constituents
Crude protein	3.86%
Fat	6.16%
Crude fiber	10.6%
Ash	13.42%
Moisture content	2.69%
Energy	2271.45cal/kg

Location of Study. This study was carried out at the SRU and theriogenology laboratory of the Veterinary Teaching Hospital, University of Ibadan. University of Ibadan is about 6 kilometers to the North of Ibadan City, at latitude 70 26° North and latitude 30 54°East at mean altitude of 277 meters above sea level. The annual rainfall is 1,200cm³, most of which fall between April and November, and a dry season from December to March (Oyeyemi & Fayomi, 2011). This study was carried out between April and October under the same ambient temperature (27-31°C) and relative humidity of about 80%.

Experimental Design. The bucks were fed and housed for six months until they were 30-54 months old and weighed between 23.48-32.03kg. The live weight of the

bucks was measured at about 0800 hours (not less than 12hours after exposure to the last feeds). The bucks were then slaughtered and the testes and epididymides were collected as previously described (Kabiraj *et al.*, 2011).

Data Collection. Scrotal circumference: The scrotal circumference was measured at the widest point that is equidistant from the scrotal poles using a non-stretchable measuring tape.

The testes with the epididymides were immediately collected. Each of the epididymis was carefully separated from the testis.

Testicular weight: This was measured by putting the testes on a sensitive electronic weighing scale (sensitive to the nearest 0.001g).

Testicular Diameter: This was also measured around the widest point at an area that is equidistant to the testicular poles.

Testicular Length: This was measured along the longitudinal axis of the testis beginning from one pole of the testis to the other pole.

Epididymal length: This was measured using a non-stretchable tape placed along the longitudinal axis of the epididymis running from one pole to the other.

Data Analysis. The means and the standard deviation of each of the parameters measured were determined. Independent paired sample T- test was used to compare the parameters of the right with the left's. Also, multiple correlation of each of the parameters of the right and the left testes and epididymis were performed to establish the relationship between them. These were done at 95% confidence interval and they were considered significant when P< 0.05.

RESULTS

The values of the mean ± standard deviation of each of the parameters are presented in Table II.

Tabla IIa. Testicular and epididymal parameters of sahel buck .

Age (month)	43.38 ± 10.44
Body weight (kg)	13.23 ± 1.69
Scrotal circumference (cm)	17.15 ± 1.14

Tabla IIb. Testicular and epididymal parameters of sahel buck.

Parameter	Right	Left	Average
Testicular weight (g)	51.79 ± 9.66	52.53 ± 11.28	52.16 ± 10.29
Testicular diameter (cm)	10.92 ± 0.89	11.02 ± 0.94	10.97 ± 0.90
Testicular length (cm)	4.70 ± 0.52	4.72 ± 0.69	4.71 ± 0.60
Epididymal length (cm)	7.46 ± 0.84	7.85 ± 1.23	7.66 ± 1.05

Right Testis (Table IIIa): The scrotal circumference is positively correlated with the testicular Weight ($r = 0.711$, $p < 0.01$) and the testicular length ($r = 0.660$, $P < 0.05$). While the testicular weight is positively correlated with the testicular length ($r = 0.760$, $P < 0.01$) and the testicular diameter ($r = 0.756$, $P < 0.01$).

The testicular length is positively correlated ($r = 0.645$, $P < 0.05$) with the epididymal length.

Left Testis (Table IIIb): The scrotal circumference is positively correlated with the testicular weight ($r = 0.769$, $P < 0.01$), testicular diameter ($r = 0.827$, $P < 0.01$), testicular

length ($r = 0.671$, $P < 0.05$) and the epididymal length ($r = 0.664$, $P < 0.05$). The testicular weight, however, is positively correlated with the testicular diameter ($r = 0.971$, $P < 0.01$), testicular length ($r = 0.740$, $P < 0.01$) and the epididymal length ($r = 0.848$, $P < 0.01$). There is also a positive relationship between the testicular diameter and the testicular length ($r = 0.704$, $P < 0.01$) as well as the epididymal length ($r = 0.751$, $P < 0.01$). Also, the testicular length is positively correlated with the epididymal length ($r = 0.658$, $P < 0.05$).

There is no significant difference ($P > 0.05$) between the parameters of the right when compared with the values of the left.

Table IIIa. Correlation coefficient of the right parameters and their significance

	Age (Months)	Body Weight (kg)	Scrotal Circumference (cm)	Testicular weight (g)	Testicular diameter (cm)	Testicular Length (cm)	Epididymal length (cm)
Age (Months)							
Body Weight (kg)							
Scrotal Circumference				0.711**		0.660*	
Testicular weight (g)			0.711**		0.756**	0.760**	
Testicular diameter (cm)				0.756**			
Testicular length (cm)			0.660*	0.760**			0.645*
Epididymal length (cm)						0.645*	

Table IIIb. Correlation coefficient of the left parameters and their significance.

	Age (Months)	Body Weight (kg)	Scrotal Circumference (cm)	Testicular weight (g)	Testicular diameter (cm)	Testicular length (cm)	Epididymal length (cm)
Age (Months)							
Body Weight (kg)							
Scrotal Circumference				0.769**	0.827**	0.671*	0.664*
Testicular weight (g)			0.769**		0.971**	0.740**	0.848**
Testicular diameter (cm)			0.827**	0.971**		0.704**	0.751**
Testicular length (cm)			0.671*	0.740**	0.704**		0.658*
Epididymal length (cm)			0.664*	0.848**	0.751**	0.658*	

*Values are significantly different ($P < 0.05$). **Values are significantly different ($P < 0.01$).

DISCUSSION

This study observes strong relationship between the scrotal circumference and the testicular as well as the epididymal parameters evaluated. This is similar to previous report (Raji *et al.*, 2008). Studies in the ram (Kheradmand *et al.*, 2006; Hassan *et al.*) and Bengal bucks (Kabiraj *et al.*) had linked scrotal circumference with the semen volume and concentration, spermatozoa motility, livability and morphological characteristics. Availability of field information on the scrotal circumference would be beneficial at predicting the testicular potentials of the sahel bucks in the humid zone. This could serve as a guide in the selection or purchase of breeding stock when planning to cross this breed with goats indigenous to the Nigerian humid zone. This would increase the breeding efficiency, save cost and prevent loss of reproductive time.

It can be concluded that the scrotal circumference is a reliable guide in the selection of the sahel buck for breeding in the humid zone of Nigeria.

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RESUMEN: Fueron investigados los parámetros testicular y epididimario de las cabras Sahel en la zona húmeda de Nigeria. Se utilizaron para el experimento 20 cabras (30-54 meses) con un peso entre 23,48-32,03kg. Se midió la circunferencia escrotal de las cabras. Los animales fueron sacrificados y se recolectaron los testículos, así como el epidídimo de cada uno. Fueron medidos el peso de los testículos, diámetro testicular, longitudes testicular y epididimaria utilizando una cinta métrica no extensible. Estos parámetros fueron correlacionados entre sí y los valores obtenidos a cada lado de testículos y epidídimos fueron comparados entre sí. La circunferencia escrotal se correlacionó positivamente con el peso testicular ($r = 0,769$, $P < 0,01$), diámetro testicular ($r = 0,827$, $P < 0,01$), longitud testicular ($r = 0,671$, $P < 0,05$) y la longitud del epidídimo ($r = 0,664$, $P < 0,05$). Se concluyó que la circunferencia escrotal es una guía confiable en la selección de la cabra Sahel para la cría en la zona húmeda de Nigeria.

PALABRAS CLAVE: Parámetro testicular; Parámetro epididimario; Circunferencia escrotal; Reproducción; Cabra Sahel.

REFERENCES

- Ahmad, N. & Noakes, D. E. Seasonal variation in the semen quality of young british goats. *Br. Vet. J.*, 152:225-36, 1996.
- Gall, C. Goat breeds of the world. Weikersheim, Germany, CTA-Margraf/FAO, 1996. P.186.
- Hassan, M. R.; Pervage, S.; Ershaduzzaman, M. & Talukder, M. A.

I. Influence of age on the spermiogramic parameters of native sheep. *J. Bangladesh Agril. Univ.* 7:301-4, 2009.

Igbokwe, I. O.; Grema, H. A.; Ikpo, A. E.; Mshelbwala, F. M. & Igbokwe, N. A. Unilateral cryptorchidism in Nigerian Sahel bucks. *Int. J. Morphol.*, 27:805-10, 2009.

Igbokwe, I. O.; Ribadu, A. Y. & Bukar, M. M. Erythrocyte glutathione concentrations in Nigerian Sahel goats. *Small Ruminant Res.*, 30:1-6, 1998.

Kabiraj, S. K.; Masusul Hoque, S. A.; Yahia Khandoker, M. A. M. & Husain, S. S. Testicular biometry and its relationship with body weight and semen output of black Bengal bucks in Bangladesh. *J. Cell Anim. Biol.*, 5:27-32, 2011.

Kheradmand, A.; Babaei, H. & Batavani, R. A. Effect of improved diet on semen quality and scrotal circumference in the ram. *Veterinarski Arhiv.*, 76:333-41, 2006.

Leal, M. C.; Becker-Silva, S. C.; Chiarini-Garcia, H. & França L. R. Sertoli cell efficiency and daily sperm production in goats (*Capra hircus*). *Anim. Reprod.*, 1:122-8, 2004.

Macdonald, I. & Low, J. *Livestocks rearing in the tropics*. London, Macmillian Education Ltd., 1985. p.63.

Maina, V. A.; Chaudhari, S. U. R. & Mshelia, G. D. Spermiogram of white ecotype of sahel bucks in Maiduguri Metropolis. *Pak. J. Biol. Sci.*, 9:307-9, 2006.

Osuagwuh, A. I. A. & Akpokodje, I. U. *The West African Dwarf (Fouta Djallon)*. In: Causes of Early Mortality. Intl. Goat Sheep Res., 1:303-9, 1981.

Oyeyemi, M. O. & Akusu, M. O. Response of multiparous and primiparous West African Dwarf goats (*Capra hircus*, L.) to concentrate supplementation. *Vet. Arhiv.*, 72:29-38, 2002.

Oyeyemi, M. O. & Fayomi, A. P. Gonadosomatic Index and Spermatozoa Morphological characteristics of Male Wistar rat treated with graded concentration saof Aloe vera gel. *Int. J. Anim. Vet. Adv.*, 3:47-53, 2011.

Raji, A. O.; Igwebuike, J. U. & Aliyu, J. Testicular biometry and its relationship with body weight of indigenous goats in a semi arid region of Nigeria. *ARPJ. Agric. Bio. Sci.*, 3:35-8, 2008.

Spedding, C. R. W. Sheep and Goat Production. *J. Liv. Prod. Sci.*, 10:93, 1983.

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