

## Morphometric Survey of Reproductive Organs of Camel (*Camelus Dromedaries*) Slaughter in Maiduguri Abattoir as a Signal for Reproductive Indices

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### ABSTRACT

Fifteen adult male camels were used in the current study to determine the dimension of the reproductive organs and correlation with thoracic cage of the camel. Morphometric characteristics of the testes considered as one of the indicators use to evaluate the reproductive efficiencies of camels. The camels were randomly selected among those presented for slaughter at Maiduguri abattoir. The testicular characteristics measured were scrotal circumference (in situ), paired of testicular and epididymal weight, volume and length. The epididymides were divided into caput, corpus and caudal the epididymides were measured in pairs. The testis and epididymis were weighed using a sensitive electronic weighing balance. This study has provided a baseline morphometric data for further studies on the reproductive potential of the male camels in Nigeria.

**Key words:** Morphometric survey, Reproductive organs, camels and Reproductive indices

### INTRODUCTION

The extant old world camelids was divided into two forms; one-humped and two-humped camels. Conventionally, they have been considered as different species, named dromedary or Arabian camel (*Camelus dromedaries*, and Bactrian or Asian camel (*Camelus bactrianus* Rybczynski *et al.*, 2013), respectively (Potts, 2004). Both are domestic animals commonly found in desert province of Eurasia and northern Africa, but there is only one endangered population of wild two- humped camels that survives in the Gobi desert (Malo *et al.*, 2016), while wild one-humped camels are unknown in human history. But populations of feral dromedaries in the south western USA, Spain and Namibia have been reported (Saalfeld and Edwards, 2010).

A camel is known as one of the most commonly domesticated animals whose reproductive potential has not yet been accomplished in science and area of reproductive biotechnology. It is fully adapted to the rigors of the extreme diurnal variations of temperature of Africa and Asia, therefore requires little expenditure in terms of shelter (Melaku *et al.*, 2015). The dromedary camels are regarded as seasonal breeders (Wilson, 1984). The impression about their life style is that decreasing day length usually lead to the stimulation of the season, but it is obvious that, dromedary camels near the equator are usually affected with some factors such as rainfall, nutrition and management (Wilson, 1984), which may override the effects of photoperiod (Skidmore *et al.*, 2013) and allow breeding to occur throughout the year (Arthur *et al.*, 1982; Malo *et al.*, 2016). The unique adaptation of camel (*Camelus dromedaries*) makes it relevant in boosting economic wellbeing in the north and eastern part of Africa, where it is mainly used as a source of meat, wool, milk and transportation. Some of the factors that usually affect reproductive efficiency of camels are long gestation period, long pubertal age and long inter-calving interval (Bhakat *et al.*, 2005; Khanvilkar *et al.*, 2009). The literature review reveals some seasonal

morphological studies on the reproductive organs of male and female camels (Tingari *et al.*, 2013; Ibrahim *et al.*, 2014). Seasonal morphological changes in the epididymis and testis of other mammalian species have also been reported (Calvo *et al.*, 1997; Iliyasu *et al.*, 2014; Melaku *et al.*, 2015). Therefore, there is a need to relente the morphometric studies of the (*Camelus dromedaries*) testes to reproductive efficiencies

## MATERIALS AND METHOD

A total of 15 camels male aged 6- 9 years were randomly designated for this study, 15 paired testes were carefully removed after slaughter at Maiduguri Central Abattoir. The testicles were transported in a cold container filled with ice pack, to the Fertility Laboratory, AI unit of the Department of Theriogenology, Faculty of Veterinary Medicine, University of Maiduguri, Nigeria, for evaluation and morphometric studies of the reproductive organs.

### Sampling Technique

The camels were randomly selected from camels presented for slaughter at Maiduguri Central Abattoir. The scrotal and thoracic circumferences were measured using a non-stretchable metric tape post slaughter.

### Sample Collection Procedure

The testicles were collected by incising through the scrotum and exteriorizing both testes, the testes were properly labeled and separated from the epididymides and trimmed off the facia and the spermatic cords. Thereafter, paired testes and epididymis were weighed using the electronic sensitive weighing balance (XY Ecen®). The testicles and epididymal length were measured using a flexible measurement tape. The epididymides were divided into caput, corpus and cauda based on the anatomy of the organs and their weights were taken using an Electronic weighing balance. The tunica vaginalis were removed from the testicular parenchyma. Testicular volume was measured using a water displacement technique as described by Toe *et al.* (2000).

## STATISTICAL ANALYSIS

The data generated was used to determine the relationship between scrotal and thoracic circumference and to test for their correlation using statistical package for social science (SPSS version 2.0). The variables were recorded as (mean S.D) value of  $p < 0.01$  and  $p < 0.05$  were considered statistically significant.

## RESULT

Table 1. Dimension of thoracic circumference and reproductive organ of camels (*Camelus dromedaries*)

| S/N | Variables                                   | Mean $\pm$ S.D     |
|-----|---------------------------------------------|--------------------|
| 1.  | Thoracic circumference (cm)                 | 185.07 $\pm$ 115.1 |
| 2.  | Scrotal circumference (cm)                  | 30.96 $\pm$ 2.9    |
| 3.  | Paired testicular weight (g)                | 78.78 $\pm$ 12.7   |
| 4.  | Paired testicular length (cm)               | 9.18 $\pm$ 3.8     |
| 5.  | Paired testicular volume (cm <sup>3</sup> ) | 119.34 $\pm$ 34.4  |
| 6.  | Paired epididymal weight (g)                | 25.32 $\pm$ 6.1    |
| 7.  | Paired epididymal length (cm)               | 22.15 $\pm$ 3.5    |

Table 2. Correlation coefficient among scrotal circumference, thoracic circumference, testicular and epididymal morphometry in Camels (*Camelus dromedaries*).

| S/N | Measurement                                      | Correlation coefficient | Remark                       |
|-----|--------------------------------------------------|-------------------------|------------------------------|
| 1.  | Testes weight and Scrotal circumference          | 0.631*                  | Good positive correlation    |
| 2.  | Testes weight and testes volume                  | 0.947**                 | Strong positive correlation  |
| 3.  | Testes weight and epididymal weight              | 0.527*                  | Partial positive correlation |
| 4.  | Thoracic circumference and Scrotal circumference | 0.943**                 | Strong positive correlation  |
| 5.  | Thoracic circumference and testes weight         | 0.659**                 | Strong positive correlation  |

Significant level \* -  $p < 0.01$ ; \*\* -  $P < 0.05$

## DISCUSSION

The dimension of the thoracic and scrotal circumferences were determined to serve as indicators for reproductive efficiencies as reported by Chanter *et al.* (2010) and this agreed with the findings of the present study. The dimension of the reproductive organs, particularly the scrotal circumference, testicular and epididymal weights and lengths, were in agreement with the findings reported by Ali *et al.* (2012). The current studied indicate, the caput has the greatest proportion of epididymal mass which might reflect the amount of sperm reserves in the extra gonadal sperm reserves this agreed with the report by Igboeli and Rakha (1971).

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However seasonal variation is out of the scope of the current studies. Yagil, (1994) reported the effects of the long dry season on organs weight in goats. It is generally recognized that animals reared in the dry season lose weight and this can be attributed to inadequate feed supply to the animals as a result of gross shortage of fresh grass to complement their required diet. Calvo *et al.*, (1997) state that high ambient temperatures decrease the weights of external organs due to decrease feed intake that regulate metabolic activities that might interfere with physiology of the animals.

Al-qarawi, (2000) reported that the testes of camel are smaller than those of the stallion, bull, ram and boar. Skidmore (2005) also reported that the mean testicular weight of camel was between 80 and 104 g. The result of this study disagreed with the testicular weight of camel reported by Abdel-Rouf *et al.*, (1975) and this can be attributed to difference in feed and geography of the study areas. The testicular weight has positive correlation with the body weight and the scrotal circumference the present studies revealed that left testicle is smaller than the right testicle (Bhakat, *et al.*, 2005) this might be due to enlarged pampiniform plexus on the left testicle commonly found in camels Khanvilkar *et al.*, 2009.

## CONCLUSION

Testicular and epididymal morphometric characteristics may be useful as a selection criterion for improvement of reproductive capability of camels. Testicular development in young camels usually associates with two distinct phases increase in body weight and age. However, the dimension of the testes and epididymis has a positive relationship that can predict the reproductive output of the male camels. A scrotal morphometric characteristic and thoracic circumference is the most accurate indicator that determines the testicular size as well as their physiological state. Scrotal and thoracic measurements are directly related to the total mass of sperm producing tissue, sperm cell normality and onset of puberty.

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