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**Kumar K**

Department of Veterinary  
Anatomy, Madras Veterinary  
College, Tamil Nadu Veterinary  
and Animal Sciences University,  
Chennai, Tamil Nadu, India

**OR Sathyamoorthy**

Department of Veterinary  
Anatomy, Madras Veterinary  
College, Tamil Nadu Veterinary  
and Animal Sciences University,  
Chennai, Tamil Nadu, India

**S Ushakumary**

Department of Veterinary  
Anatomy, Madras Veterinary  
College, Tamil Nadu Veterinary  
and Animal Sciences University,  
Chennai, Tamil Nadu, India

**S Hemalatha**

Department of Veterinary  
Anatomy, Madras Veterinary  
College, Tamil Nadu Veterinary  
and Animal Sciences University,  
Chennai, Tamil Nadu, India

**Geetha Ramesh**

Department of Veterinary  
Anatomy, Madras Veterinary  
College, Tamil Nadu Veterinary  
and Animal Sciences University,  
Chennai, Tamil Nadu, India

**Raja K**

Department of Veterinary  
Anatomy, Madras Veterinary  
College, Tamil Nadu Veterinary  
and Animal Sciences University,  
Chennai, Tamil Nadu, India

**Corresponding Author:**

**Kumar K**

Department of Veterinary  
Anatomy, Madras Veterinary  
College, Tamil Nadu Veterinary  
and Animal Sciences University,  
Chennai, Tamil Nadu, India

## Gross morphological and morphometrical observations of Ovary of Indian Buffalo (*Bubalus bubalis*)

**Kumar K, OR Sathyamoorthy, S Ushakumary, S Hemalatha, Geetha Ramesh and Raja K**

### Abstract

The present study was conducted on the 12 female buffaloes which are divided into two groups of four to six years and seven to nine years of age. The ovary of buffalo was ovoid and relatively dense structure. They were attached to the broad ligament. The ovarian surface presented follicles and corpus luteum of different sizes at different stages of their development and regression. The biometrical measurements of the ovaries were recorded and statistically analysed. The mean difference between the biometrical measurements of ovaries of two groups was found non-significant.

**Keywords:** Gross, morphological, morphometrical, observations, *Bubalus bubalis*

### Introduction

Buffaloes play a prominent role in rural livestock production particularly in Asia and factors affecting productivity are of paramount importance to agricultural economics in this region of the world. Buffalo has been traditionally regarded as a poor breeder due to its poor fertility in most conditions under which they are raised (Jainudeen and Hafez 1993; Barile 2005) [13, 3]. Reproductive efficiency is the primary factor affecting productivity and is hampered in female buffalo by inherent late maturity, poor oestrus expression in summer, distinct seasonal reproductive patterns and prolonged intercalving interval (Madan, 1988; Madan and Raina, 1984) [15, 14]. Domestic buffaloes tend to breed seasonally (Basu 1962; Quresti *et al.*, 1999) [4, 21] showing a suspension of sexual activity during summer in almost all parts of the world (Hafez, 1955; Chaudhry, 1988 and Shah, 1990) [12, 7, 26]. During this period, they remain sexually inactive without any signs of oestrus. Summer anoestrus is characterized by inactive, smooth ovaries (Roy *et al.*, 1972) [23] and abnormal hormonal profiles (Razdan, 1988) [22]. In ovarian physiology, follicular atresia is a key phenomenon for the removal of follicle that are not selected for ovulation. In buffalo, 92-95% of follicles were considered atretic based on the ratio of oestradiol / progesterone in follicular fluid from abattoir ovaries at random stages of reproduction (Palta *et al.*, 1988 a, b) [17-18]. This frequency of atresia is higher than that observed in cattle, in which the proportion of atretic follicles has been reported to be 70% using oestradiol / progesterone molar ratio in abattoir ovaries (Grimes *et al.*, 1987) [11]. Thus, it seems that ovary of buffalo contains a higher number of atretic follicles compared with cattle, although its physiological season has not been examined (Feranil *et al.*, 2005) [9]. To improve fertility in buffaloes, an adequate knowledge about the reproductive behaviour is necessary (Glatezel *et al.* 2000) [10]. For establishing programmes for oestrus synchronization and superovulation in herds of buffaloes, the knowledge about ovarian cyclic behaviour in the form of follicular development and dynamics is essential. Unlike in cattle, little attention has been focused on these topics in buffaloes (Ali *et al.*, 2003) [1]. The water buffalo (*Bubalus bubalis*) is a significant livestock species of developing countries in tropical and sub-tropical environments and is also an important production animal in developing countries (Zicarelli, 1994) [28]. Keeping in view of all these the present study was aimed with the objectives of studying the gross morphological and morphometry of ovary of adult buffalo and to study the histological and histochemical details of ovary of adult buffalo.

### Materials and Methods

The materials for the research work were collected from twelve buffaloes, ranging in age from five to ten years-old from the Corporation Slaughter House, Perambur, and Chennai. The age of the buffaloes was determined by dental examination.

The ovaries from twelve buffaloes were collected, immediately after collection the ovaries were washed with normal saline solution and transported to the laboratory in an ice box. Gross morpho metrical measurements were taken in both left and right ovaries. The weight of the ovaries was determined by electronic weighing balance. The length, breadth and thickness were measured with the help of Vernier Calliper.

**Results and Discussion**

**Gross Anatomy**

**Shape:** In the present study, it was observed that the ovaries were ovoid and relatively dense structures (Figure 1). Similar observation were made by Baishya *et al.*, (2013) [2] in elephant calf, Singh *et al.*, (2013) in buffaloes and Nagamalleswari (2016) [16] in goats. The ovaries were attached to the body wall just in front of the pelvic inlet and to the reproductive tract by the mesovarium (Figure 1) as informed by Baishya *et al.*, (2013) [2] in elephant calf and Nagamalleswari (2016) [16] in goats. The surface of the ovaries presented follicles and corpus luteum of different sizes and at different stages of their development and regression (Figure 2), as indicated by Suri *et al.*, (2013) [27] in Bakerwal goat.

**Weight**

In the present study it was noticed that, the right ovaries were heavier than left ovaries in both the age groups studied (Table 1.). However, there was no significant difference between the weight of left and right ovaries within the members of the

same age groups as well as between the members of the age groups. It agrees with the findings of Danell (1987) [8], who found that the right ovaries are heavier than the left ovaries in both cycling and non-cycling Surti buffaloes. The observations made by Parkale and Hukeri (1989) [19], Parmar and Mehta (1992) [20] and Bhardwaj (1996) [5] in buffaloes are also in accordance with the present study. But it is in contrary to the observation of Settergren (1964) [25] in Swedish highland breed heifer, who stated that the left ovary was insignificantly heavier than the right ovary.

**Dimensions**

In both the age groups studied it was noticed the length of the left ovaries were more than the length of the right ovaries (Table 2.). However, the difference was insignificant. It agrees with the earlier findings of Danell (1987) [8], Bhardwaj (1996) [5] and Sarkhel *et al.*, (1999) [24] in buffaloes. They concluded that there is no significant difference in the width of left and right ovaries. But Suri *et al.*,(2013) [27] found that in Bakerwal goat, the right ovary had higher values in dimensions (length, width and thickness) in all age groups and the difference was statistically significant in prepubertal follicular group owing preference of large vesicular follicle. In the present study it was observed that, the width measurements of anterior pole, middle pole and posterior poles were not significantly different between left and right ovaries. It is in total agreement with the findings of Buker *et al.*, (2006) [6] in Sahel goats, who informed that there is no significant difference between left and right ovaries weight, length, and width.

**Table 1:** Weight of the ovaries of Buffaloes in different age group (Between the members of the different age groups)

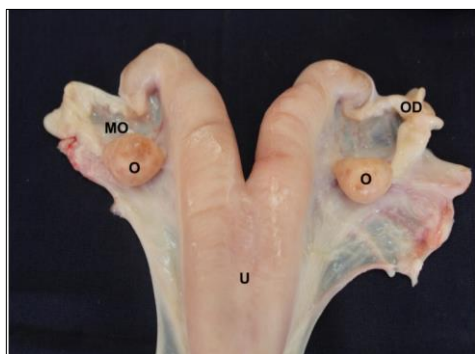
SIDE	Group – I (weight in gm)			Group – II (weight in gm)			t - Test	P - Value	RESULT
	N1	MEAN(X)	±SE(X)	N2	MEAN(Y)	±SE(Y)			
Left Ovary	6	1.52	0.2649	6	2.15	0.5874	0.98	0.3495	NS
Right ovary	6	1.88	0.2526	6	2.27	0.8255	0.46	0.6546	NS

NS – Non- Significant

**Table 2:** Length of the ovaries of Buffaloes in different age group (Between the members of the different age groups)

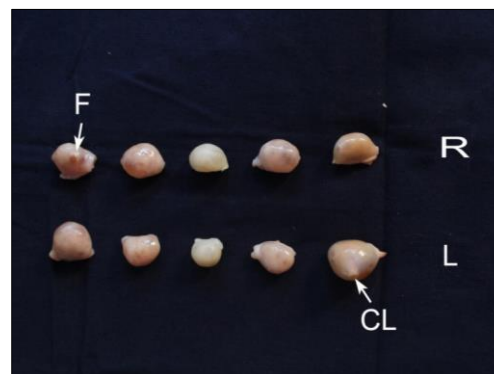
SIDE	Group – I (length in cm)			Group – II (length in cm)			t - Test	P - Value	Result
	N1	MEAN(X)	±SE(X)	N2	Mean(Y)	±SE(Y)			
Left Ovary	6	1.53	0.1085	6	1.93	0.2459	1.49	0.1675	NS
Right ovary	6	1.50	0.1291	6	1.77	0.2741	0.88	0.3994	NS

NS - Non-Significant



**Fig 1:** Photograph showing female reproductive tract of a five-year-old buffalo.

U – Uterus  
MO – Mesoovarium  
OD – Oviduct  
O – Ovary



**Fig 2:** Photograph showing surface view of right (R) and Left (L) ovaries of Buffaloes

F – Follicle  
CL – Corpus Luteum

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