

Biometry of ovary in different ruminant animals

Md. Reazul Islam^{1,2}, Rashida khaton³, Md. Hemayatul Islam³, Md. Niyamat Ullah³, Soniya Akter Nishi³,
Bobi Rani Paul³ and Md. Jalal Uddin Sarder^{3*}

¹Institute of Biological Sciences, University of Rajshahi

²Department of Preclinical Courses, Faculty of Veterinary and Animal Sciences, Gono Bishwabidyalay

³Department of Veterinary and Animal Sciences, University of Rajshahi

Abstract

Context: To establish a baseline data about the measurement of ovary of Cattle, Goat, Sheep and Buffalo.

Objectives: Estimation of biometry of ovary in different ruminant animals.

Materials and Methods: A total of 180 ovaries (Cow=50, Goat=50, Sheep=50, Buffalo=30) were studied from different slaughter houses of Rajshahi city corporation. The length, width and thickness of ovary were taken with the help of Slide Calipers. The weight of ovary was taken with the help of electrical weighing balance and finally Duncan's multiple range test (DMRT) was performed to observe significant differences of ovaries and genital tract.

Results: The results of the study revealed that the average mean length of right ovary of Cattle, Goat, Sheep, Buffalo were recorded as 2.52 ± 0.05 , 1.51 ± 0.05 , 1.17 ± 0.03 cm and 2.57 ± 0.06 cm, respectively that of the left ovary 2.41 ± 0.05 , 1.38 ± 0.05 cm, 1.12 ± 0.04 cm and 3.29 ± 0.13 cm, respectively. The width of right ovary was recorded as 1.88 ± 0.06 , 1.13 ± 0.06 , 0.79 ± 0.03 cm and 2.03 ± 0.07 cm, respectively that of the left ovary 1.80 ± 0.06 , 0.96 ± 0.04 , 0.76 ± 0.04 cm and 2.03 ± 0.07 cm, respectively. The thickness of right ovary was recorded as 1.58 ± 0.06 , 0.73 ± 0.02 , 0.65 ± 0.07 cm and 1.66 ± 0.06 cm, respectively that of the left ovary 1.59 ± 0.05 , 0.69 ± 0.03 , 0.55 ± 0.03 cm and 1.70 ± 0.06 cm, respectively. The weight of right ovary of Cattle, Goat, Sheep, Buffalo were recorded as 2.52 ± 0.05 , 1.51 ± 0.05 and 1.17 ± 0.03 gm, respectively that of the left ovary 3.87 ± 0.12 , 0.70 ± 0.04 , 0.57 ± 0.04 gm and 3.28 ± 0.13 gm, respectively.

Conclusions: The average means length, width and thickness of right ovary is more than the left ovary of experimental animals. It may be concluded that the biometry of ovary help to do proper artificial insemination thus improve reproductive performance of ruminant livestock for sustainable farming in Bangladesh.

Key Words: Biometry, Ovary, Ruminant and Animals.

Introduction

Bangladesh is one of the densely populated and the fourth largest agricultural country in the world (Habib, 2001). The economy of Bangladesh largely depends on agriculture. Livestock being one of the four major components (crops, livestock, fisheries and forestry) of agriculture and plays a vital role in national economy. In twenty first century the livestock sub-sector plays an important role in meeting the challenges of alleviate poverty of Bangladesh (Islam, 1998). At present about 6.5% of national GDP is covered by the livestock sector and its annual rate of productivity is 9% (Banglapedia, 2013). This sub-sector supplies more than 42.54% of the animal protein in the form of milk, meat and eggs (BBS, 1998). The goat (*Capra hircus*) species is a domestic animal in which the reproductive physiology is least understood compared to cattle, sheep and pig. Description of goat is usually made as if it is identical with sheep (Smith, 2010). The reproductive performance depends upon the normal structure and functions of genital organs of an animal (Siddiqui *et al.*, 2005). The knowledge of biometrical status of female genital tract is essential to perform artificial insemination, pregnancy diagnosis and dealing with the infertility problems (Memon, 1996). However, in a bid to increase and improve cattle production in Bangladesh, study on the effect of genotype/breed, age and body weight on reproductive organ of cow is essential for a maximum and rational utilization of the cattle breeding (Ibrahim *et al.*, 2012). Furthermore, there is limited study that compared reproductive organ on morphometric characteristic of any genotypes, age and body weight groups of cows. Little is known on the anatomy and

physiology of the female genitalia of tropical breeds of cattle compared to the exotic breeds (*Bos taurus*) been described by various authors (Getty, 1975; Napolcan and Quayam, 1997; Amle *et al.*, 1992). Reliable information on the reproductive parameters of cattle of different genotypes, age and body weight groups and parities owned by farmers and nomadic farmers in Bangladesh is scanty in the literature. Superior dairy cows selection seems to be very important and alternative approach to boost up the production potential. Therefore, during selection of dairy cows for breeding/production special attention should be given on genotype, age, body weight, soundness of the sexual organ. Hence, the need for this study to provide a baseline data for teaching and further research on the anatomy and physiology of the reproductive system and for enhancing the reproductive capacity within the genotypes, age and body weight groups. So, The present research work have been taken to evaluate the "Comparative biometry of ovary among ruminant livestock" for sustainable livestock farming in Bangladesh.

Materials and Methods

The biometrical study was conducted at the laboratory of the Department of Veterinary and Animal Sciences, University of Rajshahi from July, 2016 to June, 2017. Sample was collected from different slaughter houses (Shaheb bazar, Shalbagan, Binodpur bazar and Katakhal) of Rajshahi City Corporation.

Description of animals

Cross-bred cattle are mainly Holstein Friesian and Sahiwal. Approximately 20% animals are crossed in Bangladesh. Indigenous cattle are found everywhere of the country has no definite characteristics and constitute about 80% of indigenous cattle population of the country. Their coat color varies from red, grey, white, black or a mixture of them in different proportion.

* Corresponding author: jalalnusa@yahoo.com

They are of various sized animals possessing high level of phenotypic variation for most of the economic traits. They are of sole source of draught power of the subsistence farming system of the country. Major goat population constitutes Black Bengal Goat though some other breeds are also found around the country. Local sheep are available in the research area with small number of Garole sheep. Both Swamp type and river type Buffalo was found in the research area during the research period.

Grouping of experimental animals

To achieve the goal, animals were grouped according to following considering factors-Breed (Cow: Local, L × HF and L × SL; Goat: Black Bengal, Shirohi, Jamunapari, Sheep: Local sheep, Garole sheep; Buffalo: Swamp type, River type), Age group (Cow and Buffalo: <3 yrs, 3 ≤5 yrs, >5 yrs; Goat and Sheep: < 6 M, 6 M ≤ 1 yrs, 1 yrs ≤ 2yrs), Status of animal (cows and Buffalo cows: Heifer, cows; Goat and Sheep: Nulliparous, Multiparous), Body condition score (Poor, Medium, Good).

Procedure for collection of samples

After slaughtering, the reproductive tracts were separated from the pelvic viscera by dissection after sawing through the pelvic symphysis, the broad ligaments, the loose connective tissue and fat surrounding the vulva and the retroperitoneal part of the vagina were removed as far as possible. Excess fat and other tissues surrounding the ovaries were discarded by careful dissection to clear the organs for a better examination.

Methods of gross observation and measurement of ovaries

The observations of ovaries were done under broad day light. Grossly the entire ovaries were examined for the presence of any detectable abnormalities. After separating the broad ligaments the measurements of the organs were taken by different types of measuring instruments such as measuring tape, measuring scale, slide calipers, digital weight machine etc.

Examination procedure

After collection of reproductive organs are transferred to the laboratory in physiological saline of 30 to 38°C within 30 minutes of slaughter. As documented by Wilson, 1995; the ovaries were removed at their junction with the ovarian ligament as close to the ovarian tissue as possible after the fimbria was removed. The following parameters were observed. The length of ovary was taken along the excision from the ovarian ligament with the help of Slide Calipers (Figure 01). The width was taken as the greatest line perpendicular to the length line. The thickness was the distance between the medial and lateral surfaces of the ovary. The weight of ovary was taken in gm separately for the right and left with the help of electrical weighing balance (Figure 02). Also observed presence of adhesion, types of cyst, number of follicles and presence of corpus luteum.



Fig. 1. Measuring length of ovary



Fig. 2. Measuring weight of ovary

Statistical analysis

The measurement of different parts of genital organs of dairy cows was recorded using computer package programme. Simple ANOVA was performed considering the age of dairy cows and to observe the significant differences among the mean values. The Duncan's multiple range test (DMRT) was performed to observe significant differences of ovaries and genital tract in between different genotypes, age, body weight groups and parities of dairy cows. Data were presented as Mean±SE. All analysis was performed using SPSS software version 17.0. P<0.05 was considered as significant.

Results and Discussions

A total of 180 ovaries (Cow=50, Goat=50, Sheep=50, Buffalo=30) were studied from different slaughter houses of Rajshahi city corporation. Major anatomic deviation of ovaries especially length, width, thickness and weight were measured and these measurements in different species (Cattle, Goat, Sheep, Buffalo) are shown in Table 01, Figure 03 and Figure 04. The results of the study revealed that the average mean length of right ovary of Cattle, Goat, Sheep, Buffalo were recorded as 2.52 ± 0.05, 1.51 ± 0.05, 1.17 ± 0.03 cm and 2.57 ± 0.06 cm, respectively that of the left ovary 2.41 ± 0.05, 1.38 ± 0.05 cm, 1.12 ± 0.04 cm and 3.29 ± 0.13 cm, respectively. The width of right ovary was recorded as 1.88 ± 0.06, 1.13 ± 0.06, 0.79 ± 0.03 cm and 2.03 ± 0.07 cm, respectively that of the left ovary 1.80 ± 0.06, 0.96 ± 0.04, 0.76 ± 0.04 cm and 2.03 ± 0.07 cm, respectively. The thickness of right ovary was recorded as 1.58 ± 0.06, 0.73 ± 0.02, 0.65 ± 0.07 cm and 1.66 ± 0.06 cm, respectively that of the left ovary 1.59 ± 0.05, 0.69 ± 0.03, 0.55 ± 0.03 cm and 1.70 ± 0.06 cm, respectively. The weight of right ovary of Cattle, Goat, Sheep, Buffalo were recorded as 3.81 ± 0.11, 0.80 ± 0.04, 0.51 ± 0.04 gm, respectively that of the left ovary 3.87 ± 0.12, 0.70 ± 0.04, 0.57 ± 0.04 gm and 3.28 ± 0.13 gm, respectively.

Table 01. Average biometry of ovary in different species of animals.

Organs	Measurements	Species of animal			
		Cattle n=50	Goat n=50	Sheep n=50	Buffalo n=30
Right ovary	Length (cm)	2.52±0.05	1.51±0.05	1.17±0.03	2.57±0.06
	Width (cm)	1.88±0.06	1.13±0.06	0.79±0.03	2.03±0.07
	Thickness (cm)	1.58±0.06	0.73±0.02	0.65±0.07	1.66±0.06
	Weight (gm)	3.81±0.11	0.80±0.04	0.51±0.04	3.29±0.13
Left ovary	Length (cm)	2.41±0.05	1.38±0.05	1.12±0.04	2.55±0.06
	Width (cm)	1.80±0.06	0.96±0.04	0.76±0.04	2.03±0.07
	Thickness (cm)	1.59±0.05	0.69±0.03	0.55±0.03	1.70±0.06
	Weight (gm)	3.87±0.12	0.70±0.04	0.57±0.04	3.28±0.13

n=Total, ± = Standard error

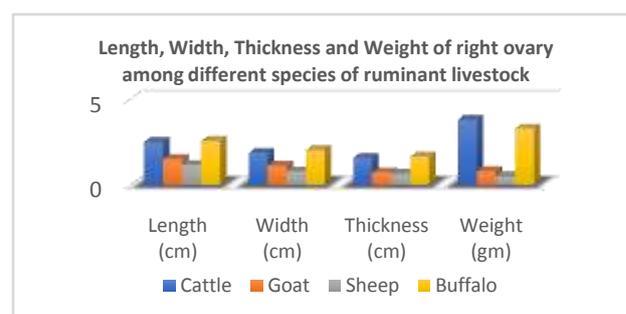


Fig. 3. Length, width, thickness and weight of right ovary among different species of ruminant livestock

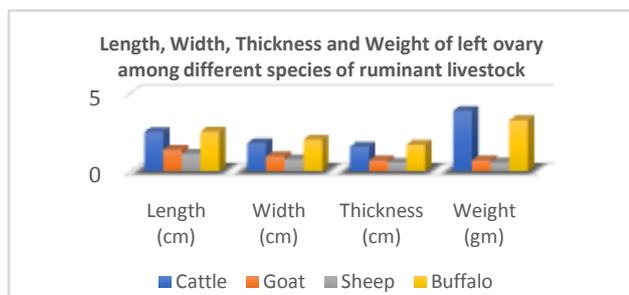


Fig. 4. Length, width, thickness and weight of left ovary among different species of ruminant livestock

Ovary of Cow

The results of the study revealed that the average mean length, width and thickness of right ovary of cow was recorded as 2.52 ± 0.05 , 1.88 ± 0.06 and 1.58 ± 0.06 cm and that of the left ovary 2.41 ± 0.05 , 1.80 ± 0.06 and 1.59 ± 0.06 cm, respectively. The weight of right and left ovary was recorded as 3.81 ± 0.11 gm and 3.87 ± 0.12 gm, respectively. Local \times Holstein Friesian has a significantly higher values ($P < 0.05$) on most of the parameters measured, followed by Local \times Sahiwal and the Local.

Table 2. Effects of Genotypes on ovarian biometry in dairy cows.

Organs	Measurements	Genotypes			Average
		Local n=12	L \times F n=27	L \times SL n=11	
Right ovary	Length (cm)	2.15 \pm 0.12 ^a	2.62 \pm 0.06 ^b	2.65 \pm 0.10 ^b	2.52 \pm 0.05
	Width (cm)	1.68 \pm 0.10	1.96 \pm 0.08	1.91 \pm 0.20	1.88 \pm 0.06
	Thickness (cm)	1.26 \pm 0.08 ^a	1.65 \pm 0.06 ^b	1.75 \pm 0.16 ^b	1.58 \pm 0.06
	Weight (gm)	3.00 \pm 0.17 ^a	4.25 \pm 0.13 ^b	3.60 \pm 0.14 ^c	3.81 \pm 0.11
Left ovary	Length (cm)	2.18 \pm 0.14 ^a	2.46 \pm 0.06 ^{ab}	2.55 \pm 0.12 ^b	2.41 \pm 0.05
	Width (cm)	1.55 \pm 0.12	1.89 \pm 0.08	1.87 \pm 0.19	1.80 \pm 0.06
	Thickness (cm)	1.31 \pm 0.14 ^a	1.72 \pm 0.05 ^b	1.59 \pm 0.15 ^{ab}	1.59 \pm 0.05
	Weight (gm)	2.81 \pm 0.14 ^a	4.45 \pm 0.13 ^c	3.60 \pm 0.09 ^b	3.87 \pm 0.12

n=Total, L=Local, F=Holstein Friesian, J=Jersey, SL=Sahiwal, \pm = Standard error, a,b means superscripts are statistically significant ($P < 0.05$) in between the column.

Ovary of Goat

The results of the study revealed that the average mean length, width and thickness of right ovary of goat was recorded as 1.51 ± 0.05 , 1.13 ± 0.06 and 0.73 ± 0.02 cm and that of the left ovary 1.38 ± 0.05 , 0.96 ± 0.04 and 0.69 ± 0.03 cm, respectively. The weight of right and left ovary was recorded as 0.80 ± 0.04 gm and 0.70 ± 0.04 gm, respectively. Jamunapari goat has a significantly higher values ($P < 0.05$) on most of the parameters measured, followed by Shirohi and the Black Bengal.

Table 03. Effects of Genotypes on ovarian biometry of goat.

Organs	Measurements	Genotypes			Average
		BB n=28	JP n=10	SR n=12	
Right ovary	Length (cm)	1.28 \pm 0.04 ^a	2.05 \pm 0.10 ^c	1.60 \pm 0.07 ^b	1.51 \pm 0.05
	Width (cm)	1.08 \pm 0.11	1.24 \pm 0.04	1.14 \pm 0.04	1.13 \pm 0.06
	Thickness (cm)	0.68 \pm 0.03 ^a	0.89 \pm 0.05 ^b	0.70 \pm 0.03 ^a	0.73 \pm 0.02
	Weight (gm)	0.71 \pm 0.04 ^a	1.01 \pm 0.12 ^b	0.85 \pm 0.12 ^{ab}	0.80 \pm 0.04
Left ovary	Length (cm)	1.20 \pm 0.05 ^a	1.84 \pm 0.10 ^c	1.44 \pm 0.10 ^b	1.38 \pm 0.05
	Width (cm)	0.92 \pm 0.06	1.09 \pm 0.07	0.95 \pm 0.09	0.96 \pm 0.04
	Thickness (cm)	0.67 \pm 0.04	0.82 \pm 0.11	0.62 \pm 0.05	0.69 \pm 0.03
	Weight (gm)	0.63 \pm 0.05 ^a	0.93 \pm 0.11 ^b	0.68 \pm 0.07 ^a	0.70 \pm 0.04

n=Total, BB=Black Bengal, JP=Jamunapari cross, SR=Shirohi cross, \pm = Standard error, a,b means superscripts are statistically significant ($P < 0.05$) in between the column.

Ovary of Sheep

The results of the study revealed that the average mean length, width and thickness of right ovary of sheep was recorded as 1.17 ± 0.03 , 0.79 ± 0.03 and 0.65 ± 0.07 cm and that of the left ovary 1.12 ± 0.04 , 0.76 ± 0.04 and 0.55 ± 0.03 cm, respectively. The weight of right and left ovary was recorded as 0.51 ± 0.04 gm and 0.57 ± 0.04 gm, respectively. Garole sheep has a significantly higher values ($P < 0.05$) on most of the parameters measured, followed by local.

Table 4. Effects of Genotypes on ovarian biometry of Sheep.

Organs	Measurements	Genotypes		Average
		LS n=43	GS n=07	
Right ovary	Length (cm)	1.14 \pm 0.03	1.37 \pm 0.11	1.17 \pm 0.03
	Width (cm)	0.78 \pm 0.03	0.84 \pm 0.12	0.79 \pm 0.03
	Thickness (cm)	0.66 \pm 0.08	0.64 \pm 0.12	0.65 \pm 0.07
	Weight (gm)	0.47 \pm 0.04	0.72 \pm 0.15	0.51 \pm 0.04
Left ovary	Length (cm)	1.09 \pm 0.04	1.31 \pm 0.16	1.12 \pm 0.04
	Width (cm)	0.76 \pm 0.05	0.74 \pm 0.16	0.76 \pm 0.04
	Thickness (cm)	0.54 \pm 0.03	0.57 \pm 0.11	0.55 \pm 0.03
	Weight (gm)	0.56 \pm 0.04	0.61 \pm 0.13	0.57 \pm 0.04

n=Total, LS= Local Sheep, GS= Garole Sheep \pm = Standard error

Ovary of Buffalo

The results of the study revealed that the average mean length, width and thickness of right ovary were recorded as 2.57 ± 0.07 , 1.70 ± 0.07 and 1.66 ± 0.06 cm and that of the left ovary 2.55 ± 0.06 , 2.03 ± 0.06 and 1.70 ± 0.06 cm, respectively. The weight of right and left ovary was recorded as 3.29 ± 0.13 gm and 3.28 ± 0.13 gm, respectively. River type buffalo has a significantly higher values ($P < 0.05$) on most of the parameters measured, followed by swamp.

Table 5 Effects of Genotypes on ovarian biometry of buffalo cow.

Organs	Measurements	Genotypes		Average
		Swamp type n=21	River type n=09	
Right ovary	Length (cm)	2.50 \pm 0.07	2.72 \pm 0.13	2.57 \pm 0.06
	Width (cm)	1.91 \pm 0.07	2.31 \pm 0.13	2.03 \pm 0.07
	Thickness (cm)	1.61 \pm 0.07	1.77 \pm 0.11	1.66 \pm 0.06
	Weight (gm)	3.24 \pm 0.16	3.40 \pm 0.22	3.29 \pm 0.13
Left ovary	Length (cm)	2.54 \pm 0.07	2.55 \pm 0.12	2.55 \pm 0.06
	Width (cm)	1.94 \pm 0.09	2.25 \pm 0.12	2.03 \pm 0.07
	Thickness (cm)	1.65 \pm 0.07	1.81 \pm 0.10	1.70 \pm 0.06
	Weight (gm)	3.15 \pm 0.17	3.57 \pm 0.20	3.28 \pm 0.13

n=Total, \pm = Standard error

The average mean length of the ovary recorded in the present study fall within the range (1.30 to 3.5 cm) of the results of Dobson and Kamonpatana (1986), Kunbhar *et al.* (2003), Carvalho *et al.* (2005), Ali *et al.* (2006), Ahmed (2011) Bello *et al.* (2012) and Leal *et al.* (2013). However the measurement for length recorded in the present study was shorter than the figures (2.8 to 5.0 cm) reported by Salisbury and Vandemark (1961), Roberts (1982), Memon (1996) and Jaji *et al.* (2012) in cattle. The width of ovary as recorded in the present study was in agreement with the results (1.1-1.9 cm) of Salisbury and Vandemark (1961), Roberts (1982), Kunbhar *et al.* (2003), Ali *et al.* (2006), Ahmed (2011) and Bello *et al.* (2012) in cattle. However, it was slightly smaller to those (2.2-3.01 cm) reported by Drennan and Macpherson (1966), Sission and Grossman (1972), Getty (1995), Carvalho *et al.* (2005), Jaji *et al.* (2012)

and Leal *et al.* (2013) in cattle. The thickness of the ovary found in the present study was in the range of those (0.6-2.0 cm) recorded by Kunbhar *et al.* (2003), Carvalho *et al.* (2005) and Ali *et al.* (2006) Bello *et al.* (2012), Jaji *et al.* (2012) and Leal *et al.* (2013) in cattle.

However, the results obtained by Salisbury and Vandemark (1961), Arthur *et al.* (1989) and Memon (1996) were greater than the present findings. The present findings for the weight of ovary were in agreement to those (3.8 g) reported by Arthur *et al.* (1989) and Kunbhar *et al.* (2003) in cattle. On the other hand higher weight (4-19 g) of right and left ovary was reported by Roberts (1982), Carvalho *et al.* (2005), Ali *et al.* (2006), Ahmed (2011), Bello *et al.* (2012), Jaji *et al.* (2012) and Leal *et al.* (2013). The discrepancy in the parameters could be due to age, breed, parity, body weight, body condition score, and management factors variation as it is established fact that the ovaries of *Bos indicus* breeds are generally smaller and lighter than those of the *Bos taurus* breeds. It was concluded that the left ovary is shorter in length, narrower in width and lighter in weight to that of the right ovary in different genotype, age and body weight and parities of dairy cows. This confirms the fact that the right ovary is more active than the left ovary (Rind *et al.*, 1999). Ramsingh *et al.* (2013) revealed that the length, width and thickness of the right and left ovaries were 1.54 ± 0.03 and 1.54 ± 0.04 , 1.17 ± 0.03 cm and 1.4 ± 0.03 ; 0.80 ± 0.02 and 0.82 ± 0.03 cm, respectively. There were no differences between right and left ovaries in terms of length and thickness. The weights of the right and left ovaries were 0.91 ± 0.06 and 0.93 ± 0.07 without any significant differences which is in agreement with the studies of Ijapuri *et al.* (1999) and Adigwe and Fayemi (2005). The variation in the biometrics might be attributed to geographic location, breed, season and nutrition etc. Comparatively a lower length for both right and left ovaries of goats was reported by Islam *et al.* (2007). However, a higher length was reported by Mohammadpur (2007) in Iranian native goat, Adigwe and Fayemi (2005) in Maradi goat of Nigeria and Sharma and Sharma (2004) in Gaddy goats of India, respectively. A significant ($p < 0.01$) difference was found between the mean width of right and left ovaries (Table 1). The mean weight of the ovary recorded in the present study was lower than that of Islam *et al.* (2007).

Also Al- Saffar (1998) reported that the dimensions of ovary in cattle and Buffalo in which the length of ovary in cattle is 2.8 – 3.8 cm and width is 5.0 – 9.4 cm, but the ovary in buffalo attained 2.2 – 2.9 cm in length and 3-4 gm. in weight. On the other hand Al- Saffar (1996) reported the dimensions of ovaries in cattle, which the right ovary is 2.61 cm in length, 1.94 cm in width, and the left ovary is 2.43 cm in length and 1.68 cm in width. So this found that the result of the present study was more or less similar to Al- Saffar (1998) and Al- Saffar (1996).

Conclusion

The results of the study revealed that the average mean length of right ovary of Cattle, Goat, Sheep, Buffalo were recorded as 2.52 ± 0.05 , 1.51 ± 0.05 , 1.17 ± 0.03 cm and 2.57 ± 0.06 cm, respectively that of the left ovary 2.41 ± 0.05 , 1.38 ± 0.05 cm, 1.12 ± 0.04 cm and 3.29 ± 0.13 cm, respectively. The width of right ovary was recorded as 1.88 ± 0.06 , 1.13 ± 0.06 , $0.79 \pm$

0.03 cm and 2.03 ± 0.07 cm, respectively that of the left ovary 1.80 ± 0.06 , 0.96 ± 0.04 , 0.76 ± 0.04 cm and 2.03 ± 0.07 cm, respectively. The thickness of right ovary was recorded as 1.58 ± 0.06 , 0.73 ± 0.02 , 0.65 ± 0.07 cm and 1.66 ± 0.06 cm, respectively that of the left ovary 1.59 ± 0.05 , 0.69 ± 0.03 , 0.55 ± 0.03 cm and 1.70 ± 0.06 cm, respectively. The weight of right ovary of Cattle, Goat, Sheep, Buffalo were recorded as 2.52 ± 0.05 , 1.51 ± 0.05 and 1.17 ± 0.03 gm, respectively that of the left ovary 3.87 ± 0.12 , 0.70 ± 0.04 , 0.57 ± 0.04 cm and 3.28 ± 0.13 gm. A number of factors influence the proper development of ovarian biometry and ovarian disorders including the species and pathogenecity of the causative agent, the cellular and immunological defensive mechanisms, hormonal imbalance, and dietary status of the animal concerned, introduction of cross breeding programme among high yielding varieties of cows and environmental sanitation. In addition to this lack of proper education or hygienic management of the postpartum cows and limited veterinary services has aggravated the situation. Therefore, in order to combat the occurrence of ovarian problems cross breeding programme through artificial insemination must be performed by skilled personnel under adequate veterinary inspection and increase cautious farming management. The etiology of having other conditions could be due to bacterial infection in the genital tract, nutritional deficiency/imbalance or stresses required further investigation.

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