

### Mona maghraby

### بسم الله الرحمن الرحيم

مركز الشبكات وتكنولوجيا المعلومات قسم التوثيق الإلكتروني







### Mona maghraby

### جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها على هذه الأقراص المدمجة قد أعدت دون أية تغيرات





### Mona maghraby





بعض الوثائق الأصلية تالفة وبالرسالة صفحات لم ترد بالأصل



B1119

Assiut University
Faculty of Veterinary Medicine
Department of Theriogenology



### STUDIES ON BUFFALO CERVIX IN RELATION TO REPRODUCTION

Thesis
Presented by

WALEED SENOSY ALI SENOSY
(B.V.Sc)
Assiut University

For the degree of M. V. Sc. Theriogenology

Under the supervision of

Prof. Dr. M. Abdel-Raouf Prof.emeritus of Theriogenology Prof. Dr. A. A. Farrag Prof. And the Head of Theriogenology Department

Dr. A. Kh. Abdel Razek Assistant prof. of Theriogenology

Assiut University (2005)

Assiut University
Faculty of Veterinary Medicine
Department of Theriogenelogy

### APPROVAL SHEET

This is to certify that the dissertation presented by

### WALEED SENOSY ALI SENOSY

For

M. V. Sc. Degree in Veterinary sciences (Theriogenology)

MR. Fath El-Bal

Had been approved by the judgement committee:

Prof. Dr. Mohammed Samy Sayed Abdou Professor of Theriogenology Faculty of Veterinary Medicine - Cairo University

Prof. Dr. Mohammed Rashad FathEl-Bab Professor of Histology Faculty of Veterinary Medicine - Assiut University

Prof. Dr. Mohammed Abdel-Raouf El-Sayed Professor emeritus of Theriogenology Faculty of Veterinary Medicine - Assiut University

Prof. Dr. Ahmed Abdel-Reheim Farrag
Professor of Theriogenology
Faculty of Veterinary Medicine - Assiut University

بسو الله الرحمن الرحيم

# خال المتعلد له الما علد لا خاناميس المالة) (ميكما الميل علم الميل الميل

سورة البقرة اية ٢٦

حدق الله العظيم

# To my Parents, my Wife and my Daughter

### **CONTENTS**

	Page
INTRODUCTION	1
REVIEW OF LITERATURE	
Buffalo	4
Cow	10
Sheep and Goat	19
Gestational changes in the dimensions of the cervix	22
MATERIALS AND METHODS	24
RESULTS	
Macroscopical characters of the cervix	29
Micromorphological features of the cervix	47
Ultrasonic picture of the cervix at different reproductive status	64
DISCUSSION	
Macroscopical characters of the cervix	74-
Micromorphological features of the cervix	78
Ultrasonic picture of the cervix	80
SUMMARY AND CONCLUSION	83
REFERENCES	87
ARABIC SUMMARY	

### INDEX OF FIGURES

	Page	
Figure 1: The cervix of buffalo (opened tube) showing the three regions		
where the specimens were obtained.		
Figure 2: Length of the cervix (cm) in follicular, luteal and static phases.	32	
Figure 3: Diameter of the cervix (cm) in follicular, luteal and static phase	es. 33	
Figure 4: Thickness of cervical wall (cm) in follicular, luteal and static p	ohases 33	
Figure 5: Buffalo genital tract with cervix opened longitudinally with two cervical		
rings	35	
Figure 6: Buffalo cervix with three transverse rings	36	
Figure 7: Buffalo cervix with four transverse rings	36	
Figure 8: Number of transverse cervical rings	37	
Figure 9: Frequency of transverse rings	37	
Figure 10: Height of transverse rings in case of two rings	39	
Figure 11: Height of transverse rings in case of three rings	40	
Figure 12: Height of cervical rings in case of four transverse rings	42	
Figure 13: Height of uterine and vaginal transverse rings		
in case of 2, 3 and 4 rings	44	
Figure 14: Number of cervical longitudinal folds	46	
Figure 15: Frequency of cervical longitudinal folds	46	
Figure 16: Cross section in the buffalo cervix at the anterior		
(uterine) third stained by Masson's Trichrome	49	
Figure 17: Cross section in the buffalo cervix at the		
middle third stained by Masson's Trichrome	50	
Figure 18: Cross section in the buffalo cervix at the posterior		
(vaginal) third stained by Masson's Trichrome	51	
Figure 19 A: The cervical mucosa of buffaloes showing primary, secondary and		
tertiary folds and cervical glands (Masson's Trichrome.: x 25)		
Figure 19 B: The cervical mucosa of buffaloes showing primary, secon		
tertiary folds and cervical glands (Masson's Trichrome.: x 50)	). 53	

Figure 20: The cervical mucosa of buffaloes showing Lamina epithelialis	
and Lamina propria (Masson's Trichrome. x 400).	54
Figure 21 A: The tubular cervical glands (Masson's Trichrome: x 200).	55
Figure 21 B: The tubular cervical glands (Masson's Trichrome: x 400).	56
Figure 22: The inner circular muscle layer of the cervix uteri showing	
numerous blood vessels in between its fibrillar elements	
(Masson's Trichrome x 100).	57
Figure 23: The outer longitudinal muscle layer of the cervix uteri represente	d as
small muscle bundles dispersing into an abundance of collagenous	
connective tissue elements (Masson's Trichrome x 25).	58
Figure 24 A: vascular layer composing of several arterioles demonstrating	
themselves in between the inner circular and outer longitudinal	
muscle layers (Masson's Trichrome.: x 50).	59
Figure 24 B: vascular layer composing of several arterioles demonstrates	
themselves in between the inner circular and outer longitudinal	
muscle layer (Masson's Trichrome.: x 25).	60
Figure 25: The outer portion of the cervical wall (cranial portion) showing	
tunica serrosa and muscular tunic (Masson's Trichrome x 50)	61
Figure 26: The thickness of the inner and outer muscular layers of the	
uterine cervix (mm)	63
Figure 27: Ultrasonographic appearance of the cervix	
during the prepubertal period	67
Figure 28: Ultrasonographic appearance of the cervix	
during the follicular phase of estrous cycle	68
Figure 29: Ultrasonographic appearance of the cervix	
during the luteal phase of estrous cycle	68
Figure 30: Ultrasonographic appearance of the cervix	
during the first trimester of pregnancy	69

Figure 31: Ultrasonographic appearance of the cervix	
during mid gestation period	70
Figure 32: Ultrasonographic appearance of the cervix	
during late gestation period	71
Figure 33: Ultrasonographic appearance of the cervix	
during the last month of pregnancy	72
Figure 34: Cervical depth at different reproductive status	73
INDEX OF TABLES	
	Page
Table 1: External Measurements (cm) of the cervix at different	
phases of ovarian activity	31
Table 2: Number and frequency of transverse cervical rings	34
Table 3: Height (cm) of transverse rings in case of two rings	38
Table 4: Height (cm) of transverse rings in case of three rings	40
Table 5: Height (cm) of transverse rings in case of four rings	41
Table 6: Height of uterine and vaginal transverse rings (cm)	
in case of 2, 3 and 4 rings	43
Table 7: Number of cervical longitudinal folds	45
Table 8: The thickness of the inner and outer muscular layers	
of the uterine cervix (mm)	62
Table 9: The relative thickness of the inner and outer muscular layers	
of the uterine cervix (%)	62
Table 10: The muscle-connective tissue content within the inner circular	
and outer longitudinal layers of the muscular coat	
of the cervix of buffaloes by Morphomat	63

# 

### **ACKNOWLEDGEMENTS**

This work would have never been crowned by success without the blessing of ALLAH, to whom my loyalty will remain forever beyond any compromise.

I wish to express my deepest appreciation, gratitude and thanks to **Professor M. Abdel-Raouf**, Professor emeritus of Theriogenology, for his valuable guidance and instructive supervision. His kind help was my candle to complete this work.

I would like also to express my sincere thanks to **Professor A. A. Farrag**, Professor and head of the Department of Theriogenology, for his close supervision and the revision of the whole work. I drew heavily on his time and he kindly never let me down.

I am deeply grateful to **Dr. A. Kh. Abdel-Razek**, Assistant professor of Theriogenology, for his guidance, continuous encouragement and support during the whole scope of the study.

I would like to thank Professor M. R. Fateh El-Bab, and Professor A. O. Salem Professors of Histology for their valuable help and guidance during the histological studies provided by the present investigation.

My deep thanks to **Dr. A. M. Ali**, Lecturer of Theriogenology, for his kindness and help in the ultrasonographic investigation presented in this work.

## INTRODUCTION

#### INTRODUCTION

The buffalo is an important farm animal in Egypt. It is considered the future animal which can provide a reliable source of red meat. The animal is of a dual purpose, as it is used in milk (1110 –2035 Kg / season) and meat production. Buffaloes characterized by their resistance to many diseases that infect cows. The population of buffaloes in Asian and Mediterranean areas averaged about 150 million head (Kruel 1991; Ali, Gilles, Fidelak, Henrion and Glatzel 2000 and Glatzel, Ali, Gilles and Fidelak 2000).

The total number of buffaloes in Egypt is about 3,560,000 heads (FAO, 2004). About 95% of this number is kept by individual farmers. The limited productivity in domesticated buffaloes is attributed to several reasons as inbreeding (Danell 1987) feeding and health care (Staigmiller and England 1982), however the major problem seems to be infertility that is much higher than in cattle (El sawaf and Schmidt 1962; Ragab, Fouda and Khalmas 1989; Dobson and Kamonpatana 1986 and Singh, Nanda and Adams 2000). Unfortunally, the scope upon this animal was delayed until the last decades, especially from the reproductive point of view. To improve fertility in buffaloes an adequate knowledge about reproduction and reproductive behavior is necessary (Glatzel et al., 2000).

The cervix is a powerful tubular sphincter of muscular structure between the vagina caudally and the uterus cranially, which during most of the time is firmly closed. It has a major role in the processes of reproduction. The specific functions of cervix, which are controlled by different reproductive hormones during the reproductive cycle as well as during parturition, pushed the scientists to focus their researches on its