

GROSS, HISTOLOGICAL AND HISTOCHEMICAL CHARACTERIZATION
OF SELECTED REPRODUCTIVE ORGANS OF COMMON
PALM CIVET (*Paradoxurus hermaphroditus*)

THESIS

REYR MANANTAN GUEYARRA

College of Veterinary Medicine and Biomedical Sciences

CAVITE STATE UNIVERSITY

Indang, Cavite

Cavite State University (Main Library)



T5732

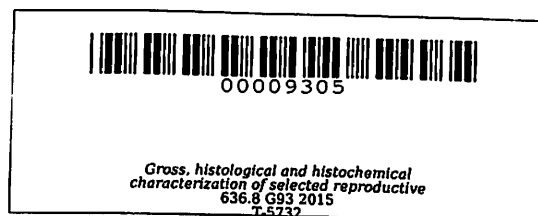
THESIS/SP 636.8 G93 2015

April 2015

**GROSS, HISTOLOGICAL AND HISTOCHEMICAL CHARACTERIZATION
OF SELECTED REPRODUCTIVE ORGANS
OF COMMON PALM CIVET
(*Paradoxurus hermaphroditus*)**

Undergraduate Thesis
Submitted to the Faculty of the
College of Veterinary Medicine and Biomedical Sciences
Cavite State University
Indang, Cavite

In partial fulfilment
of the requirements for the degree
Doctor of Veterinary Medicine



REVIR MANANTAN GUEVARRA
April 2015

ABSTRACT

GUEVARRA, REVIR M., Gross, Histological and Histochemical Characterization of Selected Reproductive Organs of Common Palm Civet (*Paradoxurus hermaphroditus*). Undergraduate Thesis. Doctor of Veterinary Medicine. Cavite State University, Indang, Cavite, April 2015. Adviser: Chester Joshua V. Saldaña, DVM, MS

A study was conducted to determine the gross, histologic and histochemical characteristics of reproductive organs of common palm civet (*Paradoxurus hermaphroditus*) by morphometry and microscopic examination using various stains.

A male and female common palm civets accidentally caught were used in the study. Morphometric features were taken and reproductive organs were collected, identified, and measured. Tissue samples were harvested and processed using Hematoxylin and Eosin, Van Gieson, Alcian Blue at pH 2.5 and 1.0, and Periodic Acid-Schiff as stains. Microscopic examinations were done at different magnification and features were observed and noted.

The common palm civets have a long body covered with gray to light brown hair with three black stripes at the tail. The total length of the male common palm civet was 106.8 cm and 95.9 cm for female weighing 3.1 kg and 2.9 kg, respectively. The sample animals were identified as adult but lighter than the reported values.

The testis is a paired, white colored oval gland with firm consistency with epididymis on its dorsolateral border enclosed within the scrotum outside the abdominal cavity. On the other hand, a paired oval ovary of the female is located in the pelvic cavity caudal to the kidney which is bilaterally flattened, concealed in an ovarian bursa. A tubular organ that lies to the dorsal surface of the small intestine comprised of distinct regions: the uterus and vagina. Histologically, the testis, epididymis and the ovary of the

TABLE OF CONTENTS

	Page
BIOGRAPHICAL DATA.....	iii
ACKNOWLEDGEMENT.....	iv
ABSTRACT.....	vi
LIST OF TABLES.....	x
LIST OF FIGURES.....	xi
LIST OF APPENDIX TABLES.....	xiv
LIST OF APPENDICES.....	xv
INTRODUCTION.....	1
Significance of the Study.....	2
Objectives of the Study.....	3
Scope and Limitations of the Study.....	4
Time and Place of the Study.....	5
REVIEW OF THE RELATED LITERATURE.....	5
MATERIALS AND METHODS.....	22
Sample Animals.....	22
Tissue Processing.....	22
Histological Examination.....	24
RESULTS AND DISCUSSION.....	25
Gross Morphology of the Reproductive Organs.....	26
Histology of the Reproductive Organs.....	31
Histochemistry of the Reproductive Organs.....	54

Van Gieson stain.....	54
Alcian Blue pH 2.5 & pH 1.0 stain.....	55
Periodic Acid-Schiff stain.....	58
SUMMARY, CONCLUSION AND RECOMMENDATIONS.....	59
REFERENCES.....	63
APPENDICES.....	70

LIST OF TABLES

Table		Page
1	Morphometric comparison between the adult common palm civet (Pai, 2008) and common palm civet in the study.....	25
2	Histochemical reactions of the different reproductive organs of the male and female common palm civet to various stains.....	54

LIST OF FIGURES

Figure		Page
1	A heavily wounded adult male common palm civet accidentally caught by a trap. Note that the viverrid is covered with coarse gray hair, a distinct feature of the animal.	23
2	The right testis (A) of a male common palm civet. Note it is a white oval gland positioned on the dorsolateral margin of Epididymis and divided into Head (B), Body (C), and Tail (D).....	27
3	Gross appearance of the female reproductive tract of the common palm civet; O – ovary, UH – uterine horn, UB – uterine body, and V – vagina.....	29
4	Gross appearance of ovary (arrow) of the common palm civet (<i>Paradoxurus hermaphroditus</i>). Note the ovary is bilaterally flattened and concealed in the ovarian bursa and lies caudal to the kidney.....	30
5	A 40x magnification image of the tunica albuginea of testis (A) stained with Hematoxylin and Eosin. It has wavy appearance with thickness of 250.33µm.....	32
6	The seminiferous tubules of a common palm civet (<i>Paradoxurus hermaphroditus</i>) having different shape and sizes, Hematoxylin and Eosin (40x).....	34
7	The seminiferous tubule of a common palm civet (<i>Paradoxurus hermaphroditus</i>). Note the different cells (A) Myoid Cells, (B) Spermatogonia, (C) Primary Spermatocytes, and (D) Interstitial Cells or Leydig Cells. Cross section, Periodic Acid-Schiff (400x).....	35
8	Section of epididymis showing epididymal ducts with various shapes and sizes. Cross section. Hematoxylin and Eosin (H&E), 40x	37
9	A section of the ovary showing tunica albuginea (A), cortex (B), and	

	medulla (C). Cross section, Hematoxylin and Eosin (H&E), 40x.....	38
10	Section of the ovary showing cortical (C) and medullary (M) region. Hematoxylin and Eosin (H&E), 200x.....	40
11	The primary follicle surrounded by a single layer of cuboidal epithelial cells (arrow). Cross section, Hematoxylin and Eosin (H&E), 400x.....	41
12	An early growing follicle in the ovary with two-layered follicular cells (arrow). Cross section, Hematoxylin and Eosin (H&E), 400x.....	42
13	A 400x magnification image of an ovary of common palm civet (<i>Paradoxurus hermaphroditus</i>) stained with Hematoxylin and Eosin showing a late growing follicle surrounded by theca interna (Ti) and externa (Te). The zona pellucida (arrow) is also shown	43
14	Cross section of the ovary showing the graafian follicle that exhibit an incipient antrum (A), corona radiata (arrow), and cumulus oophorus (Co). Hematoxylin and Eosin (H&E), 400x.....	44
15	The uterus showing mucosal folds (F), endometrium (E), myometrium (M), and perimetrium (P). Cross section, Hematoxylin and Eosin (H&E), 40x.....	45
16	The columnar lining epithelium (A) of the uterus stained with Hematoxylin and Eosin (H&E) and simple tubular gland (B) of the endometrium. Cross section, 400x.	47
17	Cross section of the vagina showing stratified squamous epithelium (arrow). Hematoxylin and Eosin (H&E), 200x	48
18	The lamina propria and tunica submucosa (A) of the uterus of a female <i>Paradoxurus hermaphroditus</i> . Cross section, Hematoxylin and Eosin (H&E), 200x.....	49
19	The vagina of the common palm civet (<i>Paradoxurus hermaphroditus</i>) stained with Hematoxylin and Eosin showing mucosal folds (F),	

	and tunica muscularis (M). Cross section, 40x.....	50
20	The uterus showing the myometrium composed of inner circular (Mc) and outer longitudinal (Ml) smooth muscle. Note the stratum vasculare (Mv) lying between the inner circular and outer longitudinal smooth muscle. Cross section, Hematoxylin and Eosin (H&E), 100x.....	52
21	The tunica serosa (S) of the uterus which consists of loose connective tissue. Cross section, Hematoxylin and Eosin (H&E), 400x.....	53
22	The tunica albuginea of testis (A), epididymis (B), and ovary (C) and the tunica serosa of the uterus (D) reacted positively to Van Gieson stain indicated by pink color. Cross section, 100x.....	56
23	A section of the lining epithelium of the epididymal duct showing a positive reaction (blue color) to the Alcian Blue pH 2.5 (A) and to Alcian Blue pH 1.0 (B). The granulosa cells that lines the antrum of the tertiary follicle of the ovary reacted positively to Alcian Blue pH 2.5 (C) and to Alcian Blue pH 1.0 (D) indicated by blue color. Cross section, 400x.....	57

LIST OF APPENDIX TABLES

Appendix Table		Page
1	Gross length of the different reproductive organs of the male and female common palm civet.....	67
2	Measurement of the tunica albuginea and parenchyma of the testis and ovary of the common palm civet.....	68
3	Measurement of the reproductive tunics of the female common palm civet.....	69

LIST OF APPENDIX TABLES

Appendix Table		Page
1	Gross length of the different reproductive organs of the male and female common palm civet.....	67
2	Measurement of the tunica albuginea and parenchyma of the testis and ovary of the common palm civet.....	68
3	Measurement of the reproductive tunics of the female common palm civet.....	69

LIST OF APPENDICES

Appendix		Page
A	Basic Morphometry.....	71
B	Necropsy Procedure.....	72
C	Calibration and Use of Micrometer.....	74

**GROSS, HISTOLOGICAL AND HISTOCHEMICAL CHARACTERIZATION
OF SELECTED REPRODUCTIVE ORGANS
OF COMMON PALM CIVET
(*Paradoxurus hermaphroditus*)**

REVIR MANANTAN GUEVARRA

An undergraduate thesis manuscript submitted to the faculty of College of Veterinary Medicine and Biomedical Sciences, Cavite State University, Indang, Cavite in partial fulfilment of the requirements for the degree of Doctor of Veterinary Medicine with Contribution Number 2014-2015 07 . Prepared under the supervision of Dr. Chester Joshua V. Saldaña.

INTRODUCTION

The common palm civet (*Paradoxurus hermaphroditus*), also known as toddy cat is a small member of the Viverridae that can be found as far west as Kashmir and as far east as the Philippines. Locally called as “musang”, these nocturnal animals are primarily ground-dwelling as they mark their ranges by dragging their anal glands along the ground. Despite being predominately ground-dwelling, the common palm civet is known to climb up into the trees either in search of food or to hide from approaching predators (Duckworth, Widman, Gonzalez, Jennings & Veron, 2008).

The common palm civets are relatively voracious omnivores (Grassman Jr., 1998). They utilize fruits such as berries and pulpy fruits as a major food source and also feed on chiku, mango, rambutan and coffee with small mammals and insects and thus help to maintain tropical forest ecosystems via seed dispersal. In India, civets are bred to harvest musk, described as sweet, pleasant and acquired by scraping out from the civet's