

## TABLE OF CONTENTS

	Page
TABLE OF CONTENTS .....	i
LIST OF TABLES .....	iii
LIST OF FIGURES .....	iv
LIST OF ABBREVIATIONS .....	v
INTRODUCTION .....	1
Objective.....	2
LITERATURE REVIEWS .....	3
Classification of Coronaviruses .....	3
Feline Coronavirus.....	6
Virion Morphology.....	8
Viral Genome.....	9
Feline Coronavirus Replication .....	11
Feline Enteric Coronavirus Infection .....	20
Feline Infectious Peritonitis Virus Infection.....	22
Diagnosis.....	32
MATERIALS AND METHODS.....	35
Virus and Clinical Specimens .....	35
Primer Selection.....	36
RNA Extraction .....	36
Standardization of RT-nPCR.....	39
Analysis of PCR-Amplified Products.....	42
Detection of Antibodies to FCoV.....	42
RESULTS .....	47
Samples.....	47
Efficiency of Different RT-nPCRs .....	47

## TABLE OF CONTENTS (Continued)

	Page
Prevalence of FCoV and FIPV.....	50
CONCLUSION AND DISCUSSIONS.....	64
LITERATURE CITED .....	70
APPENDIX.....	83

## LIST OF TABLES

Table		Page
1	Three groups of coronaviruses on the basis of serology.....	5
2	Two serotype of FCoV on the basis growth characteristics in cell culture and comparative degree of neutralization by antisera to CCoV .....	6
3	Feline infectious peritonitis virus isolates.....	24
4	A weighted scoring system for FIP diagnosis.....	34
5	Comparison results of multiplex nPCR with regular nPCR techniques.....	50
6	Results of serum samples and effusive fluids examined for the presence of FCoV or FIPV RNA, antibodies to FCoV as well as clinical signs resemble FIP.....	51
7	Proportion of cats from the central and eastern part of Thailand which were positive for FCoV and FIPV RNAs tested by RT-nPCR or antibodies to FCoV examined by dot blot ELISA .....	59
8	Relationship between detection of FCoV RNA by RT-nPCR and detection of antibody of FCoV by ImmunoComb .....	63

## LIST OF FIGURES

Figure	Page
1	Electron micrograph showing human coronavirus 229E ..... 3
2	A model of typical coronavirus structure ..... 9
3	Pathogenesis of feline infectious peritonitis (FIP) ..... 26
4	A pronounced case of effusive FIP form ..... 29
5	Abdominal cavity in effusive FIP ..... 29
6	The retina of a cat with noneffusive FIP ..... 30
7	Positions of the selected primers for the RT-nPCR..... 37
8	Rneasy Total RNA Kit flowchart ..... 38
9	Example of two teeth of a developed comb ..... 43
10	ImmunoComb <sup>®</sup> FCoV Antibody Test Kit flowchart..... 45
11	The Comb Scale ..... 46
12	Electrophoretic analysis of PCR products from cDNA synthesis with either oligo(dT) (a) or random primers (b) ..... 48
13	Electrophoretic analysis of PCR products from FCoV RT-nPCR positive samples ..... 60
14	Electrophoretic analysis of PCR products from FIPV RT-nPCR positive samples ..... 62

## LIST OF ABBREVIATIONS

ADE	=	Antibody-Dependent Enhancement
APN	=	Aminopeptidase-N
BCoV	=	Bovine Coronavirus
CCoV	=	Canine Coronavirus
cDNA	=	Complementary Deoxyribose Nucleic Acid
CICs	=	Circulating Immune Complexes
CMI	=	Cell-Mediated Immune
CNS	=	Central Nervous System
DI	=	Defective Interfering
DNA	=	Deoxyribose Nucleic Acid
E	=	Envelope
ELISA	=	Enzyme-Linked Immunosorbent Assay
ER	=	Endoplasmic Reticulum
fAPN	=	Feline Aminopeptidase-N
FCoV	=	Feline Coronavirus
FECV	=	Feline Enteric Coronavirus
FIP	=	Feline Infectious Peritonitis
FIPV	=	Feline Infectious Peritonitis Virus
GITC	=	Guanidine Isothiocyanate
hAPN	=	Human Aminopeptidase-N
HCoV	=	Human Coronavirus
HE	=	Hemagglutinin-Esterase
HEV	=	Hemagglutinating Encephalomyelitis Virus
IBV	=	Infectious Bronchitis Virus
IS	=	Intergenic Sequence
M	=	Membrane
MAb	=	Monoclonal Antibody

## LIST OF ABBREVIATIONS (Continued)

MHV	=	Murine Hepatitis Virus
mRNA	=	Messenger Ribose Nucleic Acid
N	=	Nucleocapsid
ORFs	=	Open Reading Frames
pAPN	=	Porcine Aminopeptidase-N
PCR	=	Polymerase Chain Reaction
Pol	=	Polymerase
PRCoV	=	Porcine Respiratory Coronavirus
RbCoV	=	Rabbit Coronavirus
RER	=	Rough Endoplasmic Reticulum
RNA	=	Ribonucleic Acid
RNP	=	Ribonucleoprotein
RT-nPCR	=	Reverse Transcriptase Nested Polymerase Chain Reaction
RT-PCR	=	Reverse Transcriptase Polymerase Chain Reaction
S	=	Spike, Peplomer
SAR-CoV	=	Severe Acute Respiratory Syndrome Coronavirus
SDAV	=	Sialodacryoadenitis Virus
TAS	=	Transcription-Associated Sequence
TCoV	=	Turkey Coronavirus
TGEV	=	Transmissible Gastroenteritis Virus
UTR	=	Untranslated Region
VLPs	=	Virus-Like Particles