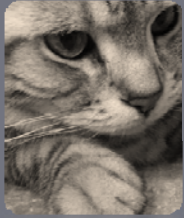


# Intratubal Artificial Insemination (ITAI) in cat



Ajjima Chansaenroj D.V.M.(Hons), M.Sc.

Faculty of Veterinary Medicine  
Mahanakorn University of Technology



# Breeding management

## ○ Principle

### ■ Male

Semen collection

Semen evaluation

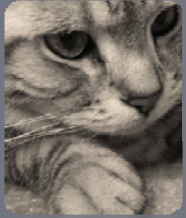
Semen preservation

### ■ Female

Estrus cycle

Timing of ovulation

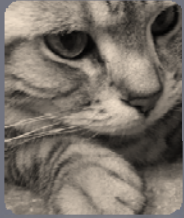
Mating management



# Breeding management

---

- ◉ Sojka et al., 1970
  - Fresh semen
  - Intravagina artificial insemination
- ◉ Still not routine
- ◉ Performed experimentally



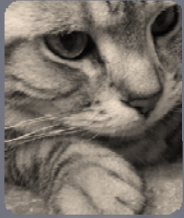
# Breeding management

## ○ Research

- Generated knowledge
- Assisted Reproductive Technology (ARTs)
- Model for the wild cat species

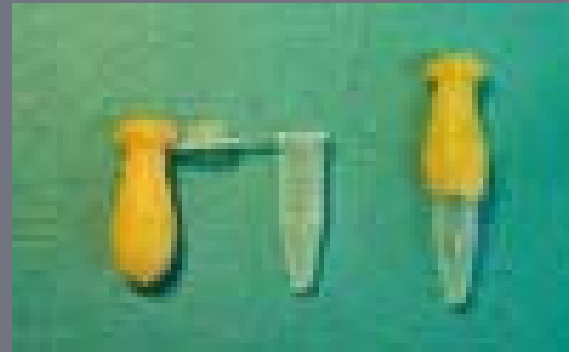


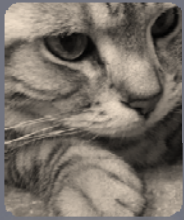




# Male Cats

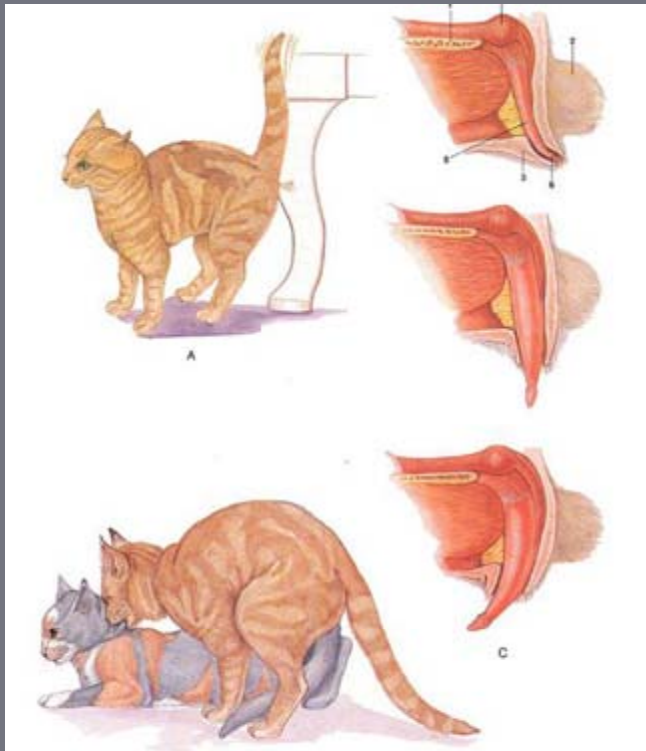
- ◉ How to collect cat semen???
- ◉ Artificial vagina
- ◉ Electroejaculation

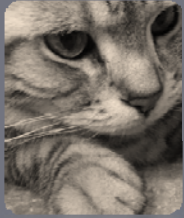




# Semen collection

## ○ Artificial vagina

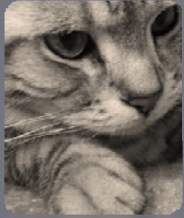




# Semen collection

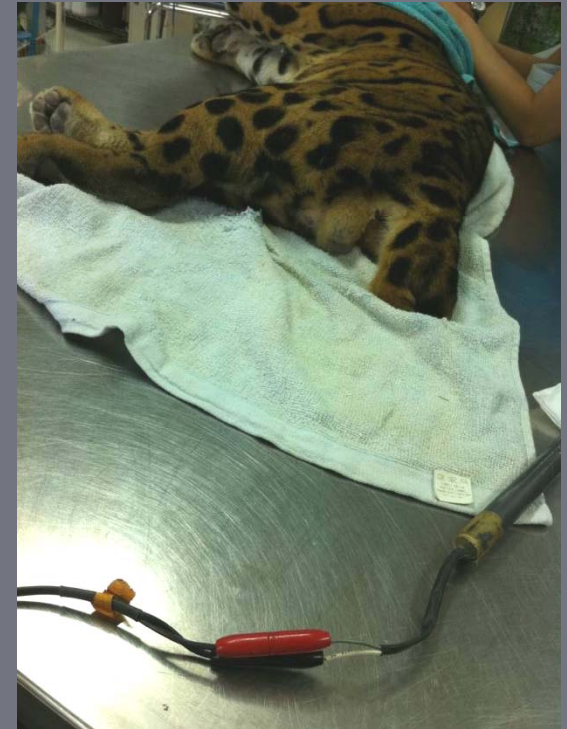
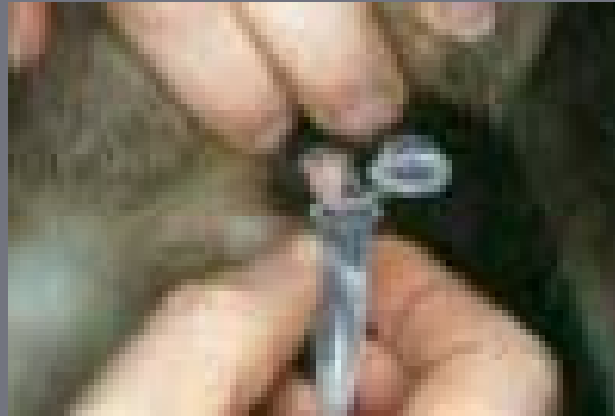
## ● Electroejaculation



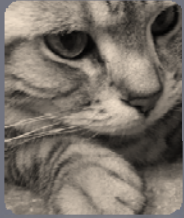


# Semen collection

## ● Electroejaculation





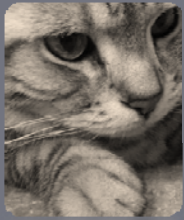


# Semen collection

---

- ◉ Electroejaculation
  - ◉ Rigid extension of hindlegs
- ◉ If this action is not seen
  - Low voltage stimulation???
  - Right position???
  - Interference by feces???



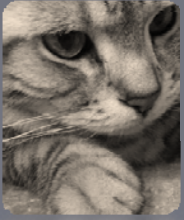


# Semen collection

## ● Caudal epididymis

- Castration
- Post-mortem



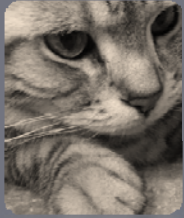


# Semen collection

## ◉ Vaginal lavage

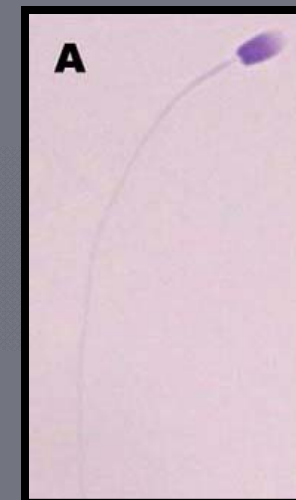
- After mating

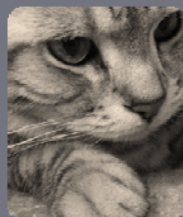




# Semen evaluation

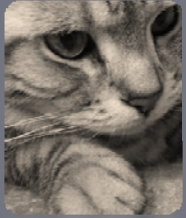
- Volume
- Colour
- Motility
- Concentration
- Total number of spermatozoa
- Morphology





# Semen evaluation

Volume of the ejaculate	By artificial vagina - Average 0.034 to 0.04 ml (range 0.01 - 0.12) By electroejaculation - Average 0.076 to 0.22 ml (range 0.019 - 0.74 ml)
Sperm concentration	By artificial vagina - Average $1730 \times 10^6/\text{ml}$ (range 96 - $5101 \times 10^6/\text{ml}$ ) By electroejaculation - Average $168 - 361 \times 10^6/\text{ml}$
Total number of spermatozoa in an ejaculate	By artificial vagina - Average $57 - 61 \times 10^6$ (range 3 - $117 \times 10^6$ ) By electroejaculation - Average $12 - 30 \times 10^6$ (9 - $153 \times 10^6$ )
Sperm morphology	Large individual variation. Average 38.2% to more than 90% normal spermatozoa. This average differs between studies probably due to different fixation and classification methods.
Motility	Highly variable Average 56% to 84%
pH	6.6 - 8.8
Osmolality	320 - 339 mOsm/Kg (range 274 - 390mOsm/Kg)
ALP	In whole semen - $160\ 355 \text{ u/l}$ to $480\ 000 \text{ u/l}$ In prostatic fluid and bulbourethral gland secretions - $228$ to $445 \text{ u/l}$ In prostatic fluid - $281 \text{ u/l}$

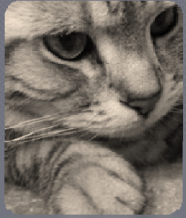


# Semen evaluation

---

- ◉ Relationship between semen quality and fertility
  - Proportion of abnormal spermatozoa
    - Azoospermia
    - Oligozoospermia
    - Teratozoospermia
    - Asthenozoospermia

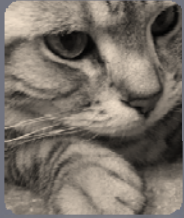




# Semen preservation

---

- ◉ Fresh semen
- ◉ Chilled semen
- ◉ Frozen semen

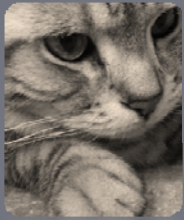


# Female cats

---

- ◉ Estrus cycle
- ◉ Timing of ovulation
- ◉ Mating management

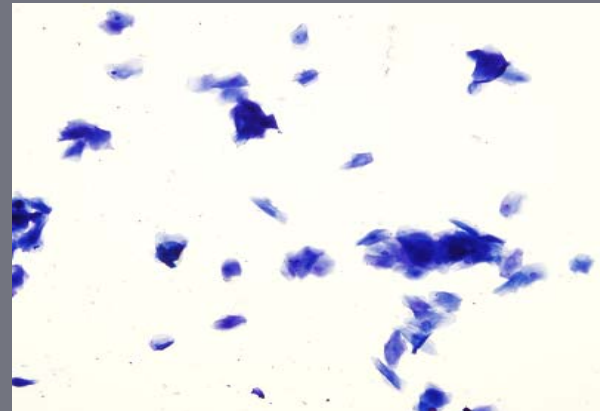
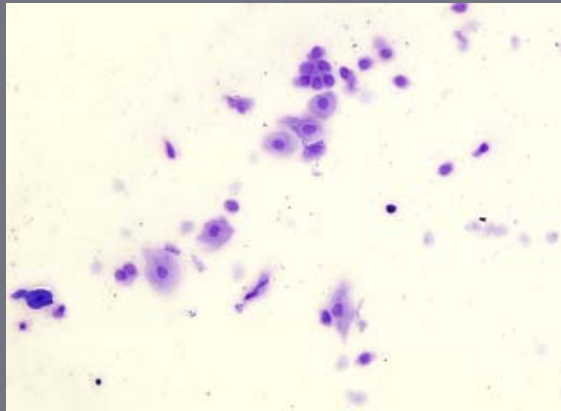


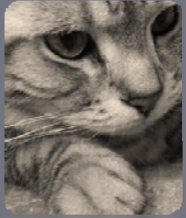


# Estrus cycle

- Natural estrus

- Induced estrus

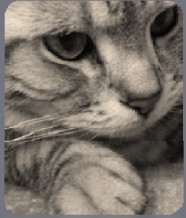




# Timing of ovulation

---

- Induce ovulator !!!!!
  - Mating
  - Vaginal stimulation
  - Hormonal administration



# Mating management

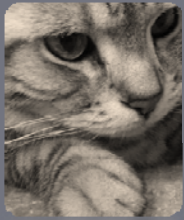
---

- ◉ Natural mating

- ◉ Artificial insemination

- Intravaginal artificial insemination
- Intrauterine artificial insemination
- Intratubal artificial insemination





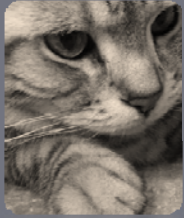
# Intravaginal artificial insemination (IVAI)

- Performed deep into the vagina using fine needle either without or with anesthesia at various interval after administration of hCG for induction of ovulation

(Soj



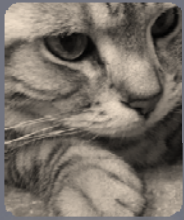
00)



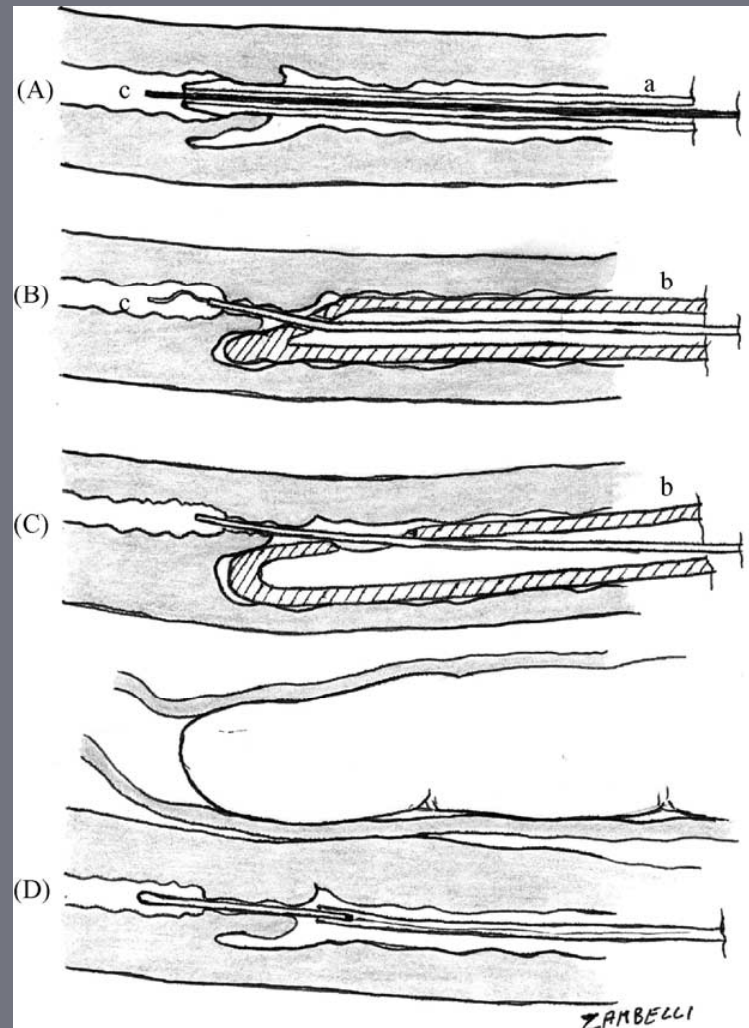
# Intrauterine artificial insemination (IUAI)

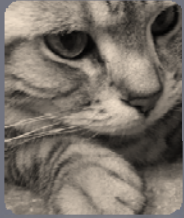
---

- **Performed both laparoscopy** (Howard et al., 1992) **and mid-line laparotomy** (Tsutsui et al., 2000)
- **Transcervical artificial insemination**
  - (Hurlbut et al., 1988; Swanson et al., 1994; Chatdarong et al., 2001; Zambelli et al., 2001)
- **Inseminated into the uterine horn**



# Intrauterine artificial insemination (IUAI)





# Intratubal artificial insemination (ITAI)

---

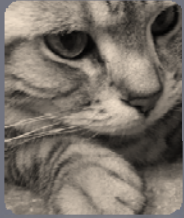
- Ventral midline laparotomy
- Performed via a catheter inserted in the ampulla of the oviduct

(Tsutsui et al., 2000)

Proceeding of the 1<sup>st</sup> symposium of the Thai Society for Animal Reproduction-TSAR, 2011-Bangkok, Thailand  
(Chansaenroj et al., 2011)

Technique	Fresh semen (spermatozoa)	Pregnancy rate (%)	Frozen semen (spermatozoa)	Pregnancy rate (%)
IVAI	5-50×10 <sup>6</sup> (Sojka et al., 1970)	54	50-100×10 <sup>6</sup> (Platz et al.,1978)	11
	20×10 <sup>6</sup> (Tanaka et al., 2000)	6	25×10 <sup>6</sup> (Villeverde et al, 2009)	0
	40×10 <sup>6</sup>	34		
	80×10 <sup>6</sup>	78		
IUAI	2.4-	14(AI before ovulation)	50×10 <sup>6</sup>	57
	19.2×10 <sup>6</sup> (Howard et al., 1992)	50(AI after ovulation)	40×10 <sup>6</sup> (epididymal sperm)(Toyonaga et al.,2011)	28
	2×10 <sup>6</sup> (Tsutsui et al., 2000)	13	25×10 <sup>6</sup> (Villeverde et al, 2009)	75
	4×10 <sup>6</sup>	31		
	8×10 <sup>6</sup>	80		
ITAI	5×10 <sup>3</sup> (Tsutsui et al., 2000)	0	10×10 <sup>6</sup> (epididymal sperm)(Toyonaga et al.,2011)	80(AI before ovulation)
	5×10 <sup>5</sup>	0		20(AI after ovulation)
	2×10 <sup>6</sup>	25		
	4×10 <sup>6</sup>	43		





# Intratubal artificial insemination (ITAI)

---

- Laparoscopic oviductal artificial insemination (LO-AI)
- Proceeding of 7<sup>th</sup> international symposium on canine and feline reproduction- ISCFR, 2012- Whistler, Canada (Lambo et al., 2012)

# Bilateral intratubal artificial insemination with frozen-thaw semen in rhFSH-induced oestrous cats

Ajjima Chansaenroj, Paweena Thuwanut, Kaywalee Chatdarong, Suppawiwat Ponglowhapan



# Intratubal artificial insemination in domestic cats

---



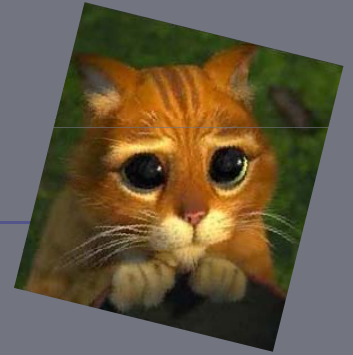
# Objective

- To investigate fertility rate after bilateral intratubal artificial insemination with frozen semen of queens induced into oestrus with rhFSH



# Materials and methods

---

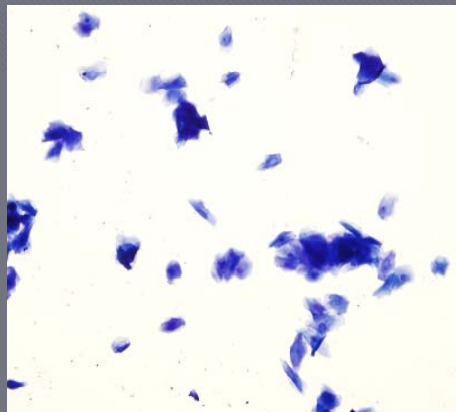
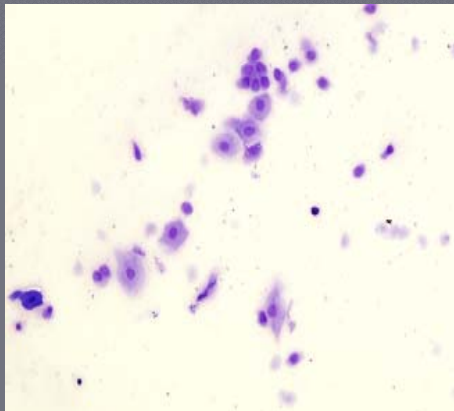
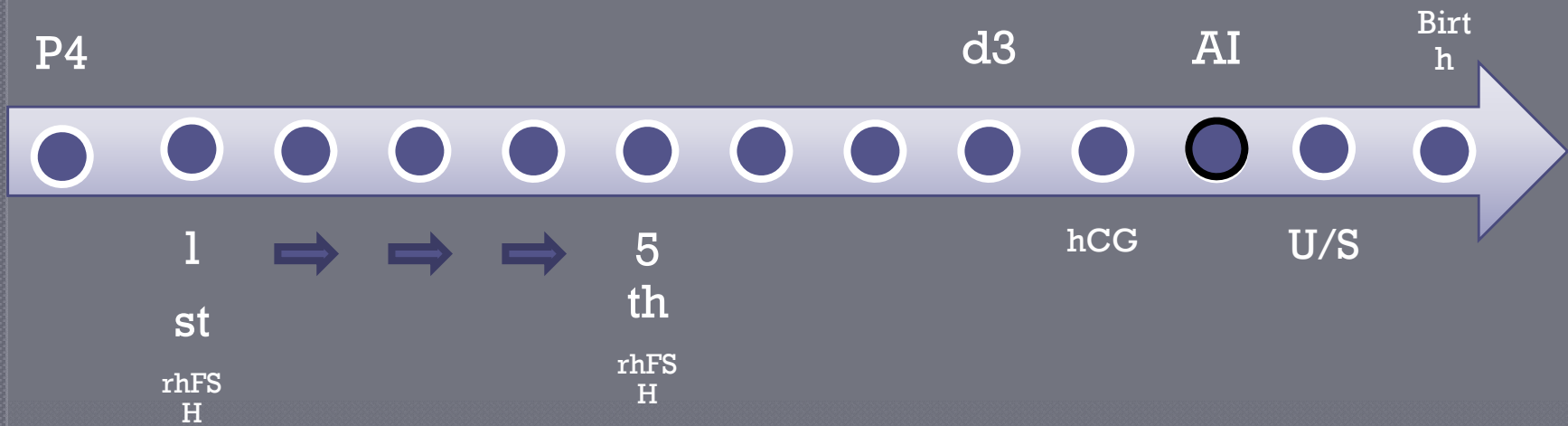


## ● Animals

- Toms
  - 3 healthy male cats , age 1-3 years
- Queens
  - 9 healthy female cats , age 1-3 years
  - No reproductive disease
  - Never received Hormonal treatment



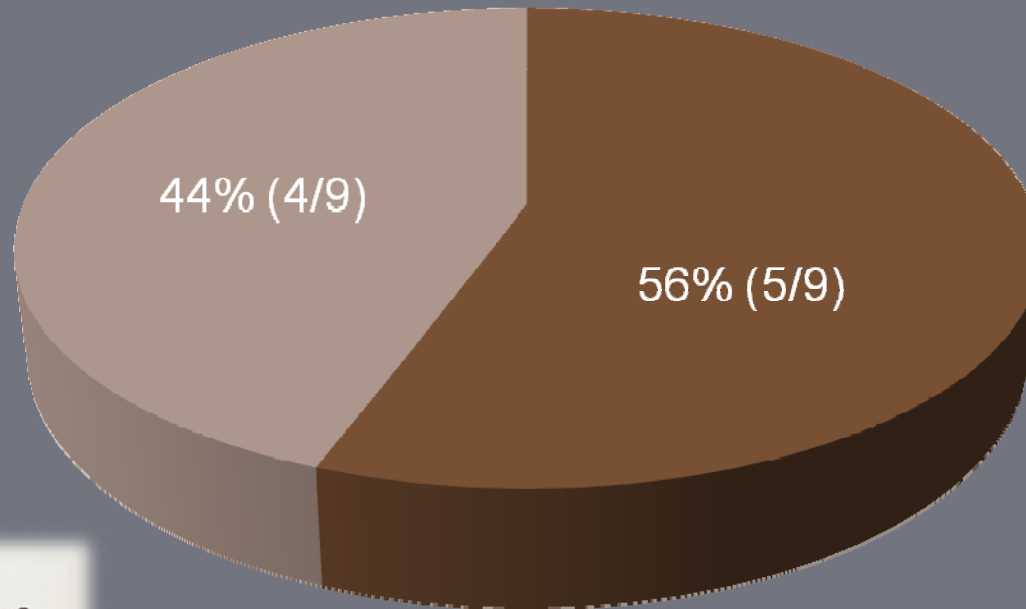
# Materials and methods



# Results

- Signs of oestrus

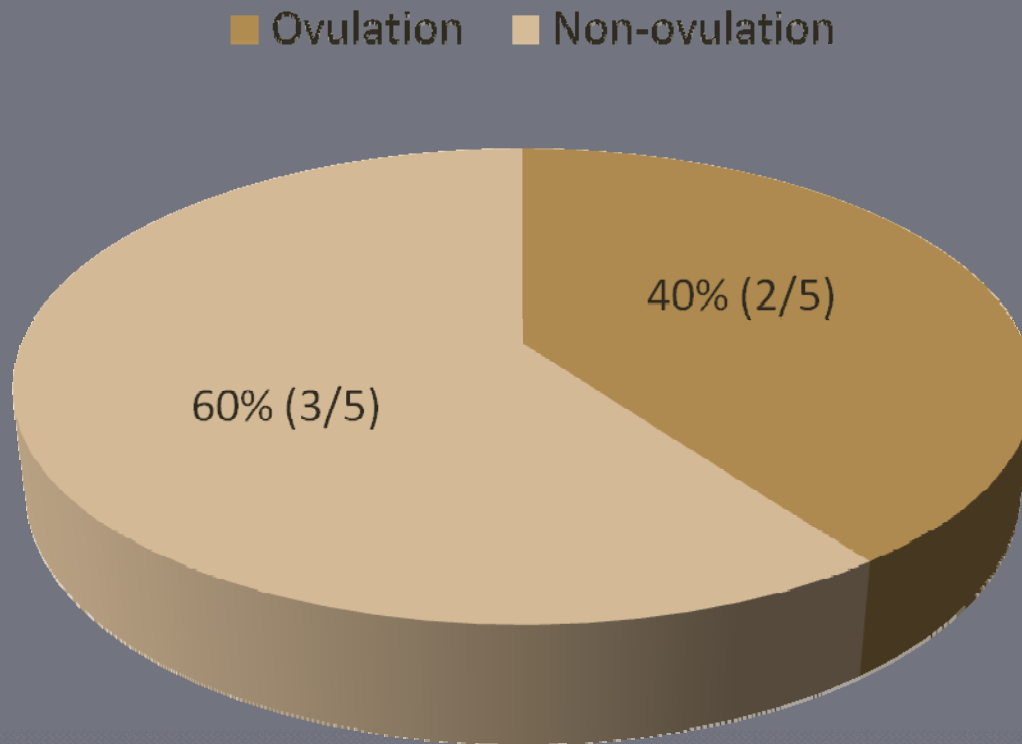
■ Oestrus   ■ Non-oestrus



# Results

---

- Ovulation (at the time of insemination)



# Results

- Ultrasonography



d 20 after insemination  
Pregnancy 20% (1/5)

# Results

---



1 wk after birth

# Discussion

---

- The low pregnancy rate may be due to the quality of frozen-thaw sperm used
- The frozen-thaw semen is inferior in fertility to fresh semen when performing intratubal AI
- To achieve higher conception rate, the number of viable sperms after thawing is crucial



# Conclusion

---

- Induce oestrus and ovulation regimen used in this study can be implicated for infertility management in domestic cats although the fertility rate is low



---

Thank you for your  
attention

