Conservation & Research Program at the Zoological Park Organization Thailand

Wisid Wichsilp, DVM
Ampika Thongphakdee, DVM, PhD
Wanlaya Tipkantha, DVM, PhD
Sumate Kamolnorranath, DVM
Boripat Siriaroonrat, DVM, PhD

Zoological Park Organization under Royal Patronage of H.M. the King, Thailand
Structure of ZPO Research Units

ZPO Director General

Director of ESCRI

Deputy director of ESCRI

Supporting staff

Genome Resource Bank
- Animal resource
- Frozen tissue bank
- Pathology archive
- Biological samples

Wildlife Health/Diagnostics
- Necropsy
- Histopathology
- Clinical pathology
- Microbiology
- Molecular diagnostics

Molecular genetics
- Cytogenetics
- Molecular genetics

Population Management
- Population management
- Clinical nutrition
- Conservation biology
- Reintroduction

Reproductive Innovation Center
- Reproductive clinic
- Endocrinology
- Gamete biology
- Cryopreservation
- ARTs: AI/IVF/ET/NT
• 5 World Association of Zoos and Aquariums member zoos under the Zoological Park Organization are implementing ‘UN Decade on Biodiversity’ campaign by:

1. Maintaining genetic diversity of captive wildlife population of global importance

2. Strengthen research programs on reproductive science and establish genome bank

3. Reintroduction programs for the ‘extinct-in-the-wild’ species
1. **Maintaining genetic diversity of captive wildlife population of global importance**

- Intensive management of population (IMP) programs have been established through collaborations with research and conservation partners.

- Prioritized species selected for IMP program are highlighted on Thai native endangered species.

![Eld’s deer (Rucervus eldii)](image1)
![Eastern Sarus crane](image2)
![Goral (Naemorhedus griseus)](image3)
![Malayan tapir (Tapirus indicus)](image4)
Disease & health risks are minimized through good preventive medicine with team of trained veterinarians & technical assistants.
Supporting facilities includes diagnostic laboratories, genetic laboratories, pathology facilities & veterinary hospitals.
Occupational health risk for zoonotic disease between animal keepers & wildlife are monitored: tuberculosis in Asian elephants & Malayan Tapirs.
2  **Strengthen research programs on reproductive science and establish genome bank**

Suitable captive management would facilitate natural breeding.
Consortium of conservation breeding for clouded leopard

(Neofelis nebulosa)
Tools for assessing fertility

- Reproductive organ examination

← Accessory sex glands investigation by ultrasonography

Songkhla Zoo

Testicular volume measurement
Reproductive tract investigation by endoscopy

• A high incidence of uterine tumors (especially leiomyoma) has been demonstrated in captive female elephants that have not calved for a long time (Hermes et al, 2004).
Hormone analysis (Non invasive technique)

- Estrus detection
- Pregnancy diagnosis
- Stress

- Fecal
- Urine

samples

Analysis

- Estrogen
- Progesterone
- Testosterone
- Cortisol

ELISA

Graph showing monthly hormone levels from Feb to Sep.
Assessment of male fertility in megaherbivores

Electroejaculation in banteng (A), gaur (B) and white rhinoceros (C). Penis characteristic of white rhinoceros (D).

Thongphakdee et al., 2011; Thai J Vet Med Suppl.
Cryopreservation is an important tool for establishment of cryobanks, as it maintains the genetic material viability for an indefinite time.

- Preserving genetic vigor & enhancing captive propagation
ZPO Genome Resource Bank

30 native wildlife species
- Sperm: 3,000+ straws
- Somatic cells: 200+ tubes

Chinese Goral/ Malayan tapir/ Serow/
Elephant/ Sambar deer/ wild cats/wild cattle
Transcervical Intrauterine AI
Pregnancy is confirmed by ultrasonography
Lin Ping at Ya’an Panda Base, China at 4.5 years old
3 Reintroduction programs for the ‘extinct-in-the-wild’ species

A global herd of Thamin eld’s deer at Khao Kheow Open Zoo & Nakornratchasrima Zoo

Animals preparation; health check up & put radio collars
Intrauterine Artificial Insemination

Thongtip et al., 2010

Ang-pao 14 Feb 2010
1st Eld’s deer fawn born from AI technique 2009
From frozen sperm to the forest
(2014)
Oocyte laparoscopically aspirated/ovariectomy
Eld’s deer mature oocyte (A), embryos at 2-cell (B), 4-cell (C) 16-cell (D) morula (E) blastocyst stages (E) and Hoechst 33342 stained blastocyst (F). Blastocyst cell number 86.5 ± 28.2 (n=4)
Embryo transfer

11 recipients synchronized as oocyte donors but started later for 6 days
IVF Fawn born on 17th October 2011
Captive management and Reproductive Science research on Thamin Eld’s deer
Eastern Sarus Crane
18/25 survived cranes are being monitored after released in 2011 following IUCN guidelines in consultation with ICF.
Chinese goral
Reintroduction of Banteng (Bos javanicus)
Artificial insemination in clouded leopards
2nd clouded leopard cubs born from artificial insemination (2015)
Sample collection for tuberculosis test in Asian elephant
Wildlife disease surveillance program
Education & Outreach
Conclusions

• Innovative reproductive technologies are useful tools for fundamental science investigation and offspring propagation in endangered species.

• Zoological medicine and preventive medicine as well as epidemiology of wildlife disease is critical for working under One Health Approach.
Acknowledgements

Zoological Park Organization
- Sumate Kamolnoranart, DVM
- Dr. Boripat Siriaroonrat, DVM
- Wanlaya Tipkantha, DVM
- Jintana Suseridumrong
- Rungtip Inthasri
- Nudthakamol Kajornklin
- Chainnarong Pankong
- Veterinarians, scientists and keepers

Chulalongkorn University
- Prof. Dr. Mongkol Techakumphu, DVM
- Assist. Prof. Dr. Theerawat Tarasanit, DVM
- Chommanart Thongkitidilok, DVM
- Kreangsak Thasripoo
- Master and PhD students

Kasetsart University
- Assist. Prof. Dr. Nikorn Thongtip, DVM
- Ms. Orasa Pralak
- Master and PhD students

Smithsonian Conservation Biology Institution, USA
- Mitchell Bush, DVM
- Dr. Pierre Commizoli, DVM
- Dr. Janine Brown

Department of Natural Parks, Wildlife and Plant Conservation

National Research Council, Thailand

Thailand Research Fund

Ag research, New Zealand
- Dr. Debbra Berg

www.facebook.com/ZpoThailand