



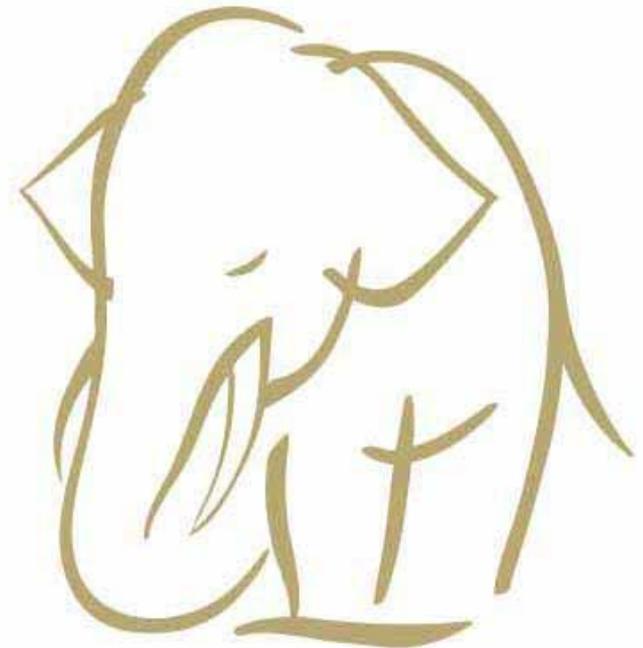
ASIAN ELEPHANT  
S U P P O R T

# 3<sup>rd</sup> EEHV Asia Working Group Meeting

17-18 November 2017

The Princess Chulabhorn International Conference Center  
Kasetsart University, Thailand

Compiled by Christine Molter, Lauren Howard and Sonja Luz



# Meeting Attendance

- 1<sup>st</sup> time the EEHV Asia Working Group meeting has been held in Thailand
- 70 participants, 12 countries
- Elephants in different situations represented
  - Zoos, camps, orphanages, wild
- PCR Lab held prior to the main conference



# EEHV: A global perspective

*Lauren Howard*

- EEHV Advisory Group website: [www.eehvinfo.org](http://www.eehvinfo.org)
  - Open to everyone in the group but must obtain a password for website
- Key points
  - Healthy elephant will eventually shed EEHV, but some calves develop EEHV-HD
  - Virus can be detected in blood prior to clinical illness
  - CBC changes include decreased WBC, monocytes, and platelets
  - Clinical signs include lethargy, colic, lameness, stiffness, change in sleep pattern in early disease; edema and cyanosis in late disease
  - Post-mortem signs include hemorrhage, edema
  - Treatment should be early and aggressive including fluids, antivirals, plasma, antibiotics, electrolyte therapy and nutritional support
- Impact on wild elephants is unknown and more research is needed

# US Update

*Lauren Howard*

- 35 EEHV-HD cases; 11 survivors; 24 fatalities
- EEHV is leading cause of death in Asian elephants in US
- US population is not sustainable
- Weekly CBC and qPCR monitoring is recommended
- Sedation may be needed for sample collection and treatment
- Deaths have occurred post-transport at > 30 day, longer than standard quarantine
  
- Challenges
  - Unsustainable population, standardizing early aggressive treatment including sedation

# European Update

*Carsten Groendahl*

- Many research projects in progress
- 2 EEHV cases survived since 2015
- Sedation in calves can be done safely and is a valuable tool
- Challenges
  - Standardizing early aggressive treatment including sedation, calf access and sample availability

# International EEHV Meeting 2017 Summary

*Lauren Howard*

- Hosted by Zoological Society of London in May 2017
- 78 participants, 9 countries
- Lots of research projects were presented and are in progress
  - Need to make a review paper on cell-culture attempts to pool collective data
- More investigation needed into why some zoos have many EEHV deaths and others have very few
- Full summary on [www.eehvinfo.org](http://www.eehvinfo.org)

# Nepal Update

*Amir Sadula*

- 215 captive elephants
- 200 wild elephants
- 9 EEHV cases since 2003; 3 survivors
  - Success with furosemide for calf with neck edema and difficulty breathing
- Screening of elephants for EEHV-1 showed shedding in trunk secretions, but not in conjunctival swabs
- Challenges
  - Resource availability, q PCR labs, obtaining famcyclovir

# Sri Lanka Update

*Vijitha Perera*

- Most dense population of wild Asian elephants
  - 200 domestic elephants
  - 5881 wild elephants
- One positive EEHV lab result (first documented positive in Sri Lanka)
- Surveillance opportunities
  - Deceased elephants
  - Sedated elephants for transport
  - Orphaned calves
- Challenges
  - PCR laboratory capacity

# India Update

*K. K. Sarma*

- Largest population of Asian elephants
  - 30,000 total elephants
- Multiple suspect EEHV-cases, 5 confirmed on PCR from Assam, (Northeast India) 70 confirmed on PCR from South India
- Challenges
  - Need capacity building for next generation of EEHV researchers and clinicians
  - Need more PCR capacity
  - Multiple suggestions for improved management including:
    - Improvement of park habitat and water access
    - Stopping livestock grazing in park
    - Forming elephant centric patrols
    - Performing thorough post-mortem exams with proper carcass disposal
    - Improving veterinary expertise
    - Providing routine preventative medicine care

# Sabah, Malaysia Update

*Laura Benedict*

- 0 confirmed in peninsular Malaysia
- 3 confirmed cases in Sabah Malaysia
  - Monitoring with weekly CBCs and banking extra blood to retrospectively for PCR
- Challenges
  - PCR capacity

# Vietnam Update

*Vanthinh Phan*

- 45 captive elephants
- 100 wild elephants
  
- No records of calves being affected by EEHV
- Calf training begins early for oral exams and blood collection
  - Checking CBCs weekly
  - Keeping plasma stores in freezer for EEHV treatments
  
- Challenges
  - PCR capacity building

# Indonesia Update

*Christopher Stremme*

- 485 captive elephants, 1000 wild elephants
- 7 cases of EEHV, no new cases since 2015
- Diagnostic lab established after EEHV deaths, including cPCR
- Need to increase number of facilities starting captive breeding programs to prevent poaching of wild elephants for captivity
- Challenges
  - Need laboratory facilities
  - Standardized post-mortem procedures
  - Standardized sample collection, storage, and shipment

# Singapore Update

*Udhaya Kumar Kalirathinam*

- 1 calf
- Trained for blood draw, rectal fluids, and trunk wash as priority behaviors
- Training under protected contact as the facility is moving away from free-contact
- Sleep study to observe calf's pattern
- Challenges
  - Transitioning to training under protected contact

# Myanmar Update

*Zaw Min Oo*

- 5500 captive elephants
- 1400-2000 wild elephants
- 3 confirmed cases, but suspect many more
- Free veterinary service program for privately owned elephants
- Challenges:
  - Lack local lab facilities, so need to treat prior to confirmatory results
  - Access to PCR testing
  - Documentation of privately owned elephants
  - Wild population decreasing from multiple threats, including poachers

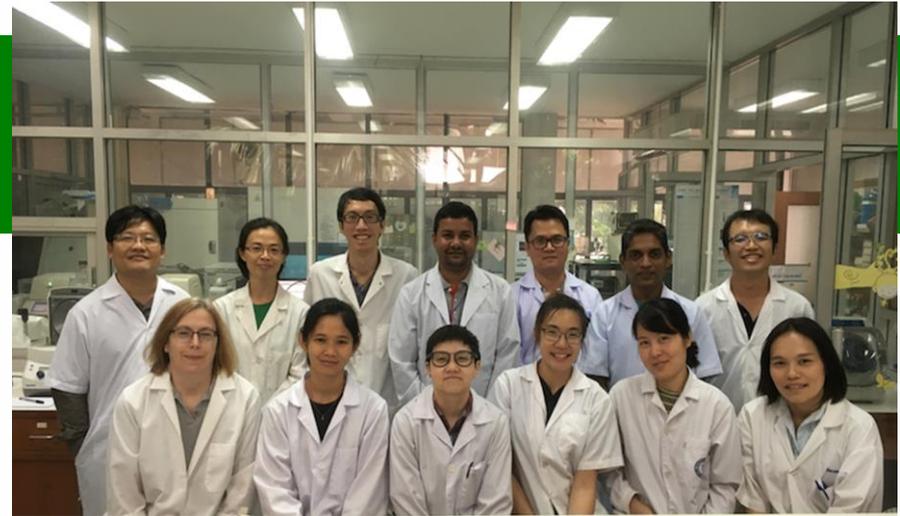
# Thailand Update

*Chatchote Thitaram*

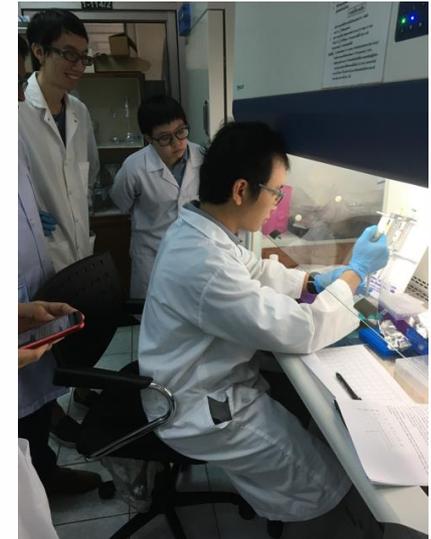
- 12 EEHV cases in 2017
- 44 total cases of confirmed EEHV-HD with 3 survivors
- EEHV Taskforce Thailand
  - Translated documents, posters, veterinary assistant training program, LINE group, mahout training course
- 5 EEHV diagnosis laboratories in Thailand
- On-going research
  - Research on pharmacokinetics of acyclovir
  - EEHV's association with transportation needs more investigation
  - Multiple international publications
- Challenges
  - Access to wild elephants

# PCR Training

*Erin Latimer*

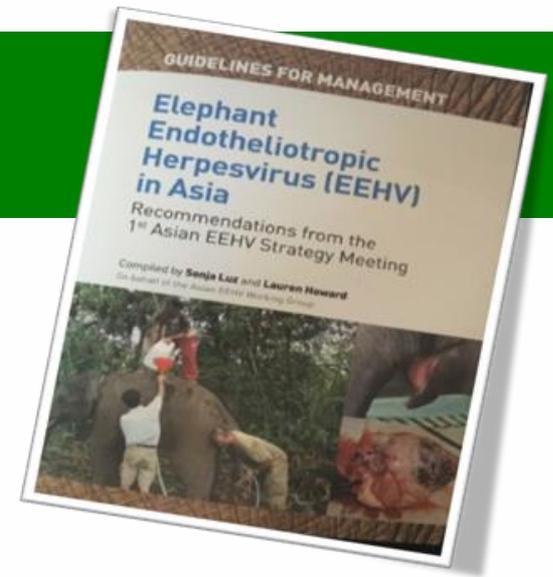


- Hosted prior to main workshop
- 10 attendees, 5 countries
- Some attendees will train at future meetings
- Both qCR and cCPR were taught
- Follow up trainings planned for 2018



# EEHV Asia Guideline

*Sonja Luz*



- 2<sup>nd</sup> Edition completed
- Indonesia and Myanmar volunteered for text translation
- Educational poster for mahouts could be translated from Thailand's template
- Additional poster for info-graphics for veterinarians and government officials

# Plasma Transfusion and Crossmatching

*Lauren Howard and Christine Molter*

- Plasma transfusions are useful in EEHV-HD cases
- Minor crossmatching should be done prior to transfusion
- Presentations will be available on [www.eehvinfo.org](http://www.eehvinfo.org)

# Breakout Sessions

- Four breakout sessions for small group discussions
  - Question 1: What are the possible risk factors for EEHV-HD? How can these be evaluated?
  - Question 2: What are the top EEHV priorities for each range country?
  - Question 3: Where are PCR labs currently located and where are more needed?
  - Question 4: What are wild elephant research priorities?

# Q1: What are the contributing or risk factors for EEHV?

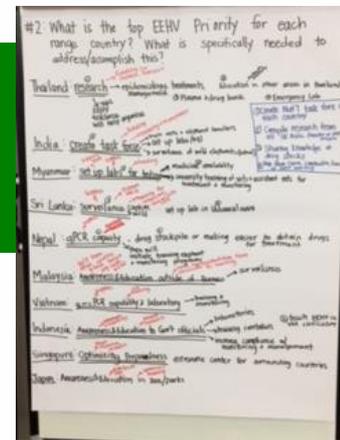


- Gender
- Age
- Immune status
- Genetic variation/relatedness
- Weaning status
- Season
- Exposure to other elephants
  - Wild elephants
  - Other domestic elephants
- Environmental changes
  - Change in handler/mahout
  - Changes in herd structure
  - Translocation (most recent move)
  - Seasonal aberrations
  - Weather
  - Human induced changes
- Orphan vs Dam reared
- Separation from dam?
  - New birth
  - Training
- Human elephant conflict
- Training
- Workload
- Management type: camp, orphan, zoo, etc.
- Herd size
- Health status dam and calf
- Diet and microbiome
- Hormone status of calf and dam
- Concurrent infections

# Q1: What are the steps for evaluating contributing or risk factors?

- Step 1: Compile and standardize data from all cases
- Step 2: Epidemiology evaluation
- Step 3: Write EEHV in Asia paper

# Q2: What are the top priorities for each range country?



## Thailand

- Continue research on treatment protocols, epidemiology, management practices, vaccines
  - To be organized by the Thailand EHV Taskforce
  - Match up advisors/mentors and students
  - Identify areas for further research
- Education of mahouts and owners of elephants in needed areas (Surin)
- Central drug bank for antivirals and vitamins, plasma bank at Chiang-Mai University
- Greater PCR lab availability (for emergencies)

# Q2: What are the top priorities for each range country?

## India

- Development of national EEHV task force
  - Including funding, training, and manpower
- Establish 4-5 PCR laboratories for throughout country
- Increased wild elephant patrols to find sick and deceased animals for testing
- Continuing education on EEHV for vets and support staff

# Q2: What are the top priorities for each range country?

## Nepal

- Establish PCR laboratories
- Advance training of calves for monitoring and treatment
- Increase the availability of antiviral and other drugs

## Sri Lanka

- Establish PCR laboratories, including at universities for wild and captive elephants
- Continued education on EEHV for veterinarians, lab techs and other support staff

# Q2: What are the top priorities for each range country?

## **Sabah, Malaysia**

- Continuing education on EEHV for other all of Malaysia, beyond Sabah
- Garner support from other national EEHV taskforces and organizations
- Invite representatives from peninsula to EEHV meetings
- Surveillance of EEHV in wild elephants

# Q2: What are the top priorities for each range country?

## Vietnam

- Establish PCR laboratories
- Advance training for calves for testing and treatments

## Singapore

- Optimize EEHV preparedness
- Share EEHV resources and research
- Establish a centralized resource center for EEHV knowledge, testing, and treatment supplies for surrounding range countries

# Q2: What are the top priorities for each range country?

## Indonesia

- Continued education on EEHV for government and private elephant owners
  - All policies and protocols for captive elephants come from the government.
- Continued education on EEHV for veterinarians, veterinary students, and elephant caretakers
- Establish PCR laboratories
- Advance training of elephants for sampling and treatments

# Q2: What are the top priorities for each range country?

## Japan

- Continued education on EEHV for zoos and wildlife park
  - Distribute information (posters/EEHV pamphlet in Japanese)
- Establish PCR laboratory

## Myanmar

- Establish PCR laboratories
- Continued education on EEHV for veterinarians, veterinary assistants, veterinary students
- Increased availability of antivirals and other drugs

# Summary of Range Country Priorities

PCR labs	Education/ awareness	Calf training	Drug/plasma availability	Wild elephants	Research	National taskforce development
Thailand India Nepal Sri Lanka Vietnam Indonesia Japan Myanmar	Thailand India Sri Lanka Malaysia Indonesia Japan Myanmar	Nepal Vietnam Indonesia	Thailand Nepal Singapore Myanmar	India Sri Lanka Malaysia	Thailand Singapore	India



## Q2: General Priorities

- Make sure representatives from other countries are here for next meeting
  - Laos, Cambodia, China, Bangladesh, Bhutan, Peninsular Malaysia, Australia
- Create and publish EEHV in Asia epidemiology study
- Create National Task Force in each country
- Sharing drug stocks of antivirals between countries
- Furthering partnerships between countries with similar issues
- Using other professional groups to help spread awareness of EEHV
- Suggestions: ASEG, WDA

# Q3: Where are the PCR labs in each country? Where should future labs be established?

	eles captive/wild	contact	email	area/province	cPCR	qPCR	status	notes
India	30,000							
Guwahati	1260/5300	Kushal Konwar Sarma		Assam				2 dfferent labs here running PCR?
Kerala		Arun Zachariah	zacharun@gmail.com	Kerala, southwest				
IVRI				central				proposed lab, premier vet institute
Orissa				eastern				vet Univ
Wildlife Institute of India				northeast				
Indonesia								
Siah Kuala		Christopher Stremme	stremme@gmx.net	Aceh			training by Chia-Da Hsu scheduled for March 2018	Hambal Mohammed et al
U Gadjah Mada		Muhammad Tauhid Nursalim	nursalimtauhid@gmail.com	JogJakarta			training by Chia-Da Hsu scheduled for March 2018	
VESSWIC		Dr Jenny		N Sumatra				
Medika satwa		Adin Priadi	adinpriadi@yahoo.com	Bogor Jakarta				
govt lab				Lampung				
Balai Vet				Riau				
Udayana Univ	100/0	Adi Suratma		Bali				

have equipment and run EEHV assay  
have equipment; don't run yet  
no equipment



# Q3: Where are the PCR labs in each country? Where should future labs be established?

	eles captive/wild	contact	email	area/province	cPCR	qPCR	status	notes
Japan								
		Kazuya Takehana	<a href="mailto:vet@zounokuni.com">vet@zounokuni.com</a>	Chiba				
Malaysia								
	EHA/SWD/DGFC	Mei-Ho Lee/Laura Benedict	<a href="mailto:Lee@ecohealthalliance.org">Lee@ecohealthalliance.org</a> ; <a href="mailto:lorzbenedict@hotmail.com">lorzbenedict@hotmail.com</a>	Borneo			trained	
	Univ Putra Malaysia			peninsular				need to initiate contact--Laura B?
	Dept of Wildlife			peninsular				need to initiate contact--Laura B?
Myanmar	5500/2000							
	LVBD			Mandalay				
	NPT			central	?			
	LVBD			Yangon				
	MTE	Zaw Min Oo	<a href="mailto:zawminoomte@gmail.com">zawminoomte@gmail.com</a>	Yangon			on list for in-house training	would like qPCR lab
Nepal	216/200							
	NTNC	Amir Sadaula	<a href="mailto:naturalamir@gmail.com">naturalamir@gmail.com</a>	central, Chitwan			available as trainer	has access to qPCR at a distance; would like to get local qPCR
Singapore								
	WRS	Chia-Da Hsu	<a href="mailto:chiada.hsu@wrs.com.sg">chiada.hsu@wrs.com.sg</a>	Singapore			available as trainer	

have equipment and run EEHV assay  
have equipment; don't run yet  
no equipment

# Q3: Where are the PCR labs in each country? Where should future labs be established?

	eles captive/wild	contact	email	area/province	cPCR	qPCR	status	notes
Sri Lanka	200/6000							
Elephant Transit Home	52	Vijitha Perera	<a href="mailto:vijithawildlife@gmail.com">vijithawildlife@gmail.com</a>	south			trained	has basic lab
U Peradeniya		Rasika Jinadasa	<a href="mailto:rnjinadasa@gmail.com">rnjinadasa@gmail.com</a>	central				
Thailand								
Chiang Mai		Chatchote Thitaram	<a href="mailto:cthitaram@gmail.com">cthitaram@gmail.com</a>	north			trained	running qpCR soon
DLD				North				
Mahidol Univ		Benjaporn Bhusri	<a href="mailto:benjaporn.bhu@mahidol.ac.th">benjaporn.bhu@mahidol.ac.th</a>	central			trained	
DLD				Surin				
Kasetsart		Supaphen Sripiboon	<a href="mailto:Sripiboon@gmail.com">Sripiboon@gmail.com</a>	central			available as trainer	
DLD				south				
PSU				south				
Rajamangola Srivijaya Univ				south				
Vietnam								
Daklak	88/100	Vanthinh Pham					on list for in-house training	

have equipment and run EEHV assay  
have equipment; don't run yet  
no equipment





Legend	
	Camp, Rescue center
	Laboratory
Green	cPCR, qPCR
Blue	cPCR w trained ppl
Yellow	cPCR w/ trained ppl
Black	No equipment

# Q4: How can EEHV be evaluated in wild elephants?



- Collection methods
  - Fecal sampling – most practical
  - Saliva sampling – challenging logistics
  - Blood scraping – challenging logistics
  - Opportunistic sampling during sedations
    - Create sampling kit / standardized instructions
  - Necropsy sampling
    - Create sampling kit / standardized instructions
    - Community participation to identify collection sites
    - Standardized community carcass reporting and education
- Basic questionnaire to target wild elephant areas to sample – symptomatic reporting

# Q4: How can EEHV be evaluated in wild elephants?

- Potential areas of research
  - EEHV in Asia epidemiology review
  - Fecal PCR survey in wild elephants
  - Consider India, Sri Lanka, and Malaysia as populations to target initially
    - Validate method in captive elephants first
    - Pair with ongoing genetics studies to identify wild individuals
    - Pair with fecal cortisol testing to correlate between stress and other risk factors with EEHV shedding
- Carcass sampling methods validation
  - Determine best tissue types, how long post-death testing is valid

# Action Items: Education and Awareness

- Create EEHV in Asia Page on [www.eehvinfo.org](http://www.eehvinfo.org) website\*  
(*Sonja to work with Erin*)
- Create toolkit of materials for each country to share with government officials (template power point, support letter, provide expertise from nearby country)  
(*Lauren?☺*)
- Translate current Mahout education poster (in Thai) to other languages  
(*WRS to work with Thailand on an English version*)
- EEHV in Asia booklet translation to local languages: Indonesia and Myanmar volunteered so far  
(*Dr Zaw and Hambal to follow up with Dr Sonja*)
- Create a more scientific EEHV Awareness poster for educating government and veterinarians  
(*Sonja and Lauren*)
- Have EEHV in Asia Working Group Members attend IUCN Asian Elephant Specialist Group Meeting  
(*Sonja to follow up with Vivek Menon, Chair of IUCN AsESG*)
- Share information on Thailand Mahout communication network as example for other countries.  
(*Thailand team to be point of contact*)
- Arrange for veterinarians to attend/assist with EEHV HD cases for improved training/preparedness  
(*To explore with the Thailand team*)
- Increase attendance at next EEHV in Asia working group meeting:
  - Bangladesh, Bhutan, China, Cambodia, Laos, Australia

# Action Items: Wild elephant sampling

- Create sampling kits and instructions for sample collection (live elephants and necropsy)  
*(Chia-Da and Erin)*
- Basic questionnaire to target specific regions for wild elephant sampling  
*(??)*
- Validate fecal PCR testing for EEHV in captive elephants, to allow for surveillance in wild elephants  
*(WRS/Thailand- Sonja to follow up with Chatchote)*
- Validate carcass sampling for PCR (tissue type and how long post-mortem it is reliable)  
*(Chia-da, Amm and Erin)*

# Action Items: Research

- Standardize information on existing EEHV cases and prepare EEHV in Asia Review Paper  
*(Lauren/Sonja/Chatchote/Wendy.....? -to prepare first draft)*
- Diet and microbiome studies in calves  
*(WRS/Thailand –Sonja to follow up with Chatchote)*
- Share regional nutritional supplement protocols in relation to immunity and EEHV (coconut milk, vitamin C)  
*(Thailand- to prepare paper or short communication?)*
- Quantify stress in calves related to EEHV shedding and EEHV HD (ex: fecal cortisol)  
*(WRS/...? –WRS started monitoring calf)*
- Evaluate impact of cyclical weather events related to elephant mortalities.  
*(??)*

# Action Items: Agenda for 2018

- Discuss and set agenda for next EEHV Asia Working Group Meeting  
*(Sonja and Chatchote)*
- Next meeting potentially to be held in Guwahati, Assam  
*(Kushal- to confirm time and venue)*



We thank you for your participation!  
Looking forward to seeing you again next year!