

# **FAQS: THE ELEPHANT ENDOTHELIOTROPIC HERPESVIRUS (EEHV)**

## **EEHV – BASIC INFORMATION**

### **What is EEHV?**

EEHV is a highly fatal disease that is seriously impacting Asian elephants in zoos in North America and Europe. The virus mainly strikes young Asian elephants and produces a hemorrhagic disease so lethal it has a higher than 90 percent mortality rate.

**The EEHV virus is the number-one killer of Asian elephants born in the last 10 years. Since 2000, there have been 11 Asian elephants stricken with EEHV in North American Zoos. None survived. Elephants who died were age seven and under.**

EEHV is known to have a sudden onset, killing elephants in a matter of days, and sometimes hours. Symptoms include swelling in the head and neck area, cyanosis of the tongue and lethargy. The disease causes a horrific death from massive internal hemorrhaging and heart failure.

### **What is known about the virus?**

Despite being identified in a young elephant who died at the National Zoo in Washington, DC in 1995, little is known about the virus: where it is harbored, its mode of transmission, or what activates it.

*The four diseases [including EEHV] all had common factors of interfacing exposures between wild and domestic species that probably would not occur under totally natural conditions....The elephant herpesvirus mode of transmission is less well understood and will require much more study to determine its epidemiology.*

Montali, 2007; 24<sup>th</sup> Annual Pathology Meeting of the West Coast Subdivision of the CL Davis DVM Foundation, p. 7

*Despite more than 30 years of study, nothing is known regarding the mode of transmission, the incubation period, the true role of the African elephant, or the factors that determine latency of the virus.*

Reid, et al, Veterinary Quarterly 2006; 28(2), p. 63

### **What are the risk factors associated with EEHV?**

- Young Asian elephants who are moved to another facility and/or have contact with African elephants.
- Elephants who are housed or have been housed in a facility where a case has occurred previously.

*“General risk factors for herpes to be considered in Asian elephants include younger animals (under 10 years old) that are moved to another facility and/or have had direct or indirect contact with African elephants. Animals coming from or going to a facility with a history of EEHV could be at increased risk.”*

Montali, 2007; 24<sup>th</sup> Annual Pathology Meeting of the West Coast Subdivision of the CL Davis DVM Foundation, p. 7

- Young Asian elephants who are born into a facility that has had multiple EEHV cases and are exposed to adult elephants there.

***“Dr. Hayward (Hayward 2008) reports that wherever there have been multiple cases of EEHV associated with one cow, one bull or one facility in North America, there has always been multiple different virus species found. Even EEHV1A viruses are often genetically distinct from one another and therefore not epidemiologically related. This indicates multiple sources of the viruses among carrier adults that may infect naïve juveniles rather than transmission from parents.” (emphasis added)***

Hayward, 2008; cited in Review of quarantine risks associated with the importation of elephant semen from Singapore, the United States of America, and Member States of the European Union, Attachment A, which was used to promulgate import guidelines by Biosecurity Australia.

Attachment A is available at:

[http://www.daff.gov.au/data/assets/pdf\\_file/0011/538886/2008\\_02a.pdf](http://www.daff.gov.au/data/assets/pdf_file/0011/538886/2008_02a.pdf)

The final guidelines issued in May 2008 are available at:

[http://www.daff.gov.au/data/assets/pdf\\_file/0008/665405/2008\\_16.pdf](http://www.daff.gov.au/data/assets/pdf_file/0008/665405/2008_16.pdf)

Dr. Laura Richman concurs, according to her comments on the 2007 death of Hansa at the Woodland Park Zoo, though she includes the mother as a possible source of the disease. ***“Hansa would have gotten it from another elephant,” Richman said. Hansa had not left Woodland Park Zoo since she was born, which suggests the virus was passed from one of the zoo's other elephants, either her mother, Chai, or Watoto or Bamboo”***(emphasis added)

*Seattle Post Intelligencer*, Dec. 4, 2007,

[http://seattlepi.nwsourc.com/local/342326\\_elephant05.html](http://seattlepi.nwsourc.com/local/342326_elephant05.html)

Dr. Scott P. Terell, a veterinary pathologist and the elephant species survival plan pathologist for the Association of Zoos and Aquariums was even more specific about the mode of transmission of this virus. ***“It can be passed either through birth or contact with another infected elephant, Terell said.”*** Associated Press, Zoo: Unknown Herpes Virus Kills Elephant, By Annie Flanzraich, July 3, 2007,

<http://www.forbes.com/feeds/ap/2007/07/03/ap3879788.html>

Dr. Parntep Ratanakorn, an expert on EEHV at the Faculty of Veterinary Science, Mahidol University in Thailand, wrote that transmission can occur between elephants via ***“direct contact of secretions or fetal material from the genital tract which is contaminated with EEHV.”***

Article in Tigerpaper, April-June 2006 (a United Nations publication), page 27,

[http://www.fao.org/world/regional/rap/tigerpaper/Paper/TP33\\_2\\_001.pdf](http://www.fao.org/world/regional/rap/tigerpaper/Paper/TP33_2_001.pdf)

Dr. Richman also has speculated publicly that newborn elephants and calves may be more susceptible to EEHV infection because their immune systems have not completely developed.

“Zoo a hot spot for fatal elephant virus; 2-year-old calf Mac the latest of 6 victims of disease,” *The Houston Chronicle*, November 16, 2008

## **What are the key stressors for elephants?**

Stressful events for elephants may play a role in EEHV. According to a report by Jonathan Cracknell on the EEHV closed workshop at the 2007 International Elephant Foundation Conservation and Research Symposium conference, key stressors are:

- Transportation
- Pregnancy and birth
- Weaning of calves (in zoos, this is often the physical separation of mother and calf, including through transfer to another zoo)
- Changes in elephant group composition (i.e., elephants leaving the group or being brought into the group through transfers between zoos) or changes in the elephants' environment (i.e., construction)

## **Is there a test for EEHV?**

There is no test for EEHV in seemingly healthy elephants and no vaccine. Definitive testing for EEHV is only possible when an elephant is actively shedding the virus or after death.

## **Does EEHV affect elephants living in the wild?**

Although a number of herpes viruses are known to be present in elephants, researchers have repeatedly noted that EEHV has not resulted in an outbreak of disease in either wild African or Asian elephant populations.

*“No herpesvirus-associated illness has been reported in wild African elephants.”*

Wellehan, et al, Veterinary Microbiology, 2007, p. 2

*“The impact of this virus in the wild is unknown and although epidemic outbreaks in Asia have not occurred as expected, the impact of EEHV could be exaggerated because of the fragmented populations and the skewed sex ratios. In captivity, a substantial proportion of reproductive failures and infant deaths are attributed to [EEHV]....”*

Reid, et al, Veterinary Quarterly 2006; 28(2), p. 63

*“There have been 43 of these fatal cases from elephant herpesviruses identified globally since 1995, but none occurred in Africa.”*

Montali, 2007; 24<sup>th</sup> Annual Pathology Meeting of the West Coast Subdivision of the CL Davis DVM Foundation, p. 7

Moreover, one case cited by zoos as evidence of the disease in the wild actually relates to an elephant named Seima who was held in captivity, after being confiscated from traders, for 2.5 years of the 3 years she lived before she died from EEHV.

*“The deceased elephant (“Seima”) was approximately three years old, wild-born [in Cambodia]. She was confiscated from traders in 2002 as an approximately 6 months old calf and placed in Phnomn Tamao Wildlife Rescue Center where she was bottle-reared by keepers and housed with 4 other elephants....She died in lateral recumbency on May 6, 2004 without observed symptoms and without any treatment.”*

Reid, et al., Veterinary Quarterly 2006; 28(2), p. 63, under “Case report/Disease History”

Some experts have actually speculated about the risk that this virus, which affects captive elephants, will eventually spread to the wild through contact of captive elephants with wild ones.

***“It would be very dangerous if EEHV was to spread to Thailand’s domestic elephant population, which are raised to roam free in the forest periphery that shares habitat with wild Asian elephants. Some of the domestic and wild elephants court and mate, and EEHV could spread from domestic to wild elephants. This would be disastrous among calves and young wild Asian elephants and a great threat to our valuable and endangered species. The extinction of Asian elephants could arrive sooner than we fear.”***

Dr. Ratanakorn, article in Tigerpaper, April-June 2006 (a United Nations publication), page 27,

[http://www.fao.org/world/regional/rap/tigerpaper/Paper/TP33\\_2\\_001.pdf](http://www.fao.org/world/regional/rap/tigerpaper/Paper/TP33_2_001.pdf)