



SCIENTIFIC MEETING

## THE MANAGEMENT OF ASIAN ELEPHANT HEALTH AND REPRODUCTION

Tuesday, 10 June 2008

The Meeting Rooms, The Zoological Society of London, Regent's Park, London NW1 4RY

**Chair: David Field, Zoological Director, Zoological Society of London**

### **The EU-Asia Link *Elephas maximus* 2007–2010 project**

*Professor Tanu Pinyopummintr, Kasetsart University, Thailand*

The EU-Asia Link *Elephas maximus* 2007–2010 project is a collaboration between five 'partner' institutes (Kasetsart University, Thailand; Chiang Mai University, Thailand; University of Peradinya, Sri Lanka; Utrecht University, The Netherlands and The Royal Veterinary College (RVC), United Kingdom) and three 'associate' institutes (including the Institute of Zoology, UK). Its principal aim, with a budget of €800 000, is to further the training of staff and students at the Asian institutes involved so that they can proactively tackle the problem of declining elephant numbers in Asia. More details can be found on the project's official website [www.vet.cmu.ac.th/elephant/Project%20information.php](http://www.vet.cmu.ac.th/elephant/Project%20information.php).

### **Inhibiting reproductive activity in elephants**

*Professor T.A.E. Stout, Department of Equine Sciences, Faculty of Veterinary Medicine, Utrecht University, The Netherlands & Department of Production Animal Sciences, University of Pretoria, South Africa*

Inhibition of reproductive activity in elephants is of current interest for two major reasons: control of population growth and suppression of aggressive behaviour. In some areas of southern Africa, elephant population numbers have increased to such an extent that it is widely accepted that control measures must be implemented as a matter of urgency if irredeemable damage to the habitat and biodiversity is to be averted. In the past, population control was performed by way of an annual cull of family groups; in the current political climate, public and governmental support for culling is contingent upon 'all other reasonable' alternatives having been found wanting. These alternatives include 'transfrontier' mega-parks and contraception. The contraceptive techniques thought to offer the most realistic chances of halting population growth (in the mid to long term) include porcine zona pellucida (pZP) vaccination of female elephants or gonadotrophin

releasing hormone (GnRH) vaccination of either sex. Over the last 10 years, a combination of experimental studies and field trials have demonstrated that pZP vaccination is an effective and, at least in the short term, safe way of achieving contraception in female elephants. Current studies aim to determine if pZP contraception can be successfully achieved using a single yearly injection, and whether it is also 'safe' in the longer term with respect to effects on reproductive and social behaviour and the recovery of fertility after the cessation of vaccination. Although GnRH vaccination has proven an effective way of inducing contraception in both males and females of other species, in elephants it is primarily being tested as a way of suppressing circulating testosterone concentrations in bulls considered dangerously aggressive either during or outside the period of enhanced sexual activity known as 'musth'. The GnRH vaccination has shown great initial promise as a means of reducing unwanted aggressive behaviour in both captive and 'problematic' wild elephants.

#### **Further reading**

Delsink, A.K., van Altena, J.J., Grobler, D., Bertschinger, H.J., Kirkpatrick, J.F. & Slowtow, R. (2007): Implementing immunocontraception in free-ranging African elephants at Makalali conservancy. *J. S. Afr Vet Assoc* **78**: 25–30.

Managing African Elephant Populations (2003) – proceedings of an expert consultation on control of wild elephant populations organised by Utrecht University

<http://elephantpopulationcontrol.library.uu.nl>

Perdok, A.A., de Boer, W.F. & Stout, T.A.E. (2007): Prospects for managing African elephant population growth with immunocontraception: a review. *Pachyderm* **42**: 97–107.

#### **Breeding and genetic management of Asian elephants**

Chatchote Thitaram<sup>1,2,\*</sup>, Sitthavee Thongtipsiridech<sup>3</sup>, Sittidet Mahasawangkul<sup>4</sup>, Johannes A. Lenstra<sup>2</sup>, Tom Stout<sup>2,5</sup> and Ben Colenbrander<sup>2</sup>

<sup>1</sup>Faculty of Veterinary Medicine, Chiang Mai University, Chiang Mai, Thailand;

<sup>2</sup>Faculty of Veterinary Medicine, Utrecht University, Utrecht, The Netherlands;

<sup>3</sup>Faculty of Veterinary Medicine, Kasetsart University, Kampaengsaen, Nakornpathom, Thailand;

<sup>4</sup>National Elephant Institute, Forest Industry Organization, Lampang, Thailand; <sup>5</sup>Section of Reproduction, Department of Production Animal Studies, Faculty of Veterinary Science, University of Pretoria, South Africa.

Numbers of Asian elephants in most range states are dangerously low, and the viability of free-ranging populations is threatened by habitat loss, human-elephant conflict and a limited exchange of genetic material between populations. In addition, western zoo populations are not self-sustaining. Nevertheless, breeding from captive stock is preferable to removing more animals from the wild and, to ensure optimal breeding management, it is crucial to develop techniques for measuring genetic diversity, preserving genetic material and performing assisted reproduction. In recent years, artificial insemination has been performed successfully in elephants and considerable progress has been made in understanding the reproductive endocrine cycle and the timing of ovulation in females. While cryopreservation of elephant semen also appears promising there have as yet been

no calves produced using frozen-thawed semen. In general, natural breeding is still the best method for increasing numbers of captive elephants but assisted reproductive techniques, such as artificial insemination, may be essential to improve genetic management and avoid inbreeding. For this reason, the genetic diversity of various Asian elephant populations is being studied using 'microsatellite' and mitochondrial DNA approaches, while studies of reproductive behaviour, endocrinology and semen quality are also helping to improve the toolbox for reproductive management of Asian elephant populations in the future.

#### **Further reading**

Brown, J.L. (2000): Reproductive endocrine monitoring of elephants: an essential tool for assisting captive management. *Zoo Biol* **15**: 347–367.

Hildebrandt, T.B., Goeritz, F., Hermes, R., Reid, C., Dehnhard, M. & Brown, J.L. (2006): Aspects of the reproductive biology and breeding management of Asian and African elephants: *Elephas maximus* and *Loxodonta africana*. *Int Zoo Yb* **40**: 20–40.

Hodges, J.K. (1998): Endocrinology of the ovarian cycle and pregnancy in the Asian (*Elephas maximus*) and African (*Loxodonta africana*) elephant. *Anim Reprod Sci* **53**: 3–18.

Sukumar, R. (2003): *The Living Elephants: Evolutionary Ecology, Behavior, and Conservation*. New York: Oxford University Press, Inc.

#### **Herpes-viruses in Asian elephants**

*Jonathan Cracknell BVMS CertVA CertZooMed MRCVS, RCVS Trust Resident in Zoo and Wildlife Medicine, Zoological Society of London & Royal Veterinary College, UK*

Herpes viruses have only recently been described in Asian (*Elephas maximus*) and African (*Loxodonta africana*) elephants. The principal group are the beta-herpesviridae, but gamma-herpesviruses have also been described. Elephant Endotheliotropic Herpes Virus (EEHV) is one of the most important emerging infectious diseases of elephants. EEHV is classed as an unusual member of the beta-herpesviridae. This group of viruses includes the cytomegaloviruses but from which EEHV is evolutionary distinct and may be classed as a separate group itself. EEHV has implications for the future of captive as well as wild population management programmes and is thought to be a major cause of mortality in calves. Ossent *et al.* (1990) described the first death of an Asian elephant in 1988 but Richman *et al.* did not officially describe the disease until 1996. Despite being recognised for over twenty years very little is known about the epidemiology of this disease. Fickel *et al.* (2001) differentiated EEHV into three types: EEHV1 which is found in Asian and African elephants, EEHV1b which is found in Asian elephants only, and EEHV2 which is only found in African elephants. As of last year the group has been expanded to include EEHV3a, EEHV3b, and EEHV4 (Richman 2007), all of which are presently found in Asian elephants only. In 2005 the first case of EEHV was seen in the UK. One year later a second case of EEHV was identified in a separate collection.

This talk reviews what is currently known about EEHV, describes the cases in the UK, discusses future management strategies and the introduction of a BIAZA-led national elephant health programme.

#### **References**

Fickel, J., Richman, L.K., Montali, R., Schaftenaar, W., Goritz, F., Hildebrandt, T.B. & Pitra, C. (2001): A variant of the Endotheliotropic herpesvirus in Asian elephants (*Elephas maximus*) in European zoos. *Veterinary Microbiology* **82**: 103–109.

Ossent, P., Guscetti, F., Metzler, A.E., Lang, E.M., Rubel, A. & Hauser, B. (1990): Acute and Fatal Herpesvirus Infection in a Young Asian Elephant (*Elephas maximus*). *Veterinary Pathology* **27**: 131–133.

Richman, L.K. (2007): Elephant Endotheliotropic Herpes Virus: Update. *Proceedings of the International Elephant Conservation and Research Symposium, Florida, USA, 2–4 November 2007*.

Richman, L.K., Montali, R.J., Cambre, R.C. & Lehnhardt, J. (1996). Endothelial Inclusion Body Disease: A newly recognised fatal herpes-like infection by Asian elephants. *Proceedings of the American Association of Zoo Veterinarians*, 483–485.