



Borneo Rhino Sanctuary (BRS) Programme 2015 Report

Last chance to prevent the extinction of the rhino in Borneo



Tam remains in good condition (19 June), although now estimated to be approaching 30 years old, advanced middle age for a Sumatran rhino.

Asian Two-horned rhinoceros (*Dicerorhinus sumatrensis*), commonly known as Sumatran rhino, was once widespread through South-east Asia, with the rhinos of this species in Sumatra and Borneo a millennium ago representing the southern-most equatorial rainforest populations. In 2015, there were nine Sumatran rhinos in fenced, managed facilities (three of them in Sabah), and only tens of wild Sumatran rhinos in Indonesia. The species is on the edge of extinction. The problem is not just one of very small numbers, but the fact that the rhinos are scattered in at least six locations. Unless these rhinos are captured and managed as one population with the objective to boost annual births, by maximizing the potential contribution of every rhino's eggs or sperm to producing babies, the species will go extinct. The rhinos need not be all moved to one place. Rhino eggs and sperm can be transported between sites.

On 2 March 2015, WWF-Malaysia released a media statement "In Peninsular Malaysia, the species is likely to be totally extinct." On 18 April, the Sabah Minister of Tourism, Culture and Environment noted that wildlife researchers reported it was unlikely that there were any rhino left in the wild in Sabah ... and "We are facing the prospect of our Sumatran rhinos going extinct in our lifetime". The first formal public domain announcement of national Malaysian governmental policy on Sumatran rhino appeared on 5 June, whereby Malaysia's National Biodiversity Council "agreed with the Sabah government's proposal for joint implementation of conservation measures to prevent the extinction of the Sumatran rhinoceros and other threatened wildlife using Advanced Reproductive Technology, as well as in joint efforts with Indonesia."

The tragedy is that none of the international conservation NGOs recognize the reality, and therefore do not act to support creation of a global Sumatran rhino "meta-population". Although there is some interest in Indonesia in a collaborative approach (for example, an Indonesian team visited Sabah in February 2015 to discuss methods of rhino capture and translocation), at a formal level Indonesia declines to engage



The Indonesian group visitors observing husbandry techniques for Puntung at TWR (25 February).



Sabah Wildlife Department HQ (22 April; left to right) Prof. Arief Boediono, Dr Abdul Hamid Ahmad (BORA chairman), Dr Sen Nathan (SWD senior veterinarian), Mr William Baya (SWD Director), Rafaela Fiuza, Dr Frank Goeritz, Prof. Thomas Hildebrandt and Dr Robert Hermes (IZW)

with Malaysia. Malaysia does recognize the reality, but is hamstrung by lack of international support. On 22 September 2015, IUCN erroneously reported that “With the ongoing poaching crisis, escalating population decline and destruction of suitable habitat, extinction of the Sumatran rhino in the near future is becoming increasingly likely.” It is shocking that in 2015, one of the most ancient mammalian genera is heading to extinction through absence of such basic needs as a clear understanding of the situation by global wildlife conservation bodies, leadership and collaboration between nations.

For Sabah, the assumption has to be made that maximizing births in the context of a global “meta population” of Sumatran rhinos will in the next few years become a reality, and that the imperative is to utilize the eggs and sperm of the three remaining rhinos in Sabah to create the first Sumatran rhino embryos in vitro.



Mr Yap Keng Chee, senior technician in the Faculty of Veterinary Medicine, UPM, prepares liquid nitrogen ready for receiving semen for freezing, observed by Dr Donny Yawah (PERHILITAN veterinarian)

There were some small but significant advances in reproductive work during 2015. Agro-biotechnology Institute (ABI) Malaysia, a governmental institution which has up-to-date equipment for performing intra-cytoplasmic sperm injection (ICSI), along with Faculty of Veterinary Medicine, Universiti Putra Malaysia (UPM), entered into collaboration with Sabah Wildlife Department and the NGO Borneo Rhino Alliance (BORA) to attempt to produce Sumatran rhino embryos in Malaysia. A “trial-run” ICSI procedure was performed at



ABI laboratory (24 April; left to right) Prof. Abdul Wahid Haron (Faculty of Veterinary Medicine, Universiti Putra Malaysia), Mr Loo Shu San (ABI), Dr Zainal Z Zainuddin (BORA veterinarian), Prof. Arief Boediono (Institut Pertanian Bogor).



First intracytoplasmic sperm injection attempt into Sumatran rhino egg in Malaysia by Prof. Arief Boediono.



(Left) Tam under general anaesthesia undergoing the electro-ejaculation procedure (24 August), performed by a multi-institutional Malaysian team and (right) disappointment on 6 October when it is seen that Puntung lacks follicles ready for aspiration of oocytes.



(Left) Copious bleeding with mucus from Iman's uterine fibroids caused much concern in June 2015 and (right) following the significant blood loss from her fibroids, Iman recovers body weight with constant attention and an enriched diet (19 June).

ABI on 16 April by Professor Arief Boediono of Institut Pertanian Bogor (IPB), Indonesia, using the last remaining frozen sperm obtained by the team from Leibniz Institute for Zoo and Wildlife Research (IZW) in May 2014 and preserved in liquid nitrogen at Tabin. All equipment and personnel were in place, and the only missing "ingredient" on that day was a rhino egg. On 23 April, a fresh semen sample was obtained from the sole male rhino, Tam, and divided into straws for freezing by the IZW team, and three oocytes (immature eggs) were obtained from female rhino Iman on the same day. No oocytes were obtained from the other female, Puntung. All the gametes were taken to ABI on 24 April. Sperm quality turned out to be very poor and accordingly only one ICSI attempt was made by Prof. Arief, but there was no cell cleavage. The other 2 oocytes and the remaining semen straws were cry-preserved and stored in ABI.

The biggest single constraint to progress on development of advanced reproductive technology for Sumatran rhinoceros is the lack of adequate eggs to keep on trying, to perfect all elements of the techniques involved. As in other mammals, female Sumatran rhinos have an oestrus cycle, so that oocytes are potentially available for harvest only at limited times. The IZW team are able to visit Sabah on average only twice per year, for very short periods and typically at non-optimum times during the rhinos' oestrus cycle. The wastage of oocytes that could potentially be harvested more frequently for in vitro fertilization is an issue of very great concern. These are amongst key reasons why the involvement of Indonesia, which has three captive female rhinos, is greatly regretted.

A further constraint is the lack of local expertise to safely harvest sperm and oocytes from living rhinos. To start addressing this gap, in May the BORA veterinarian visited the Equine Reproduction Laboratory at Colorado State University for training in oocyte harvesting from horses and cows. On 19 August, veterinarians at Peninsular Malaysia's Department of Wildlife and National Parks (PERHILITAN) and BORA collaborated on semen collection from captive Malayan tapir in Selangor, providing the opportunity for practice prior to the first electro-ejaculation procedure on Tam without

foreign assistance (performed 24 August), involving a fully Malaysian team of veterinarians and technicians from BORA, PERHILITAN, Sabah Wildlife Department, Wildlife Reserves Singapore and Universiti Putra Malaysia. This attempt worked very smoothly in procedural and logistical terms, but no sperm was obtained. It is believed that this unfortunate result was down to bad luck: Tam had inadvertently touched an electrified wire on his paddock perimeter fence less than 3 days before the procedure.

All three rhinos were put under general anaesthesia again on 6 October for gamete harvesting by the IZW team with Malaysian veterinarians. Small amounts of semen containing sperm were obtained and frozen. No oocytes could be obtained from Puntung; timing was not optimal. The fibroids in Iman were found to have enlarged and the IZW team deemed it unsafe to continue with oocyte harvest. Semen from Tam was taken immediately to ABI. On 7 October, two oocytes from Iman, frozen on 24 April 2015 and stored in ABI, were successfully thawed and intracytoplasmic sperm injection (ICSI) was performed by Prof. Arief Boediono. Unfortunately, by 9 October, it was ascertained that no cell cleavage had occurred.

There were three periods when Iman lost significant amounts of blood from her uterine fibroids in 2015, and this was managed through medication and intensive care. Tam and Puntung remained healthy. Work to seek wild rhinos continued, by WWF-Malaysia in Danum Valley, and by BORA checking on occasional reports in several sites, but all proved to be false. An important publication on the status of Sumatran rhino appeared in the journal *Oryx* in August, in which 12 authors, some of whom disagree on the specific steps needed to save the species, did agree to the following conclusion: "To avoid extinction it will be necessary to implement intensive management zones, manage the metapopulation as a single unit, and develop advanced reproductive techniques as a matter of urgency." As in previous years, financial support from Sime Darby Foundation was essential in sustaining both the Tabin rhino husbandry work and the advanced reproductive technology attempts.