



Borneo Rhino Sanctuary (BRS) Programme 2017 Report

Extinction imminent in the absence of one programme

The decline of the Asian Two-horned rhinoceros (*Dicerorhinus sumatrensis*), commonly known as Sumatran rhino, has not been due primarily to poaching or habitat loss. Instead, throughout the twentieth century, almost all Sumatran rhino individuals have been scattered in small, inbred and non-viable clusters through Indonesia and Malaysia, and with the possible exception of one location in Sumatra, the birth rate has not been sufficient to replace rhino deaths, whether or not poaching is minimized. In the absence of a single managed breeding programme, extinction has been inevitable since 1970s. This was recognized by some parties, including Sabah Forestry Department and WWF-Malaysia in the early 1980s, and resulted in an IUCN-brokered international programme 1984. That programme was fatally undermined by the fact that some participants in the discussion insisted that clusters of wild rhinos showing evidence of births be retained in situ, and that only "doomed" (i.e. mainly old, infertile and sub-fertile) rhinos be captured for breeding. Indeed Tabin Wildlife Reserve was established following lack of support by IUCN for Sabah's 1980 proposal to capture the estimated 12-15 rhinos present in 1980, which included some fertile females (and very likely the mother of Puntung; see below).

For many reasons, the 1984 captive breeding programme unraveled and except for persistent efforts by Dr Terri Roth in Cincinnati Zoo, USA, was essentially abandoned by year 2000. During 2017, actions to try to prevent the genus extinction occurred almost entirely in Malaysia. A combination of lack of interest, understanding or leadership in mainstream conservation NGOs and Indonesia has resulted in no movement towards the necessary single programme geared to maximizing Sumatran rhino birth rate by a combination of natural breeding and advanced reproductive technology (ART).



BORA staff at Tabin Wildlife Reserve : (left to right) Alvin Erut, assistant field manager; Samat Gubin, rhino keeper; Wilson Kuntil, senior rhino keeper.

There were a few bright spots in 2017. Most importantly, funding from Ministry of Natural Resources and Environment Malaysia to Sabah Wildlife Department under the "Application of ART to endangered species in Sabah" programme continued through the year, enabling constant high quality care by Borneo Rhino Alliance (BORA) of the rhinos managed in fenced facilities in Tabin Wildlife Reserve. This programme is pioneering ART for endangered species in Malaysia, with the initial emphasis on Sumatran rhino. However, to be successful for this species, collaboration with Indonesia is essential, as the only other rhinos of this species live in Sumatra and Kalimantan. The euthanisation of Puntung (see below) not only allowed her genome to be preserved in live cell culture in Malaysia but attracted global interest in the species, and some donations that topped up the governmental support.

John Payne and K. Yoganand were contracted by WWF-Indonesia to prepare a report on developing a long term strategy for Sumatran Rhino conservation, which was finalised in May 2017 and later made available in public domain

(https://www.wwf.or.id/en/news_facts/publication/?63965/CRITICALLY-ENDANGERED-SUMATRAN-RHINOCEROS-Inputs-for-Recovery-Strategy-and-Emergency-Actions-2017-2027). This report showed that the near extinction of Sumatran rhino is down to chronic lack of sufficient births, which can be remedied only through a single programme of managed breeding. As a result of this report, WWF made a remarkable rapid switch in May 2017 from the prevailing "poaching and habitat loss" view to the need for capture while there are still a few wild fertile rhinos left alive. The plight of the species was outlined in several articles during 2017, notably on the Mongabay website (for example : 23 June, (<https://news.mongabay.com/2017/06/footprints-in-the-forest-the-future-of-the-sumatran-rhino/>); 7 November, (<https://news.mongabay.com/2017/11/worst-case-scenario-there-could-be-only-30-wild-sumatran-rhinos-left/>); 10 November, (<https://news.mongabay.com/2017/11/the-fate-of-the-sumatran-rhino-is-in-the-indonesian-governments-hands/>); 1 December, (<https://news.mongabay.com/2017/12/petition-for-indonesian-government-to-save-sumatran-rhino-garners-global-support/>)).

A swelling on the upper left cheek of the female rhino, Puntung, was initially noted in February but did not respond to routine treatment, and gave rise to significant concern by the end of March. An international expert team was assembled from Thailand (Dr Tum Teerapol Chinkangsadarn, Mahanakorn University of Technology, Bangkok), South Africa (Dr Johan Marais and Dr Zoe Glypis of Saving the Survivors) and Singapore (Dr Abraham Mathew, Wildlife Reserves Singapore) and on 19 April they joined Dr Zainal Zahari Zainuddin (BORA) to conduct surgical removal of three of Puntung's cheek teeth. Samples of the gingiva mucosa were sent to two laboratories and the lesion was diagnosed as squamous cell carcinoma. Growth of this cancer proceeded rapidly thereafter. Possible treatment options were investigated but by end of May, it was apparent that Puntung was suffering significant pain



Two molar and one premolar teeth extracted from Puntung on 19 April.



Rapid growth of the squamous cell carcinoma in Puntung, 29 April.



(Left) In the weeks preceding death, Puntung received constant care and attention. Here she is offered fruits inside her night barn and (right) given a manually applied mud bath.

Implementation of a difficult but necessary decision : euthanisation of Puntung on 4 June.



Professor Muhammad Lokman Md. Isa and Dr Mokrish Ajat receiving tissues from Puntung on afternoon of 4 June.



A piece of leiomyoma spontaneously discharged from Iman's uterus, 30 December.

and that no known treatment would be successful. Accordingly, the decision was taken to euthanise Puntung on 4 June. Immediately after her death, her ovaries and samples of various tissues were rushed to Agro-Biotechnology Institute Malaysia (Selangor), where Professor Arief Boediono (Institut Pertanian Bogor), confirmed that no follicles (and therefore no oocytes) were present. Ovarian cortex was removed, treated and preserved in liquid nitrogen, in case future technology allows this tissue to yield gametes. Professor Muhammad Lokman Md. Isa (International Islamic University Malaysia) and Dr Mokrish Ajat (Universiti Putra Malaysia) were on standby to receive tissues for cell culture.

Both other rhinos (male Tam and Female Iman) managed by BORA at Tabin Wildlife Reserve remained healthy through 2017, although Iman suffered from serious bleeding from her uterine



Dr Zainal Zahari Zainuddin injects Iman with Improvac, an immunocontraceptive vaccine which temporarily inhibits female reproductive hormone production, and results in reduced growth and bleeding of her leiomyoma tumours.



The IZW team remove oocytes from Iman, 14 July.



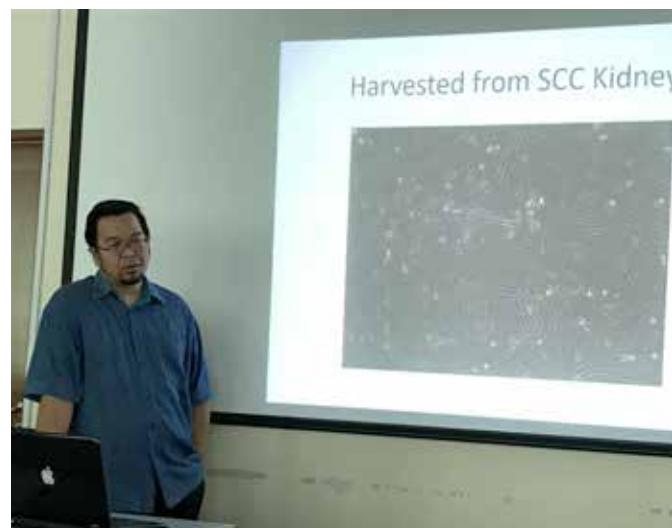
Liquid nitrogen tank at Agri Biotechnology Institute Malaysia containing Tam's semen and Puntung's ovarian cortex.

tumours in December, when some pieces of leiomyoma were spontaneously discharged.

The Leibniz Institute for Zoo and Wildlife Research (IZW) team visited Tabin twice during 2017, harvesting semen from Tam and oocytes from Iman (one on 21 April, two on 14 July). In vitro fertilization was performed by Professor Cesare Galli but no embryo resulted. Professor Galli believes that the problem lies more with the poor quality of Tam's sperm than with Iman's oocytes. It is a tragedy that Indonesia has two young male Sumatran rhinos in captive conditions, but has yet to respond to repeated requests for their semen, dating from June 2015.

Malaysia continued to make overtures to Indonesia during 2017, at national and Sabah governmental levels, and via non-governmental organisations, academic institutions and personal contacts. BORA visited Aceh in April and November to assist in seeking suitable sites for a Sumatran rhino holding facility, and participated in multi-stakeholder meetings in Jakarta, 16-18 May, in relation to capture and translocation of Sumatran rhino in Kalimantan, and collaboration on ART. The first formal Malaysia – Indonesia bilateral governmental meeting on collaboration on application of ART to Sumatran rhinoceros was held in Jakarta on 19 October. The Malaysian delegation included Sabah Wildlife Department, Ministry of Natural Resources and Environment, Universiti Putra Malaysia, PERHILITAN and BORA. There was no disagreement between the experts of Malaysia and Indonesia, but bureaucracy within Ministry of Environment and Forestry Indonesia halted progress up to end of 2017. Tun Musa Hitam raised the issue of collaboration at the World Islamic Economic Forum in Sarawak, 23 November, requesting that the leaders of Indonesia and Malaysia “intensify efforts on conservation of endangered species including Sumatran rhino”. By end of 2017, collaboration was no closer to reality than it had been in 2012, when Tun Musa initiated discussion with the then Minister of Forestry Indonesia.

It appears that 2018 will be the make or break year for Dicerorhinus.



Professor Muhammad Lokman Md. Isa shows an image of a successful culture of kidney cells taken from Puntung.



First official meeting of Indonesian and Malaysian Sumatran rhino experts in Jakarta, 19 October (left to right: for Malaysia, Embassy in Jakarta, BORA, Universiti Pertanian Malaysia, Ministry of Natural Resources and Environment, Sabah Wildlife Department; chairman Bambang Dahino Adjji, director of biodiversity conservation Indonesia; and Indonesian experts).



Participants listening to the welcoming address by the Director of Biodiversity Conservation Indonesia in Jakarta, 17 May, at a two-day international workshop on capture and translocation of Indonesian rhino.



Field visit by BORA (assistant field manager Alvin Erut on left) with staff of Forum Kbservasi Leuser to seek potential Sumatran rhino holding facility locations in Aceh, Indonesia.



Informal meeting of Indonesian, Malaysian, US and German participants from government, NGOs and research institutions, to help initiate collaboration on the application of advanced reproductive technology to Sumatran rhino, 19 May.