



Borneo Rhino Sanctuary (BRS) programme

Annual report : covering the period January - December 2017

Programme objective

To prevent the extinction of the Sumatran rhinoceros

Main participating agencies

Sabah Wildlife Department (SWD; www.wildlife.sabah.gov.my), implemented by Borneo Rhino Alliance (BORA; www.borneorhinoalliance.org), with Faculty of Sustainable Agriculture, Universiti Malaysia Sabah (Sandakan; www.ums.edu.my/fpl/index.php/en), Agro-Biotechnology Institute Malaysia (Selangor; <https://www.abi-nibm.my/>), Faculty of Veterinary Medicine, Institut Pertanian Bogor (<https://ipb.ac.id/faculty/index/faculty-of-veterinary-medicine>), Department of Basic Medical Sciences for Nursing, International Islamic University Malaysia (Pahang; IIUM, <http://www5.iium.edu.my/ar/nursing/departmentbmsn>), Faculty of Veterinary Medicine, Universiti Putra Malaysia (<http://www.vet.upm.edu.my/>), Department of Reproduction Management, Leibniz Institute for Zoo and Wildlife Research (IZW; www.izw-berlin.de), Avantea (www.avantea.it/), and Sabah Forestry Department (SFD; www.sabah.gov.my/htan).

Main financing agencies during this period

Largely Government of Malaysia through funding made available under the 11th Malaysia Plan from Ministry of Natural Resources and Environment to Sabah Wildlife Department. The funding is made available for a programme entitled "Application of Advanced Reproductive Technology (ART) in Conservation of Endangered Species in Sabah", whereby Sabah Wildlife Department contracted Borneo Rhino Alliance (BORA) to (amongst other obligations) "maintain the Sumatran rhinoceroses held at Tabin Wildlife Reserve, for harvesting their gametes ... and to develop the application of advanced reproductive technology towards the recovery of the Sumatran rhinoceros and other endangered wildlife species in Sabah." Many individual donors from within and outside Malaysia contributed extra funds.

Targets for this period

(A) Keep Malaysia's last three *Dicerorhinus* rhinos alive and healthy. (B) Produce a Sumatran rhino embryo *in vitro*. (C) Develop local capacity in advanced reproductive technology. (D) Continue to seek opportunities for collaboration with Indonesia.

General picture

There were few bright spots for Sumatran rhino in 2017. Most importantly for the Borneo Rhino Sanctuary programme, however, funding from national government of 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 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 euthanasiation 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.



(left) Mr Augustine Tuuga (Director, Sabah Wildlife Department) and (centre of picture) Dato' Sr Dr Azimuddin bin Bahari, Deputy Secretary-General, Ministry of Natural Resources and Environment, visited the rhinos at Tabin, 12 June 2017, the latter with his officers and officers from Department of Wildlife and National Parks Peninsular Malaysia, (right) the team from Department of Basic Medical Sciences for Nursing, International Islamic University Malaysia, Kuantan demonstrate at Faculty of Sustainable Agriculture, Universiti Malaysia Sabah, Sandakan, techniques of preparing mammalian tissues for cell culture.

Activities during this period

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.



(left) Dr Zainal Zahari Zainuddin injects Iman with Improvac, an immunocontraceptive vaccine which temporarily inhibits female reproductive hormone production (April), and results in reduced growth and bleeding of her leiomyoma tumours, (right) the IZW team remove oocytes from Iman, 14 July.

Puntung

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 Teerapol Chinkangsadarn, Mahanakorn University of Technology, Bangkok), South Africa (Dr Johan Marais and Dr Zoe Glyphis 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 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, 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.



(left) Puntung received all manner of care and attention in the months leading to her death, including daily application of mud when she became too sick to wallow in her paddock, (right) BORA staff Alvin Erut (assistant field manager), Samat Gubin (rhino keeper) and Wilson Kuntil (senior rhino keeper)



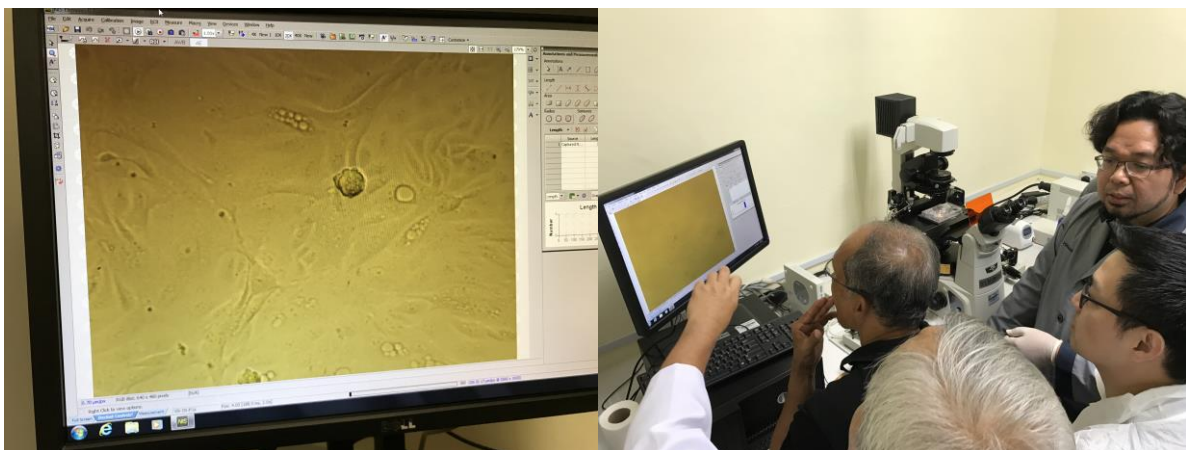
Premolar and molar teeth extracted from Puntung, 19 April



(left) Puntung being offered fruits in her night barn, (right) the condition of the squamous cell carcinoma in the days before euthanasiation



(left) Tissues being removed from Puntung immediately post-euthanasiation, (right) Professor Arief Boediono, at Agro Biotechnology Institute, seeks the presence of follicles in the ovaries.



Three-and-a-half months after the death of Puntung, Professor Muhammad Lokman Md. Isa (above right in this picture) was able to demonstrate the successful thawing from frozen cell culture of her living fibroblasts, thus showing that preserving the living genome of individual endangered species is possible in Malaysia.

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

Indonesia

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. WWF made a remarkable rapid

revision in May 2017 from the prevailing “poaching and habitat loss” view to the need for capture while there are still wild fertile rhinos left alive.

Malaysia continued to make numerous 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, 16-19 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.



Field visit by BORA with staff of Forum Konservasi Leuser to seek potential Sumatran rhino holding facility locations in Aceh, Indonesia



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



(left) Discussion in Jakarta, 19 May, on the need for application of ART in Sumatran rhino, with representatives from Biodiversity Conservation Division of Ministry of Environment and Forestry Indonesia, Wildlife Conservation Society, Institut Pertanian Bogor, Veterinary Faculty of Universitas Syiah Kuala Banda Aceh, Indonesian Rhino Foundation, International Rhino Foundation and BORA, which, by end of 2017 turned out to have been fruitless



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 Adji, director of biodiversity conservation Indonesia; and Indonesian experts)

Awareness

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/>

Other updates

Dr Reza Tarmizi joined BORA in April 2017, as veterinary officer under the Application of ART in Conservation of Endangered Species in Sabah programme.

Issues and solutions to be addressed

The absence of leadership, decision-making, appropriate policy decisions and urgency, both in Indonesia and in international institutions such as IUCN and International Rhino Foundation, remain the prime cause of the genus' impending extinction.

Plans for 2018

Continue to seek opportunities for collaboration with Indonesia; produce a Sumatran rhino embryo in vitro (but Indonesia must also provide gametes); continue to develop local capacity to pursue advanced reproductive technology for Sumatran rhino.