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## Saving Our Last Jewel

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Malaysia is well known as one of the top 17 mega-biodiversity countries in the world (Von Rintelen *et al.*, 2017). However, despite being a country with such rich biodiversity of flora and fauna, Malaysia is about to lose a precious jewel, the Sumatran rhinoceros (*Dicerorhinus sumatrensis*). Our country once had two species of rhinos, but with the Javan rhinoceros (*Rhinoceros sondaicus*) in Borneo officially declared extinct in 2007 (Cranbrook & Piper, 2007), there is now only one living rhino species left for us to treasure, namely, the Sumatran rhino. The severe decline of the Sumatran rhino population is also of global concern as it is listed as Critically Endangered (CR) under the IUCN Red List of Threatened Species (Strien *et al.*, 2008). Recent data from governments, researchers and NGOs show that the global population of Sumatran rhino could be as low as 216 individuals, a decline from c. 320 estimated in 1995 (Ahmad Zafir *et al.*, 2011).

The Sumatran rhinoceros is the smallest and hairiest rhinoceros compared to the other four species in the world, namely, Javan rhinoceros, White rhinoceros (*Ceratotherium simum*), Black rhinoceros (*Diceros bicornis*) and Indian rhinoceros (*Rhinoceros unicornis*) (Save The Rhino International, 2017). The Sumatran rhinoceros is divided into two subspecies where *D. sumatrensis sumatrensis* is confined to Sumatra and Peninsular Malaysia

while *D. sumatrensis harrissoni* is endemic to Borneo (Ahmad Zafir *et al.*, 2011). It is believed that the Sumatran rhinoceros is the closest living relative of the extinct woolly rhinos (Borneo Rhino Alliance, 2016a) which were once distributed throughout South-East Asia up to the foothills of the Himalayas (Corbett & Hill, 1992). Unfortunately, the Sumatran rhino is currently extremely rare and restricted to isolated parts of Indonesia and Malaysia only (Ahmad Zafir *et al.*, 2011).

The Sumatran rhinoceros is a member of the family Rhinocerotidae from the order Perissodactyla ("odd-toed" ungulates). Most people often confuse rhino tracks with those of the Malayan Tapir (*Tapirus indicus*) and many also believe that tapirs are actually young rhinos (Flynn & Abdullah, 1984). Thus, it is very important to confirm any rhino report through field surveys. The Sumatran rhino differs from the tapir by its larger body size and different number of toes – the Sumatran rhino has three toes on each foot while the tapir has four toes on its front feet and three toes on the hind feet, and different body colour pattern. The Sumatran rhino is generally dark brown while the tapir is generally black and white in colour. The Sumatran rhino also differs from other species of rhinos because of its thick skin and body which is covered extensively by sparse hairs. There are two main folds of skin on its body and several smaller folds of skin on its hind legs. This species is the

only Asian rhino with two horns, a front horn which is relatively narrow and about 250-300 mm long in males but smaller in females, and a short rear horn, rarely more than 100 mm long.

The Sumatran rhino was formerly recorded in a variety of forest types, from tropical rainforest to montane moss forest and occasionally at forest margins and in secondary forest (Nowak, 1999). Previously, it mainly occurred in hilly areas near to water sources and exhibited seasonal movements; moving uphill in times of lowland flooding (Strien, 1975). It was also reported to depend on salt licks (Strien, 1975). Now, it can only be found in lowland forest and sometimes in fairly hilly areas.

The Sumatran rhinoceros is an important seed dispersal agent as it consumes fruits with seeds of between 4 cm and 6 cm diameter. Generally, the Sumatran rhino is a 'browser', feeding on leaves and twigs. It feeds on foliage of over 100 species of small trees and understorey shrubs, preferring the leaves of pioneer trees and vines, especially *Ficus*, *Artocarpus*, *Spatholobus* and *Macaranga*. Usually it uses its neck and body to bring a tall sapling down and then cuts off branches with its sharp teeth. It usually feeds at night and during the coolest times of the day, in the early morning and/or later in the afternoon. At the same time, it tends to eat fruits whenever available, especially mangoes. Other seeds dispersed by the Sumatran rhino are those of wild mangosteen, wild rambutan, most figs, and Belian (*Eusideroxylon zwageri*). Defecation sometimes takes place in streams and watercourses and this makes water the secondary dispersal agent.

Sadly, our Sumatran rhino has been under serious threat particularly during the early decades of the 20<sup>th</sup> century, primarily due to excessive hunting (Strien, 1975). This had greatly reduced the number of Sumatran rhino and their distribution range (Strien, 1974). Rhino horns have been used in traditional Chinese medicine (Rabinowitz, 1995) and traded in China since as early as 2600 B.C. (Nowell *et al.*, 1992) with sources coming from South-East Asian territories such as Vietnam, Java, Sumatra, the Malay Peninsula, Borneo, Cambodia, Laos and Thailand (Rabinowitz, 1995). The high value of and demand for the horn continues to encourage the persistence of illegal hunting (Flynn & Abdullah, 1984). According to the records of the Department of Wildlife and National Park (DWNP), about 30 individuals of Sumatran rhino were poached in Peninsular Malaysia between 1975 and 2006 (DWNP, 2009). Apart from that, the Sumatran rhino has long been threatened by extensive habitat destruction due to logging and forest clearance for agriculture development. These activities have caused the rhino populations to become fragmented, small, and isolated (Flynn & Abdullah, 1984).

In 2013, Malaysia realised that the Sumatran rhino was most likely extinct in the peninsula and on the verge of extinction in Sabah (Abdul Hamid *et al.*, 2013). In August 2015, the species was officially declared extinct in the wild in Malaysia (Martinez, 2015; World Wide Fund for Nature, 2017). The last record of a Sumatran rhino in Peninsular Malaysia was in 2007 (Magintan *et al.*, 2010). Currently, no single living individual of this species has been found in the wild, and there are only two known to be living in captivity, namely, a male rhino, Kertam, and a female, Iman, housed at the Tabin Wildlife Reserve Lahad Datu, Sabah (Borneo Rhino Alliance, 2016b).

Poaching and habitat loss, especially in the lowlands, are no longer the most significant threats to the conservation of this species in Malaysia as this species is already extinct in the wild.

Currently, the Sumatran rhino is mainly threatened by too low densities which will lead to a likely negative population growth rate (Havmøller *et al.*, 2016), small population size and slow breeding rate. It is experiencing the Allee effect (Allee, 1931) which refers to a "positive correlation between population size or density and the mean individual fitness". This indicates that as the Sumatran rhino population declines to very low numbers, its chances of successful breeding will also decline (Courchamp *et al.*, 2008). Difficulty in finding a mate, narrow genetic base, random skewed sex ratio, and reproductive tract pathology (also representing low reproduction) have all contributed to very low numbers of annual Sumatran rhino births. Currently, it appears that even in places with suitable habitats and zero human off-take, i.e. no poaching or hunting by humans, it is just a matter of time before the average annual death rate of the Sumatran rhino will exceed its annual birth rate, with the population going extinct due to its small, scattered and non-contiguous "populations" (Abdul Hamid *et al.*, 2013).

Existing statutes and laws, such as Wildlife Conservation Act, 2010 (applies to Peninsular Malaysia only), Wildlife Protection Ordinance, 1998 (applies to Sarawak only) and Wildlife Conservation Enactment, 1997 (applies to Sabah only) which list the Sumatran rhino as Totally Protected, have proven ineffective in preventing a decline in its numbers. This is due to lack of enforcement as well as the animal's low breeding rate. The species has also continued to go locally extinct across its range although protected areas had been created and other in-situ conservation efforts increased. Previous captive breeding programmes had also failed to increase the numbers of this species; from a total of 45 Sumatran rhinos taken from the wild since 1984, there were no captive births until 2001 when this occurred in Indonesia (Havmøller *et al.*, 2016). Not a single baby rhino has been born in Malaysia from the captive breeding programme and by the end of the 20<sup>th</sup> century, almost all the captive Sumatran rhinos had died because of disease.

We hope we are not too late to save our precious jewel from extinction. At the Sumatran Rhino Crisis Summit held in Singapore in April 2013, and later agreed upon in the Bandar Lampung Declaration in October 2013, four key actions were identified to save the Sumatran rhino from extinction. The first key action is a need for a unifying global strategy to manage the global population (both wild and captive) as a single metapopulation across national and international borders (Havmøller *et al.*, 2016). The national government of Malaysia and state government of Sabah are ready to collaborate with Indonesia on this management strategy. However, this project might take some time to fully materialise as the Malaysian and Indonesian governments have yet to sign the Memorandum of Agreement for the collaboration. The second key action is a need to continue deployment of strengthened Rhino Protection Units at sites with remaining breeding populations in Indonesia (Havmøller *et al.*, 2016). The third key action is to create intensive management zones (IMZs). These are rhino breeding areas which need to be designated as protected areas with increased protection and monitoring. It has also been proposed that isolated rhinoceroses outside the IMZs be brought into these zones to maximize their chances of reproducing (Havmøller *et al.*, 2016). The fourth key action is the development of advanced-reproductive technology (ART) in captive breeding. This is currently on-going in Sabah, conducted by the Borneo Rhino Alliance (BORA) in collaboration with the Leibniz Institute for Zoo and Wildlife Research, Agro-Biotechnology Institute Malaysia (ABI), Universiti Putra Malaysia (UPM), and others (Havmøller *et al.*, 2016). ART which emphasises producing embryos through

in-vitro fertilization from cryopreserved gametes from Kertam and Iman is needed since Iman has reproductive pathologies and natural conception is not possible. Attempts are ongoing to create the first test tube Sumatran rhino embryo for implantation into a viable surrogate mother (Borneo Rhino Alliance, 2016). BORA also plans to cryopreserve gametes and skin cultures of Kertam and Iman for the future. It should be possible for every female in managed conditions to produce several progeny once the technique for removing oocytes from females and producing embryos in-vitro have been established (Havmøller *et al.*, 2016). This management strategy may take many years, but it is better than doing nothing, to help increase the birth rate of the Sumatran rhino. The exchange of gametes between individuals across countries, such as Malaysia and Indonesia, can provide a genetic advantage for this species (Goossens *et al.*, 2013). The Indonesian government has already agreed to send semen of their Sumatran rhinoceros, Andalas, to Malaysia for the ART programme. The plan is to use the Indonesian rhino's sperm to fertilise viable eggs of Malaysia's only remaining female rhino, Iman (Miwil, 2018). The collaboration between Malaysia and Indonesia in ART is seen as the last means of saving this critically endangered species (Gokkon, 2018).

There has been a significant increase in funding from the Sumatran Rhino Crisis Summit but only for Sumatran rhino habitat protection. The Forest Research Institute Malaysia (FRIM) has also provided funds to procure some equipment for the in-vitro fertilisation process, but funding is still inadequate to fully implement the new strategic management plan. According to Havmøller *et al.* (2016), there is a lack of funds for metapopulation management and conservation breeding, including expanding the conservation breeding facilities and development of the ART.

In a nut shell, it is very crucial that this new strategic management plan for small populations of this critically endangered species be fully implemented. So, let's not wait anymore. We need to work together to save our last jewel. Let us give our support to BORA in order to save our last two living individuals of the Sumatran rhino before it is too late. Otherwise, we are going to lose the species in Malaysia. As we have always been told, "it is better late than never".

## References

- Abdul Hamid A, Payne J & Zainal ZZ. 2013. Preventing the extinction of Sumatran rhinoceros. *Journal of Indonesian Natural History* 1(2): 11-22.
- Ahmad Zafir AW, Payne J, Mohamed A, Fong Lau C, Kumar Sharma DS, Christy Williams RAA, Nathan S, Ramono WS & Clements GR. 2011. Now or never: what will it take to save the Sumatran rhinoceros *Dicerorhinus sumatrensis* from extinction? *Oryx* 45(2): 225-233.
- Allee WC. 1931. *Animal Aggregations. A Study in General Sociology*. Chicago, IL: University of Chicago Press.
- Borneo Rhino Alliance. 2016a. The battle to save the Sumatran Rhino. <http://www.borneorhinoalliance.org/background/borneos-last-sumatran-rhinos/>. Retrieved on September 15, 2017.
- Borneo Rhino Alliance. 2016b. Only two left in Malaysia. <http://www.borneorhinoalliance.org/only-three-left-in-malaysia/>. Retrieved on September 15, 2017.
- Corbett GB & Hill JE. 1992. *The Mammals of the Indomalayan Region: A Systematic Review*. Oxford University Press, New York, USA.
- Courchamp F, Berec L & Gascoigne J. 2008. *Allee Effects in Ecology and Conservation*. Oxford University Press, New York, USA.
- Cranbrook E & Piper PJ. 2007. Short communication: The Javan rhinoceros *Rhinoceros sondaicus* in Borneo. *The Raffles Bulletin of Zoology* 55(1): 217-220.
- DWNP. 2009. Sumatran Rhinoceros (*Dicerorhinus sumatrensis sumatrensis*) in Peninsular Malaysia. [http://wildlife.gov.my/images/stories/penerbitan/kertas\\_maklumat/rhino.pdf](http://wildlife.gov.my/images/stories/penerbitan/kertas_maklumat/rhino.pdf). Retrieved on March 28, 2017.
- Flynn RW & Abdullah MT. 1984. Distribution and status of the Sumatran rhinoceros in Peninsular Malaysia. *Biological Conservation* 28: 253-273.
- Gokkon B. 2018. Indonesia hints rhino sperm transfer to Malaysia may finally happen this year. <https://news.mongabay.com/2018/01/indonesia-hints-rhino-sperm-transfer-to-malaysia-may-finally-happen-this-year/>. Retrieved on February 20, 2018.
- Goossens B, Salgado-Lynn M, Rovie-Ryan JJ, Ahmad AH, Payne J, Zainuddin ZZ, Nathan SKSS & Ambu LN. 2013. Genetics and the last stand of the Sumatran rhinoceros *Dicerorhinus sumatrensis*. *Oryx* 47: 340-344.
- Havmøller R, Payne J, Ramono W, Ellis S, Yoganand K, Long B, Dinerstein E, Williams A C, Putra RH, Gawi J, Talukdar BK & Burgess N. 2016. Will current conservation responses save the Critically Endangered Sumatran rhinoceros *Dicerorhinus sumatrensis*? *Oryx* 50(2): 355-359. doi:10.1017/S0030605315000472.
- Magintan D, Rufino MBM, Cosmas N & Dennis TCY. 2010. Some evidence of Sumatran rhinoceros presence in Temengor Forest Reserve, Perak. *Journal of Wildlife and Parks (2009-2010)*, 26: 5-10.
- Martinez J. 2015. The Sumatran Rhino Is Now Extinct in Malaysia. *Newsweek*. <http://www.newsweek.com/sumatran-rhino-extinct-364975>. Retrieved February 20, 2018.
- Miwil O. 2018. Sabah Wildlife Department thrilled to hear Indonesia will send Sumatran rhino sperm. <https://www.nst.com.my/news/nation/2018/01/328779/sabah-wildlife-department-thrilled-hear-indonesia-will-send-sumatran>. Retrieved on March 16, 2018.
- Nowak RM. 1999. *Walker's Mammals of the World*. The John Hopkins Univ. Press, London.
- Nowell K, Chyi WL & Pei CJ. 1992. *The Horns of a Dilemma: The Market for Rhino Horn in Taiwan*. Traffic International, Cambridge, England.
- Rabinowitz A. 1995. Helping a species go extinct: The Sumatran Rhino in Borneo. *Conservation Biology* 9 (3): 482-488.
- Save the Rhino International. 2017. Species of Rhino. [https://www.savetherhino.org/rhino\\_info/species\\_of\\_rhino](https://www.savetherhino.org/rhino_info/species_of_rhino). Retrieved on February 20, 2018.
- Strien VNJ. 1975. *Dicerorhinus sumatrensis* (Fischer), the Sumatran or two-horned rhinoceros: a study of literature. *Netherlands Committee for International. Nature Protection Meded* 22: 1-82.
- Strien VNJ. 1974. The Sumatran or two-horned Asiatic rhinoceros. A study of the literature. *Meded. Landbouwhogeschool Wageningen*: 74-16.
- Strien VNJ, Manullang B, Sectionov Isnani W, Khan MKM, Sumardja E, Ellis S, Han KH, Boeadi, Payne J & Bradley Martin E. 2008. *Dicerorhinus sumatrensis*. The IUCN Red List of Threatened Species 2008: e.T6553A12787457. <http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T6553A12787457.en>. Retrieved on September 15, 2017.
- Taylor AP. 2015. Sumatran rhino goes extinct in the wild in Malaysia. <https://www.livescience.com/51965-sumatran-rhino-extinct-in-malaysia.html>. Retrieved on March 16, 2018.
- Von Rintelen K, Arida E & Häuser C. 2017. A review of biodiversity-related issues and challenges in megadiverse Indonesia and other Southeast Asian countries. *Research Ideas and Outcomes* 3: e20860. <https://doi.org/10.3897/rio.3.e20860>. Retrieved on January 10, 2018.
- World Wide Fund for Nature. 2017. Sumatran Rhino. [http://wwf.panda.org/what\\_we\\_do/endangered\\_species/rhinoceros/asian\\_rhinos/sumatran\\_rhinoceros/](http://wwf.panda.org/what_we_do/endangered_species/rhinoceros/asian_rhinos/sumatran_rhinoceros/). Retrieved on January 10, 2018.