Sumatran Rhino Conservation Strategy in Sabah, Malaysia

Edwin Bosi [1]DVM, M.Phil. Annelisa Kilbourn[2] DVM and Nan Schaffer[3] DVM
[1] Program Officer, SOS Rhino, C/O Institute of Tropical Biology and Conservation, Universiti Malaysia Sabah, Locked Bag 2073, 88999, Kota Kinabalu, Sabah, Malaysia.
[2]Field Scientist, SOS Rhino, C/O Sepilok orangutan Rehabilitation Center, W.D.T. 200, 90009, Sandakan, Sabah, Malaysia.
[3]Founder and President, SOS Rhino, 680 N.Lake Shore Drive, Suite 807, Chicago, IL 60611.

Introduction

Sabah is one of the two Malaysian States located north of the island of Borneo. The other Malaysian State is Sarawak situated in the western part of Borneo. The other political boundaries are Kalimantan, Indonesia in the east and the tiny Brunei Sultanate in the west, sandwiched between Sabah and Sarawak.

Sabah covers an area of approximately 73713 square km. A total of about 3.6 million hectares of land is under Permanent Forest Estate (Anon, 1997), 245000 hectares and 503000 hectares constitute Parks and Plantation Forest respectively (Anon, 1992). Wildlife Reserve takes up about 133000 hectares while 30000 hectares is under Wildlife Sanctuary.

Sabah has such a diverse fauna population. Yasuma and Andau (1999) indicated that there is about 189 species of land mammals. There are about 540 species of birds representing over 60 families (Sale & Andau, 1994). Sabah is also home to many species of snakes, non-marine turtles, tortoises, lizards, frogs, toads and insects (Anon, 1998, Inger & Stuebing, 1989) and aquatic mammals (Yasuma & Andau, 1999).

Sabah is home to three large herbivores, the rare and critically endangered Sumatran rhinoceros (*Dicerorhinus sumatrensis harrissoni*), Asian elephants (*Elephas maximus*) and Tembadau (*Bos javanicus*). The conservation of Sumatran rhino is undoubtedly the most important and challenging in our time. The main constraints affecting this species are its critical small population, habitat loss and poaching.

The Sumatran rhino in Borneo is a subspecies and confined to Sabah. There is no report of their presence in Kalimantan, Sarawak or Brunei. Presently there are probably less than 30 individuals in the wild (Ambu, 1995) and two in captivity. The other subspecies, *Dicerorhinus sumatrensis sumatrensis*, are found in the island of Sumatra, Indonesia and in Peninsular Malaysia

Distribution of Sumatran rhino in Borneo

A total of 10 rhinos were captured from the Kinabatangan, Sukau and Lahad Datu areas of Sabah (Bosi, 2001). Out of these ten individuals, eight were males. One was collared and released in Tabin Wildlife Reserve (Bosi, 1996). Only one pair is left at Sepilok Rhino Breeding Center. A female was shot dead in March 2001 at the Kalabakan Forest Reserve, north of the Kalimantan/Sabah border.

Dicerorhinus sumatrensis has been recorded throughout Borneo (Mjoberg, 1999; Shelford, 1999) but information gathered from previous surveys conducted by the Wildlife Department (Ambu, 1995) and other (Davies & Payne, 1982) indicated that this species is mainly confined to the lowland forest along the Kinabatangan and Segama Rivers in Sabah. They were also observed in Danum Valley conservation area in 1985 and Maliau Basin conservation area in 1988 (Anon, 1988). Bennett et al., (1995) reported of the last rhino been killed by the people in the Sipitang district.

There are recent surveys that confirmed their presence in Tabin Wildlife Reserve (Kilbourn, per. com., Bosi 2000 unpublished), Gunung Rara Forest Reserve and Kalabakan Forest Reserve (Malim et al., 1999) and the Lower Kinabatangan Wildlife Sanctuary, Sukau (Stephen, per. com.,). There are only sightings of rhino been noted at Tabin Wildlife Reserve (David, per. com.,) and Danum Valley conservation area (Gideon, per. com.,).

Some Important Aspects of Sumatran Rhino Ecology

Sumatran rhinos are solitary animals except for the females with young calves. They are browser and consume about 321 plants comprising more than 147 species and 48 plant families (Flynn, 1981 as cited in Davies & Payne, 1982). About 75% of the plant consumed is mature leaves and 20% small stems, and some fallen fruits.

Van Strien (1985) stated that males have larger home range of more than 30 km square and adult females, about 25 km square. Females with calves have smaller home range. Their existence is focused on finding food, visits to saltlicks and mud volcano for their mineral requirement and propagation (Van Strien, 1985).

Sumatran rhinos are shy and illusive animals, fleeing deep into the most remote part of the forest when human activities are nearby (Davies & Payne, 1982). They are however, quickly tamed under captive management.

For large mammals such as the Sumatran rhinos, an area of at least 6000 square km of contiguous rainforest is required to sustain a viable population of about 200 individuals (Davies & Payne, 1982).

Conservation organizations working on Sumatran rhino

The Wildlife Department of Sabah is the responsible authority on wildlife. The department is guided by the Wildlife Conservation Enactment 1997. The Sumatran rhino is one of the nine species placed under Schedule One Part I of the said Enactment. Under this category of totally protected species, hunting, trapping and keeping of Sumatran rhino is strictly prohibited. On conviction of an offence relating to this species is a mandatory jail sentence of not less than six months and not more than five years.

Prior to the establishment of the Wildlife Department Sabah, the Game Branch of the Forestry Department Sabah was the authority on wildlife. In 1985, there was an attempt to capture and relocate some rhinos to United States for managed breeding (Anon, 1985a). The controversy led to the formation of the Sabah Rhino and Wildlife Conservation Committee (SRWCC) by the State government. The government then was in favor of undertaking the capture and breeding in Sabah. Several forest reserves were surveyed and followed by capturing of doomed rhinos, and moving them to Sepilok for that purpose. In 1988, the Game Branch and SRWCC merged to form the Wildlife Department Sabah.

The Wildlife Department has undertaken several surveys on Sumatran rhinos. Others research and survey works were conducted by the World Wildlife Fund for Nature (WWF) and the Wildlife Conservation Society (WCS). The conservation of this species was boosted with funding for about US411000.00 received from the GEF-UNDP Rhino Project Malaysia from 1995 to 1998 (Anon.1995b).

SOS Rhino in Sabah

The completion of the GEF-UNDP Rhino Project Malaysia is followed by the extension of SOS Rhino (Save Our Sumatran Rhino) to Sabah in November 2000. SOS Rhino is a US-based conservation organization that focuses its resources and expertise on the critically endangered Sumatran rhinoceroses, particularly in Sabah.

Dr. Nan Schaffer, a renowned veterinarian specializing in rhino reproduction, is the founder and President of SOS Rhino. The Chairman is Dima Elissa, a successful audio-visual producer in the United States. SOS Rhino has appointed US-trained veterinarian, Dr. Annelisa Kilbourn as its Field Scientist while a local wildlife veterinarian, Dr. Edwin Bosi the Program Officer.

Both Dr. Kilbourn and Dr. Bosi are responsible for the recruitment and training of one local veterinarian and 12 field staffs to assist in the *in situ* and *ex situ* conservation works at Tabin and Sepilok respectively.

SOS Rhino has awarded a US10000.00 research grant to a local Malaysian student to undertake a Masters in Sumatran rhino ecology. He is currently enrolled in University Malaysia Sabah (UMS) under the supervision of Associate Professor Datin Dr. Maryati Mohamed and Dr. Edwin Bosi. His external supervisors are Dr. Nan Schaffer and Dr. Annelisa Kilbourn. SOS Rhino is providing a second grant for similar program.

In situ conservation and achievement

Tabin Wildlife Reserve (TWR) covers an area of about 1200 square km. The Reserve is gradually engulfed by oil palm plantation. A small parcel of swampy land connects the Reserve to Kulamba Wildlife Reserve (approx. 30000 hectares) in the northeast of

TWR. There are at least three rhinos in TWR based on a sighting in 1999, released of a collared rhino in 1993 and a recent evidence of fresh hoof prints at the core area in January 2001. Researcher has estimated that the population of rhino in TWR is possibly in the region of nine individuals (Boonratana, per. com.). The Wildlife Department's estimate is between 15 to 20 individuals (Ambu, 1995).

SOS Rhino has invested 20 phototrap cameras for purpose of getting photographic evidence of the rhinos in TWR. Two teams comprising of 5 men each are now working in TWR, to penetrate the deepest and remotest part of the Reserve, seeking evidence of rhinos via hoof prints, wallows, browsing and marks on trees. There will be at least 15 cameras placed strategically throughout the Reserve. Team members will visit the sites on a 3-week cycle to check on the integrity of the cameras, collecting the films and reloading them. The 3-week cycle that involved only two members of the team to undertake this task is meant not to frighten the animals away from the area. So far the pictures taken by these cameras are mostly of elephants, sambar deer, wild pigs and civets.

The Wildlife Department has kindly allowed SOS Rhino to take over the rhino base camp at Tabin.

Ex situ conservation and achievement

There is no record of breeding leading to birth of Sumatran rhino in captivity. Breeding of Sumatran rhino naturally has been successful at Sepilok (Bosi, 1996). This success has opened the window to other breeding successes in Cincinnati Zoo, USA, Sg. Dusun, West Malaysia and Way Kambas, Sumatra.

SOS Rhino is working diligently to breed the last pair of rhino at Sepilok. Dr. Nan has for several occasions ultrasound the female (Gelogob) and collected semen from the male (Tanjung). Dr. Kilbourn has successfully joined the pair to breed. Blood collection for progesterone analysis is done twice a week to study the hormonal profile which is correlated to the behavior been studied at the same time.

Dr. Nan has found some pathology in Gelogob while no spermatozoa has been detected from Tanjung as yet. Dr. Kilbourn finds that the estrus cycle erratic based on blood progesterone profile. However, natural mating is observed but other attempts have been unsuccessful. Currently, the estrus cycle has been determined via clear mucus vaginal discharge, and consistent with observation by Bosi (1996) at 28-30 days. The animals will be joined again when she comes into estrus based on evidence of mucus discharge.

Nature Tourism

Dr. Nan and Dima have recently guided a group of special tourists to Sabah to see the rhinos in Sepilok. They had a chance to see Dr. Nan doing an ultrasound on Gelogob, and collection and evaluation of semen. Later in the night, they had an opportunity to listen to Dr. Nan's talk on challenges facing the survival of the Sumatran rhino. Although this trip is focuses on the rhino, the group was also brought to other places of interest such as the Kinabalu Parks, Sukau Rainforest and water rafting at Padas River.

Discussion

SOS Rhino will continue to support and assist the wildlife department in the conservation of Sumatran rhino in Sabah. The recruitment of a new veterinarian for the *ex situ* component, and provision of another student grant for research shows the commitment of SOS Rhino in this project.

This is the first attempt by any organization to undertake intensive and extensive survey of Sumatran rhinos in Tabin. SOS Rhino is deploying 12 persons fulltime to reach and survey the remotest part of the Reserve, and assisted by a fulltime researcher. SOS Rhino field staffs are also working as ear and eye of the Wildlife Department and Forestry Department by providing information on poachers and illegal logging activities.

SOS Rhino is confident to breed the pair of rhino at Sepilok and will work closely with the Rhino specialists in Cincinnati Zoo. The fieldwork is more risky, laborious and tedious. Our staffs have encountered poachers in the Reserve. One of our cameras has been stolen while a couple of others have been damaged by wild elephants. The finding of fresh hoof prints around the mud volcano in January 2001 is timely.

The dead of a female rhino near the Kalimantan/Sabah border in March 2001 is a tragedy to the conservation of this species. There is a need to quickly determine the where about of the rhinos and their number in Sabah. This will help in formulating management strategy for the species. It is without doubt that protection of habitat and educating the people on the value of this species to the country are the immediate actions that need to be implemented.

The areas along the Segama and Kuamut Rivers, the Maliau Basin and down south to the kalimantan/Sabah border are reported to have some rhinos. A rhino has also been reported in the Lower Kinabatangan Wildlife Sanctuary. There is an urgent need to undertake intensive survey on these areas. This however, requires substantial manpower and funding.

Conclusion

The Sumatran rhino in Sabah is of global significance because of its critical population size. The extinction of this subspecies is not impossible. Malaysian in Sabah is therefore placed in such a difficult position and responsibility to protect and conserve the last population of *Dicerorhinus sumatrensis harrissoni*. The international community is supporting this noble cause through AREAS, a project of WWF and SOS Rhino. We hope more organizations and individuals will come forward to help SOS Rhino in terms of technical support, field and research equipment, and donations. Our website is at www.sosrhino.org

The breeding of the last pair must be intensified. It may not save the species but may help us to understand the biology of this species. Cincinnati Zoo is waiting for a successful birth of its Sumatran rhino. Data and experience gathered from Cincinnati will be useful to the other Sumatran rhino facilities.

The death of a female rhino in March 2001 is a reminder that even at this modern time and when medicine is so advance, the rhino is still not safe. The protection of known rhino habitats is crucial and will involve more manpower and finance.

Intensive surveys and research must be undertaken so that we know the population of rhinos within the habitats. This will facilitate the management and protection of the species. Educating the people on the value of Sumatran rhino and other wildlife is equally important. Nature tourism is increasingly important as revenue earner for the country. There is then every reason to conserve nature.

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Reference

AMBU, L.N. (1995). The Status of the Asian Two-Horned Rhinoceros (*Dicerorhinus sumatrensis harrissoni*) in Sabah, Malaysia. Report for the Malaysian Population and Habitat Viability Analysis (PHVA) Conference, 27th – 30th November 1995 Sandakan, Sabah.

ANON. (1985a). Symposis of the Rhino Forum n November 23rd, Sabah Society Journal. Vol. VIII. Number 1.

ANON. (1995b). First Year Work Plan April 1995 – March 1996 Malaysia. UNDP RAS/94/G32/A/1G/99 Conservation Strategy for Rhinoceros in South East Asia (Indonesia and Malaysia.)

ANON. (1988). Expedition to Maliau Basin, Sabah April-May 1988 Final Report. Yayasan Sabah Forestry Division in Conjunction with WWF-Malaysia Project No. MYS 126/88.

ANON. (1998). Encyclopedia of Malaysia. Vol. 3. Animals, Editions Didier Millet

ANON. (1992). Annual Report 1992. Department of Forestry Sabah.

ANON. (1997). Annual Report 1997. Department of Forestry Sabah.

BENNETT, E.L., NYAOL, A. & SOMPUD, J. (1995). The Conservation Management Study of Wildlife Hunting in Sabah and Sarawak. Report on the Completion of Fieldwork. Wildlife Conservation Society.

BOSI, E. (1996). Mating Sumatran Rhinoceros at Sepilok Rhino Breeding Center, Sandakan, Sabah, Malaysia. Pachyderm No. 21, p. 24 –27.

BOSI, E. (2001). Assessment of Rhino Population in the Lower Kinabatangan Wildlife Sanctuary. Paper Presented at the 3-Day Workshop of the Lower Kinabatangan Management Plan on Theme: Towards Quality Conservation Programmes for The Lower Kinabatangan Wildlife Sanctuary under The new DANCED supported project (SWD-CBP). 28th to 30th March 2001 Sepilok Nature Resort, Sandakan.

DAVIES, G. & PAYNE, J. (1982). A Faunal Survey of Sabah. Prepared by World Wildlife Fund Malaysia for Game Branch, Forest Department Sabah. IUCN/WWF Project No. 1692.

INGER, R.F. & STUEBING, R.B. (1989). Frogs of Sabah. Sabah Parks Publication No. 10.

MALIM, T.P., ANDAU, M. & AMBU, L.N. (1999). A Faunal Survey of the Kalabakan Forest Reserve of Tawau, Sabah and Its Potential Management Inplication. Paper Presented at the 4th SITE Seminar, Shangrila Tanjung Aru Resort, Kota Kinabalu, September 1999.

MJOBERG, E. (1999). Forest Life and Adventure in the Malay Archipelago. Natural History Publications (Borneo), Kota Kinabalu.

SALE, J.B. & ANDAU, M. (1994). Wildlife as a Tourist Attraction in Sabah. Seminar on Nature Tourism as a Tool for Development and Conservation in Sabah, Kundasang, March 29-31, 1994 Jointly Organised by Institute of Development Studies (Sabah) and Ministry of Tourism and Environmental Development.

SHELFORD, R.W.C. (1999). A Naturalist in Borneo. Natural History Publications (Borneo) Kota Kinabalu.

VAN STRIEN, N. (1985). The Sumatran Rhinceros in Gunung Leuser National Park Sumatra, Indonesia. Its Distribution, Ecology and Conservation, Doorn, Netherland.

YASUMA, S. & ANDAU, M. (1999). Mammals of Sabah. Field Guide and Identification. Japan International Cooperation Agency and Sabah Wildlife Department, Ministry of Culture, Environment and Tourism, Sabah, Malaysia.

Counting Rhinos From Dung: A Method to Estimate the Minimum Number of Animals Present in a Protected Area Using Microsatellite DNA

*J Cunningham, A M. Morgan-Davies and *C O'Ryan
*Department of Molecular and Cellular Biology, University of Cape Town, Rondebosch, 7701, South Africa; Wildlife and Protected Areas Management Consultant, PO Box 24944, Nairobi, Kenya (e-mail: jessica@molbiol.uct.ac.za)

We report a DNA-based method to estimate the minimum number of individuals in a population of black rhinoceros, *Diceros bicornis*, in a reserve in southern Tanzania. The number of individuals present in this population could not be determined by conventional means for a number of reasons. In this pilot study, total genomic DNA was extracted from dung samples collected in the reserve and polymorphic microsatellite DNA loci were amplified using the Polymerase Chain Reaction. Although very low amounts of DNA were extracted, positive amplification products were obtained from 60% of the dung samples. For the remaining samples, plant inhibitors co-extracted with the rhinoceros DNA prevented the amplification of the microsatellite loci. Nine unique genotypes were observed using polymorphic black rhinoceros specific primers. Preliminary results suggest that, although the technique is not as yet reproducible, it provides the basis for non-invasive and cost effective sampling of rare and endangered animals in the wild.

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