

# The *In Situ* and *Ex Situ* Program of Sumatran Rhinoceros (*Dicerorhinus sumatrensis*) in Peninsula Malaysia.

By

Aidi Mohamad, DVM

Sumatran Rhino Conservation Centre, Department of Wildlife and National Parks,  
Sg. Dusun, 44010 Kuala Kubu Bharu, Selangor, Malaysia.

## Introduction

Sumatran rhinoceros (*Dicerorhinus sumatrensis*) or the lesser two horned rhinoceros is one of the three rhinoceroses that living in Asia. The other two are the Javan (*Rhinoceros sondaicus*) and the greater one horned rhinoceros, the Indian/Nepali (*Rhinoceros unicornis*). This Sumatran rhinoceros is the smallest and hairiest species of rhinoceros in the world. It is also critically endangered and threatened compared to the other rhino species and needs intensive management to survive (Schaffer *et. al.*, 1994; Khan, 1989).

The population of the Sumatran rhinoceros in the wild is less than 400 animals and is mainly found in Malaysia and Indonesia and the number has declined dramatically due to poaching and habitat destruction (Foose, 1999). As the declined in current population continues at a rapid rate, this rhino species is at high risk of extinction and is listed on Appendix I of CITES (Heistermann *et. al.*, 1998). This species also is categorised as a totally protected animal under the Malaysian Wildlife Protection Act 76/72 (Samsudin, 1994).

In Peninsula Malaysia, it is estimated about 70 animals roaming in the wild and the Sumatran rhinoceros are concentrated mainly in four primary location, namely Taman Negara, Endau Rompin, Belum and Selama (Samsudin, 1994). However, there is also evidence that some of the rhinoceroses were found outside those areas which including Ulu Besut, Kuala Balah, Sg. Depak, Ulu Lepar, Gunung Belumut and Gunung Inas (Khan, 2000; pers.com).

A lot of efforts had been done to sustain the survival of the Sumatran rhinoceros. Anon (1993) stated that the Department of Wildlife and National Parks (DWNP) had introduced the Sumatran Rhinoceros Action Plan for the conservation of this species in Malaysia. The plan concentrates on the survival and recovery of viable populations and it consists of both the *in situ* and *ex situ* components. The *in situ* program has been initiated to protect the rhinos in the wild from being poached and the *ex situ* program has been conducted to breed this species in captivity.

## In Situ Program

The objectives of this program are to do the *in situ* protection and secondly to manage the viable population in the wild. Monitoring of the rhinoceros in the wild is conducted by routine patrolling to protect the rhino population especially in the areas known to have

rhinoceros. The Rhino Patrolling Units (RPU) is formed to conduct the patrolling at the designated areas and they are important in providing updates on the rhinos and encroachment of their habitat.

Currently, there are 7 groups of RPU and each unit consist of 10 personnel which involving the states of Pahang, Perak, Johor, Trengganu and Kelantan.. This RPU mainly patrolled the four primary locations as well as the areas suspected to have rhinoceros. This program has been successful to prevent any encroachment and surveys done by the RPU showed that the rhinos are also found outside the four primary locations. However, the safety of this rhino is questionable since they are vulnerable to the poachers. Therefore, efforts had been taken to overcome the problems by reducing and/or eliminating the threat in those areas.

The RPU consists of the rangers from the DWNP and also staff hired by the International Rhino Foundation (IRF). Sometimes, the aborigines are hired to show the location that suspected to have rhinoceros during the patrolling or survey. Usually, the patrolling or survey is conducted for 7 to 10 days.

### **Ex situ Program**

The program is mainly conducted at the Sumatran Rhinoceros Conservation Centre (SRCC) in Sg. Dusun, Selangor. This centre is located inside the Sg. Dusun Wildlife Reserve (SDWR), which used to have wild rhinoceros in the past. The reserve is about 10 400 acres and bordered by two rivers, Sg. Dusun in the south and Sg. Tenggi in the north which are connected by a canal.

### **Sumatran Rhino Conservation Centre (SRCC)**

The DWNP has established this centre in 1991. The centre consists of the night stalls, administrative buildings, staff quarters and also the natural enclosure. This centre has a captive population of 2 males and 5 females. These animals were housed in a pie-shaped enclosure with 8 night stalls; each connected to a paddock. One paddock is connected to a quarter-acre electric fence enclosure and subsequently to 10-acre enclosure, fenced up in the forest. The enclosures were mainly used for breeding purposes. An additional education centre and another 100 acres fence natural enclosure was built up last year.

There are a few objectives of this centre including to provide refuge for displaced rhinos captured from threatened areas in Peninsula Malaysia and also to breed the species in captivity (Zainal, 2000, per. com). The centre also provides a lot of information on this species especially in captive management. Another role is to create the public awareness of the rhinoceros and its ecosystem.

### **Captive Diet**

*Dicerorhinus sumatrensis* is known as generalist herbivore and prefer more nutritious leafy material when available (Yusnita, 1998; Flynn, 1983; Mohd Tajuddin, 1985). In captivity, Zainal (1989) stated that these animals were fed on variety of forage including napier grass (*Pennisetum purpureum*), carpet grass (*Axonopus compresses*), leaves such as jackfruit leaves (*Artocarpus heterophyllus*), kelompong gatal (*Ficus glossolaridus*).

kelompong hijau (*F. variegata*), tapak gajah (*Macaranga gigantia*) and daun tapai (*M. triloba*). Fruits such as banana and papaya were given beside sweet potatoes and horse pellets.

However in SRCC, the rhinoceroses are fed browses, fruits and also concentrates. The feed was supplied by a contractor, which delivered every morning. The feed consists of a few types of browses, which could be found around the reserve area. Although only selected browses were given, these nutritional leaves are among the favourite of the rhinos. To ensure that the rhinos get adequate nutrition, fruits and concentrate are given to them.

In this centre, the rhino are fed twice daily. The first feeding is at 9.00 a.m., where the animals are fed 1.5kg of concentrates, about 20-25 kg of browses and 2.5kg of produces (Table 1). The second feeding time is at 3.30 p.m. The amount and type of food given is the same as the first feeding, excluding the concentrates (Zainal et. al, 1999). Fruits are also used to bait the rhinos into the chute and also to calm them during the routine program such as bleeding, ultrasound and physical examination.

**Table 1: The daily captive diet of the Sumatran rhinoceros in SRCC**

TYPE OF FOOD	WEIGHT (KG)
<b>Concentrates:</b> Horse Pellets (Cargill (M) Sdn. Bhd.)	1.5
<b>Browses:</b> Nangka / Jackfruit leaves ( <i>Artocarpus rigidis</i> ) Pulai ( <i>Alstonia specilata</i> ) Mahang ( <i>Macaranga triloba</i> & <i>M. gigantea</i> ) Kelompong ( <i>Ficus variegata</i> & <i>F. glossolariodus</i> )	40.0 – 50.0
<b>Produces/Fruits:</b> Banana Papaya Sweet potatoes	2.0 2.0 2.0

#### **Breeding management**

There are seven rhinos in the centre comprising of two males and five females. The two males are namely Ara and Shah and these males will be bred with the five females namely; Rima, Seputeh, Mas Merah, Panjang and Minah. Usually, Ara will be paired with Rima, Seputeh while Shah will be mixed with Mas Merah, Panjang and Minah for breeding purposes.

The rhinos will be paired either based on the result of progesterone hormone profile or by daily introduction. Based on the hormone level, Rima and Seputeh are mixed with Ara when their progesterone level is low. About ten successful breeding has been recorded since January 2001 i.e. Rima (6) and Seputeh (4). The rhinos were mixed inside the quarter acres and the breeding took place on 21 days interval for both females.

As for daily introduction, the procedure was carried out on Shah and two females; Mas Merah and Panjang. The procedure was carried out on Shah because the male has a history of aggression towards the females. He will attack the female and cause a serious injury wounds by using his sharp canine teeth. Fruits were used to control the aggression during the procedure. In some occasions, plywood was used as baffle boards to separate the rhinos when fighting occurred. The daily introduction was also carried out on females with irregular estrus cycle to establish breeding. Once the breeding is achieved, the female will be mixed with the male on 21 days interval.

### **Blood Collection & Progesterone Hormone Profile**

Blood was collected twice weekly from all females to establish the progesterone hormone profile. A few methods had been tried on all females including the ear marginal vein, the cephalic vein and the coccygeal vein. The blood was collected via coccygeal vein at two sites, at the base and the tip of the tail. However, all rhinos tolerated well to the collection from the tip of the tail. This method is proven the easiest compared to the other methods and was initiated by Dr. Zainal Zahari. The blood samples were pooled before sending them to Universiti Putra Malaysia (UPM) for analysis.

The blood was analysed using the radio immunoassay (RIA) kit. The result then was used to tabulate the progesterone hormone graph. Based on the result, the rhinos will be mixed when the progesterone level is low. This is to ensure that the female is ready and to avoid any aggression by the male. Based on this graph, it can be concluded that Rima and Seputeh had a regular cycle and they were bred on 21 days interval. Mas Merah and Panjang had an irregular cycle and they were paired daily with the male to establish breeding. As for Minah, she had a basal level of progesterone and she is being monitored closely.

### **References**

- Anon. 1993. Malaysia Rhino Conservation Action Plan. Dept. Of Wildlife and National Parks, Peninsula Malaysia; Dept. of Wildlife, Sabah and Dept. of Forestry, Sarawak.
- Flynn, R.W. 1983. Distribution, Status and Feeding Ecology of the Sumatran Rhinoceros in Malaysia. MS Thesis, University of Montana.
- Mohd Khan Momin Khan. 1989. Asian Rhinos. An Action Plan for Their Conservation. International Union for Conservation of Nature and natural Resources.
- Mohd Samsudin Mohd Suri. 1994. The Situation of Sumatran Rhinoceros in Peninsula Malaysia and Proposal for A Conservation Program. A Case Study for 17<sup>th</sup>

UNEP/UNESCO/BMU International Postgraduate Diploma Course in Environmental Management for Developing Country.

N.E. Schaffer, Z. Zainal-Zahari, M.S.M. Suri, M.R. Jainudeen, R.S.Jayenderan. 1994. Ultrasonography of the Reproductive Anatomy in Sumatran Rhinoceros (*Dicerorhinus sumatrensis*). Journal of Zoo and Wildlife Medicine: 337-348

Thomas, J. Foose. 1999. Populations and Conservation of Rhinos. Proceeding of the First Rhino Workshop, USA.

Yusnita Mohd. Fazil. 1998. Management of sumatran rhinoceros (*Dicerorhinus sumatrensis*) in Captivity. DVM Thesis, Universiti Putra Malaysia.

Zainal Zahari and Marid Hassan. 1989. Feed Intake and Digestibility of *Ficus variegata* in Captive Sumatran Rhino at Zoo Melaka. The Journal of Wildlife and Parks.

Zainal-Zahari, Z. 1995. Review of Sumatran Rhinoceros (*Dicerorhinus sumatrensis*) Population in Peninsula Malaysia. The Journal of Wildlife and Parks 14: 1-15

Zainal-Zahari, Z. Julia, Ng. 1999. Annual Report of Sumatran Rhinoceros Conservation Center, Sg. Dusun. Unpublished Report.