

**BLOOD COLLECTION IN THE CAPTIVE SUMATRAN RHINOCEROS  
(*Dicerorhinus sumatrensis*) AT THE MALACCA ZOO**

by  
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**INTRODUCTION**

The current population of captive Sumatran rhinoceros is fourteen, eight of which are in Peninsular Malaysia. Ensuring continued survival of this endangered species would require information on its normal physiology.

Blood parameters can give an important indication on the animal's physiology, particularly about its health. The site for blood collection in the Indian, black and white rhinoceros is the auricular vein (Wallach and Boever 1983). These animals were restrained using etorphine and acepromazine, intramuscularly (Jones 1979). Currently, there is no report on blood collection in the rhinoceros using physical restraint. This technique of restraint was developed and refined at the Malacca Zoo (Zainal — Zahari 1987).

**Animals and methods**

The physical restraint technique was attempted on one male and five females. All the animals were made to go down on lateral recumbency and blood was collected from the auricular vein. The outer surface of the ear was swabbed with alcohol. A 25 gauge needle and a 3 ml. syringe were used. The blood collected was measured and transferred into a sterile venoject tube (with E.D.T.A.) for analysis.

**RESULTS**

The blood was successfully collected from five of the six Sumatran rhinos. A minimum of 3.0 mls each was obtained from the one male and two females. Insufficient blood (less than 1.0 ml.) was collected from two females (Table 1).

**DISCUSSION**

The high rate of success in blood collection (83%) was mainly attributed to the relax state of the rhinoceros under the restraint method as reported previously (Zainal — Zahari 1987; Mohd Tajuddin and Zainal — Zahari 1987). Some of the rhinoceros were apparently asleep with their eyes closed. However, only 50% of the animals whose blood were collected was in excess of 3.0 mls each. The volume of blood obtained depends on the degree of in-

terference during the whole procedure. Unfamiliar smell, noise sight and time schedule are some examples. At the Malacca Zoo, the Sumatran rhinoceros were more relaxed between 1200 and 1300 hours. This is associated with the

**Table 1: Blood collection from the Sumatran rhinoceros.**

Animal	Sex	Blood volume (mls.)
1	M	3.0
2	F	3.0
3	F	3.0
4	F	1.0
5	F	1.0
6	F	0.0

completion of the morning feeding that includes forage, fruits and concentrates.

This technique for blood collection is possible in the other species of rhinoceros. Their large body size would reflect a relatively larger auricular vein, thus making blood collection easier.

Blood collection must be done with the needle facing obliquely upwards with the syringe below the level of the auricular vein. The blood should be withdrawn slowly to prevent collapse of the vein.

A lot of risk is involved when collecting blood from a standing Sumatran rhinoceros. This is especially so when there is no restraint facility in the enclosure. The speed and agility of the Sumatran rhinoceros must never be overlooked as similarly reported in the Black rhinoceros (Ritchie 1963). It is always more reliable to collect blood from a recumbent rhinoceros.

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**REFERENCES**

1. JONES, D.M. (1978). The husbandry and veterinary care of captive rhinoceroses. Int'l Zoo Yearbook. vol? 239—250.
2. MOHD TAJUDDIN ABDULLAH and ZAINAL ZAHARI ZAINUDDIN (1987). An observation on the Sumatran rhinoceros and its management in captivity at Torgamba, Indonesia. Unpubl. report, Dept Wild, and Natl. Parks, Kuala Lumpur.
4. WALLACH, J.D. and BOEVER, W.J. (1983). Diseases of Exotic Animals. Medical and surgical management. W.B. Saunders Company, Philadelphia. pp: 761—828.
5. ZAINAL ZAHARI ZAINUDDIN, (1987). Psychological restraint in the Sumatran rhinoceros (*Dicerorhinus sumatrensis*) Unpubl. report, Dept, Wildl, and Natl, Parks.

## BIRTH OF A SUMATRAN RHINOCEROS AT THE MALACCA ZOO, MALAYSIA

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### INTRODUCTION

On 23 May 1987, a female Sumatran rhinoceros (*Dicerorhinus sumatrensis sumatrensis*) was born in captivity at the Malacca Zoo. Bred in the wild, this is the first *D. s. sumatrensis* to give birth in this century. Three other captive births have been recorded all in the 19th century.

On December 1872, a *D. sumatrensis* gave birth in a den on a steamship at the Victoria Docks, England (Bartlett 1873). At Alipore, Calcutta, on the 30th. January 1889, a hybrid was born from a *D. s. lasiotis* dam a *D. s. sumatrensis* sire (Reynolds 1960). The third birth occurred in February 1895, when a female subspecies *D. s. l.*, bred in the wild, gave birth to a calf in Calcutta (Reynolds 1960).

This endangered species is categorised as totally protected animal under the Malaysian Wildlife Protection Act 76/72 (Anon 1972). Its population in the wild, in scattered habitats, is estimated between 70 to 100 individuals (Flynn and M. T. Abdullah 1984, M. Khan 1987).

The new born rhinoceros has provided the rare opportunity for research and monitoring of growth and development of an individual. The birth is part of an intensive captive breeding program for the endangered species in Malaysia.

This note represents part of the observations made on a female pregnant rhinoceros and a female new born calf up to one week old.

### METHODS

A pitfall trap measuring 2.44 x 1.22 x 2.44 m was used to capture the adult female Sumatran rhinoceros. The trap design was a modification from an early design measuring 2.44 x 2.44 x 1.83 m which was found to be ineffective (Abdullah 1987).

The facility for the rhinoceros at Malacca Zoo consist of a circular enclosure with the night housing in the center. Each of the eight night stalls

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has separate access to the outside exercise yard and water pool. The cemented floor of the night stalls were laid with rubber mats (8 mm thick) to prevent injuries on the toes and soles of the rhinoceros.

Although animals pregnancy was unsuspected, her health condition and maintenance was observed and recorded by veterinarians, researchers and keepers. Thus the observation prior to birth was rather accidental while we conducted investigations on the behaviour, endo-parasites and other aspects of management.

On the 23 May 1987, at 0700 hours the female rhinoceros was seen with the calf in the night stall #3. The mother and calf was kept under a 24-hr observation by a team of two of four workers. Twenty-four hours surveillance continued until early July 1987.

Physical examination and measurement was conducted in the rhinoceros enclosure from the 23 May until 25 May. The examination was made possible by means of physical and psychological restraint of the calf (Zainal-Zahari in prep.). The calf was psychologically restrained by gently stroking the perineum, under and the medial thighs for a few minutes. Minah responded by being inactive, erecting the tail horizontally and subsequently she would sit on sternal and lie down laterally. Initially, the eyes widened but later closed completely when she fall into deep sleep. Except for frequent squirt urinating, Rima was cooperative and tolerant while we handled her calf.

Body weight was measured by using Tru-Test AG350 electronic weighing scale (trade name, manufactured by Tru-Test Distributors Ltd., 241 Ti Rakau Drive, East Tamaki, New Zealand). A veneer caliper was used to measure the maximum width, digits 1 to 3, of the fore and hind limbs.

## RESULTS AND DISCUSSION

### History of the parent

On February 8, 1986, a large female Sumatran rhinoceros, weighing about 590 kg, was caught in a pitfall trap located on an old logging road at Tenggaroh, Johore. The site is about one kilometer to the South China Sea on the east and three kilometers to a new oil palm plantation to the west.

After about 60 hours in the pit, on 10 February, the animal was crated and transported to the Malacca Zoo. From the first time the rhinoceros was sighted in the pit until she reached the zoo, food (apples, pears, and leaves from *Macaranga* sp. and *Artocarpus* sp.) and water were offered regularly. Feeding and bathing helped to reduce the animal's aggressive activities while in the pit and during transportation.

The animal, named Rima, was then transferred into a confinement crate measuring 4.88 x 1.07 x 1.68 m for a period of 14 days. Rima was docile and responded to hand feeding.

She was then transferred into a temporary wooden paddock about 10 m wide and 15 m long, alternatively sharing the compound with another female called Jeram. On the 2nd October 1986, Rima was transferred into a new and

larger enclosure at the zoo.

After about a month in captivity, its behaviour changed drastically. Rima became aggressive and sensitive to contact. Her aggressive behaviour was manifested by loud nasal blow, rubbing the objects in the enclosure and charging at any intruder. Frequent whistling indicated that the animal was demanding for food or in boredom.

On the 13 February 1987, an outbreak of *salmonellosis* at the Malacca Zoo forced a temporary relocation of Rima to Sungei Dusun Reserve, about 300 km north of the zoo. She was confined for 10 days in a transport crate before being released into a temporary enclosure at Sungei Dusun Reserve. While in the crate, endoparasite (strongyles and strongyloides) count increased drastically within seven days and was treated with mebendazole (20 g) and tribressen boluses were administered twice daily for five days as a precautionary measure against the pathogenic *salmonella*. She was intolerant during hand feeding and required a pail of water be poured on her dorsum to initiate defecation. When released into the temporary enclosure, she was observed to be more aggressive and intolerant to any intruders and keepers. In early April 1987, Rima was sent back to the Malacca Zoo.

Later, on 10 May, swelling of the vulva was observed along with the change in coloration from light brown to purplish red; in addition, the mammary glands became engorged. The animal reduced food intake. After 469 days in captivity, Rima gave birth to a female calf in the early hours on the 23rd. May 1987. The birth was unassisted and unattended. On first encounter with the keeper, the cow was docile and manageable.

#### Physical characteristics of a new born calf

The new born Sumatran rhinoceros calf weighed 24 kg and had soft, pliable skin covered with small wrinkled hairs. The body length, heart girth, and height of withers measured 600 mm, 750 mm, and 450 mm respectively. The other measurements are included in Table 1.

The maximum width, between digit 1 to 3, of the standing fore and hind feet measured 85.5 mm and 82.9 mm respectively. The measurements of the left fore and hind limbs on standing and sitting positions have variations of 4.2 and 6.8 mm respectively (Table 2). The tip of the hooves were coarse and horny and curved inwards. The sole was tender and smooth.

Body hair was unevenly distributed; black and dark brown coloration. It was prominently on the body, legs, ears, neck, tail, head parts behind the eyes and lower jaw (Table 4). Anterior to the eyes the hair was sparse; no hair was found on the sex organ.

Unlike in the adult rhinoceros, the horns were not developed in the calf; however, the anterior horn bud was apparent, the base measuring 23.4 mm in diameter and the tip is 10 mm high (Table 3). The horn bud was smooth and soft.

The skin folds, which is the distinguishing feature of the Sumatran rhinoceros, were present. The anterior fold was prominent but the posterior

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fold was barely developed.

Eye pigmentation was dark blue in the centre and blue at the margins. In contrast, the eyes of its parent was blue in the centre and the iris was brown. The tail tip was curled to the right, a trait also present in the mother. The umbilical cord was attached and about 110 mm in length. The vulva was oval with flabby and strunken lips.

Two types of vocalization were made by the new born calf; whinnying and whistling-like. Vocalisation was always in a slow one or two-toned manner.

The calf urinated about 0.33 litre which was colourless. The first feces excreted on 24 May was soft, yellowish brown, and weighed 330 gm.

After birth the calf was monitored closely. Her umbilicus was swabbed with tincture of iodine. It was only on the third day that the remnant of the umbilicus dropped leaving a concentric, thickened skin. All abrasions were treated topically with acriflavin solution.

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### LITERATURE CITED

1. M.T. ABDULLAH (1978). Rhino trapping in Malaysia. *Rimba Indonesia* XII (1): 27-29.
- 2. ANON (1972) Protection of Worldlife Act, 76/72. Govt. and ~~Int. Zoo Yb. 2: 17-42.~~ X
3. BARTLETT A.D. (1973). On the birth a Sumatran rhinoceros *Proc. Zool. Soc. Lond.* 1873: 104-106.
4. FLYNN, R.N. and M.T. ABDULLAH (1984). Distribution and status of the Sumatran rhinoceros in Peninsular Malaysia. *Biol. Conservation* 28: 253-273.
5. M.K.M. KHAN (1987). Distribution and population of the Sumatran rhinoceros *Dicerorhinus sumatrensis* in Malaysia. *Rimba Indonesia* XXI (1): 75-82.
- 6. REYNOLDS R.J. (1960). Asian rhinos in captivity <sup>Int. Zoo Yb.</sup> ~~Int. Zoo Yb.~~ 2: 17-42.
7. ZAINAL ZAHARI ZAINUDDIN (in prep.) Psychological restraint of the Sumatran rhinoceros.

**Table 1: The morphology of a new born *D. s. s.***

Characters	Measurements
Body weight	24 kg
Total length	920 mm
Head length	120 mm
Body length	600 mm
Tail length	200 mm
Shoulder height	450 mm
Heart girth	750 mm
Neck girth	170 mm
Ear length	100 mm

**Table 2: The measurements of the maximum width (digit 1 to 3) and the midtoe (digit 2) of a new born *D. s. s.***

Standing forelimb D13 and D2	
Left	85.5 mm; 38.1 mm
Right	85.6 mm
Standing hind limb D13 and D2	
Left	82.9 mm; 37.2 mm
Right	75.0 mm
Sitting forelimb D13	
Left	81.3 mm
Sitting hind limb D13	
Left	76.1 mm



**Table 3: Other characteristics of a new born Sumatran rhinoceros.**

Hair length	10 — 28 mm	wrinkled and black
Skin		soft
Eyes		large
Anterior horn bud (diameter)	23.4 mm	
Posterior horn bud		absent
Anterior skin fold		present
Posterior skin fold		present
Upper incisor		absent
Lower canine		absent
Molar		present
Hoof (tip and underpart)		fibrous coarse

**Table 4: Distribution of hair on a new born *D. s. s.***

Assessment of hair	Region of the body
Very dense	Ventral abdomen, metacarpus, metatarsus, and ear margin.
Dense (8 — 10/ sq. cm)	Flank, rump-region of femur, tibia and fibula region, forehead, region behind the eyes.
Moderately dense	Dorsum region of thoracic, cervical and lumbar, below neck and lower mandible.
Sparse	Inner thigh, pelvis, inner ear, ear base and anterior to the eyes.
Nil	Vulva, anus and sole.