
PRELIMINARY OBSERVATIONS ON A
SUMATRAN RHINOCEROS IN AIR KEROH
ZOO MALACCA

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ABSTRACT

This is the first account on observations made on one of the rarest mammal i.e. female Sumatran rhinoceros (*Dicerorhinus sumatrensis*) that was captured on 30th April 1984 in Jeram Selangor. The animal was then brought to Zoo Air Keroh Malacca and has been kept there ever since in a temporary enclosure. This rhino is the only captive specimen anywhere in the world. The paper describes the animal and the preliminary observations made of the animal's eating habits, behaviour and notes on the presence of parasites. The rhino has since been named Jeram.

ABSTRAK

Ini adalah merupakan lapuran pertama ke atas pemerhatian yang telah dibuat ke atas salah satu mamalia yang jarang sekali dijumpai iaitu seekor badak kerbau (*Dicerorhinus sumatrensis*) betina yang telah dapat ditangkap pada 30hb. April 1984 di Jeram Selangor. Binatang itu telah diletakkan di dalam kurungan sementara Zoo Air Keroh Melaka. Ia merupakan satu-satunya spesimen dalam kurungan di dunia ini. Kertas ini menerangkan ciri-ciri binatang itu dan hasil pemerhatian awalan ke atas cara pemakanan, perlakuan dan catatan mengenai parasit. Badak ini telah diberi nama Jeram.

INTRODUCTION

The sumatran rhinoceros (*Dicerorhinus sumatrensis*), Rhinocerotidae, Perisodactyla is one of the three species of rhinoceros living in Asia. The other two are the Javan or smaller one – horned rhinoceros (*Rhinoceros sondaicus* DESMAREST) and the Indian or great one – horned rhinoceros (*Rhinoceros unicornis* L.). These two Rhinoceros species are characterised by the presence of several folds in the skin, giving the animal an armoured appearance, and the possession of only one horn on the nose. In *Dicerorhinus* the skin folds are less marked and there are two horns on the nose. *Dicerorhinus* is by far the smallest of the three species (Van Strien 1974).

BACKGROUND

On 30th April 1984, the Department of Wildlife and National Parks was informed that a rhino was caught in an oil palm estate in Jeram Selangor. When officials from the Department arrived at the scene, the rhino was

already tied to an oil palm tree and animal was drinking from a bucket held by a man. The animal seemed calm even though it was surrounded by about 200 people. A transport cage that was previously constructed for another rhino capture project was brought in. The animal was manouvered into the cage and a crane was used to lift the cage and its load onto a lorry. The animal was then transported to Air Keroh Zoo in Malacca.

A temporary paddock was quickly constructed and completed within two days at the Zoo. The animal was released into the paddock.

At the moment, this rhino is the only captive specimen of its kind in the world. The last captive sumatran rhino died in Copenhagen Zoo in 1972. There is great interest worldwide in this rhino and it has become the focus of attention of many scientists internationally. However the animal is not exhibited to the public. It is being kept in the temporary enclosure for close observation and preliminary research on this unique species.

STUDY AREA

The rhino is kept in a wooden enclosure in the Air Keroh Zoo, Malacca. The Zoo is situated 14 km from Malacca town centre. It has a total area of 53 acres which are being developed in phases. A permanent paddock comprising a barn with eight stalls is now under construction and is reaching completion.

METHOD

The method involved direct observation of the animal. The general appearance, the horns, the dentition, the sensory organs and the call were recorded. The initial body measurements and weight were recorded when the animal was first caught.

Measurements of the body parts were done once every month. Observations on the animal's behaviour and habits were done daily. Faecal analysis to check on the presence of parasites were done once a month. The animal was also dewormed after some worms were observed in its faeces. The types of plants and other food items preferred by the animal were noted. Three types of litter beds were experimented on the floor of the sleeping stall and the reaction of the rhino to the beds was noted.

RESULT AND OBSERVATION

General Appearance

If one were to look at Jeram from the back one would have thought that she was a buffalo because of her small size and the colour of her skin i.e. dirty greyish brown. The animal also emitted odour typical of bovines. This resemblance is further enhanced by the bristly hair on her body and her four limbs.

Body measurements

Foot size	16.0 cm
Width of central toe	7.9 cm

Height at shoulder level	112.0cm
Length of body from tip of nostril to tip of tail	258.0 cm
Body weight	400 – 500 kg

All the above measurements were actual sizes of the animal as they were measured on the animal itself, except for the body weight which was estimated.

The Horns

When the animal was first caught, her anterior horn was clearly developed and measured about 6 cm. However the horn broke during her transfer from Jeram to Zoo Air Keroh, Malacca.

The posterior horn was represented by a small stub. Once in the enclosure Jeram developed the habit of constantly rubbing her horn on the wood of the paddock with the result that the horn was completely worn away and has remained so.

The skin

The skin was tough and on closer examination cracks could be seen especially along the spinal region from behind the ear to almost the top of the tail region. The cracks were more obvious after the animal had been bathed and if the animal did not wallow in the muddy water the exposed cracks could become infected. Other parts of the skin were much smoother. The cracks are believed to be caused by the more open and drier conditions that the animal is exposed to as compared to its natural habitat. To overcome this problem mud is applied to the animals back several times a day.

There were two folds on the body, one major fold behind the fore limbs encircling the abdominal region and a smaller one in front of the hindlimb. The skin on the top halves of the fore limbs were also folded.

The skin was dirty greyish brown in colour. However the inner parts of the folds, the lips region, inside the ears and below the neck, the skin was pinkish in colour.

The Dentition

The dental formula is as below:-

$$i = \frac{1}{1} \qquad c = \frac{0}{0} \qquad pm = \frac{3}{3} \qquad m = \frac{3}{3}$$

The animal lacked canines. The teeth were well developed and the premolars and molars were blackened due to the animal's preference for leaves that produced latex. Otherwise they were in good condition.

The Sensory Organs

Her left eye was damaged and infected when she was caught. The wound has since been treated and has healed. However the eyeball was pierced

resulting in total blindness. The right eye is perfect. It is not known how sharp her hearing is. However it has been observed that the external ear lobes would stand up whenever she heard any sound in her vicinity. She was also aware of any human movement and sound outside her enclosure. As to her sense of smell, that was also unknown. In the wild, whenever the animal picks up human smell, it would run away. In the case of Jeram, she has become quite accustomed to human presence especially her keeper and the fear of human does not exist.

The Call

The animal emits a squeal rather unexpected of a large animal. The sound comes from her nostrils.

She would squeal while she was resting and also during feeding. Sometimes she would also snort especially after feeding, while wallowing and especially when annoyed.

The Limbs

The legs were short and stout in comparison with the large body. Each of the feet had three toes complete with hooves. The hooves were dirty brown in colour. The sole of the foot was soft and elastic. Thus when the animal walked, her feet would spread out.

Behaviour

The animal is let out of the stall at 7.00 am everyday by her keeper. She then proceeds straight to the feeding cage even though the cage door has not been opened yet. She has related the cage as her 'food source' because feeding has been done in the cage all the time. After the first feeding of the day she would urinate and defaecate. Defaecation always takes place in the wallow. Defaecation would always be preceded by her pawing the ground with her hind feet. Urine is squirted backwards.

At one feeding, she would consume between 15 to 20 kg. of leaves. After feeding she would go to sleep either in the feeding cage itself or in the wallow. If she was in the wallow, she would either squat or lie on her sides, changing sides from time to time with her head 'planted' in the soft mud.

She would squeal and snort at the same time. When hungry she would proceed back into the feeding cage. If her keeper was not around, she would squeal almost continuously. At other times, she would walk within the compound rubbing her head against the tree trunks and the walls of the wooden enclosure. She would sometimes rest against the wall of the enclosure.

Diet

From the first day Jeram was caught up till now (September 1984), she has been fed with leaves obtained from nearby forests. The types of leaves

fed to Jeram was based on observations made on plants browsed by rhinos in the wild and through references in the rhino literature. Besides that other leaves not known to be eaten in the wild were also given and the preference for these leaves was noted. Commercially obtained food was also fed to her.

Listed below are the plant species eaten by Jeram.

No.	Scientific names	Vernacular name	Parts eaten
1.	<i>Macaranga triloba</i>	Mahang merah	leaves
2.	<i>M. gigantea</i>	Mahang gajah	leaves
3.	<i>M. hypoleuca</i>	Mahang putih	leaves
4.	<i>Ficus grossularoides</i>	ara	leaves, fruits
5.	<i>F. fistulosa</i>	ara	leaves, fruits
6.	<i>Artocarpus integer</i>	cempedak	leaves
7.	<i>A. heterophyllus</i>	angka	leaves
8.	<i>A. elasticus</i>	terap nasi	leaves
9.	<i>Garcinia spp.</i>	kandis	leaves
10.	<i>Elaeis guienensis</i>	kelapa sawit	leaves
11.	<i>Saccharum officinarum</i>	tebu	leaves, stem
12.	<i>Hevea brasiliensis</i>	getah	leaves
13.	<i>Mangifera odorata</i>	quini	fruits
14.	<i>M. indica</i>	mangga	fruits
15.	<i>Flacouratia rokom</i>	rokom	leaves
16.	<i>Mikania cordata</i>	akar malayalam	leaves
17.	<i>Spatholobus spp.</i>	kacang gila	leaves
18.	<i>Pyrus malus</i>	apple	fruits
19.	<i>Ipomea reptans</i>	kangkong	leaves
20.	<i>I. batatas</i>	keledek	leaves
21.		kambing	leaves
22.	<i>Manihot utilissima</i>	ubi kayu	leaves
23.		temperar	leaves
24.	<i>Cratoxylum formosum</i>	derum	leaves
25.	<i>Adinandra dumosa</i>	tiup-tiup	leaves
26.		jolok hantu	leaves
27.	<i>Mallotus spp.</i>	balik angin	leaves
28.		puding	leaves

On average Jeram was fed about 55 kg. of leaves a day. The amount was spread into five separate feedings during the day. During the night about 20 kg of leaves were left in the sleeping stall for the animal to feed herself.

Among the plant species listed above, the most favoured by Jeram were from the *Macaranga* and *Ficus* genera. During the day the animal was handfed and usually no leaves were wasted. If allowed to feed by herself, she would select and pick the leaves that she liked and waste the rest. Feeding was done in a wooden cage placed at one corner of the stockade.

Besides the leaves each day Jeram was fed one kilogramme of special pellets. She was also given salt.

Parasites

i) Ectoparasites

No ectoparasites were detected on the body of the animal. The animal

was bathed every evening before being kept in the sleeping stall. That was done to prevent any external infection because the animal liked to wallow in her faeces and urine.

ii) Endoparasite

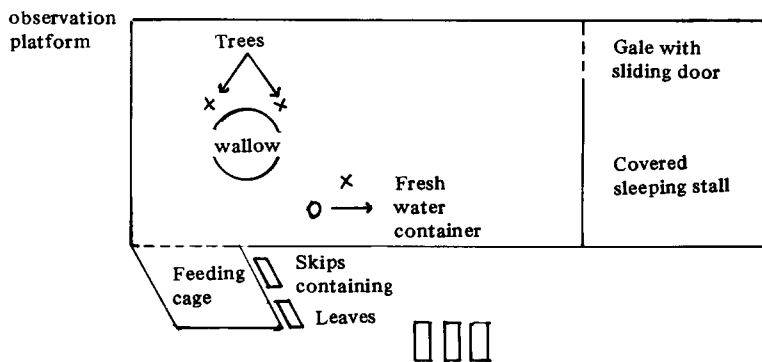
The animal was given a deworming drug MEBENDAZOLE (Methyl-5-benzoyl-1H-benzimidazole-2yl) carbamate in early July. This was immediately after, some worms were observed in faecal sample sent for laboratory examination. The following day the faecal sample had a very heavy worm load (up to 200 worms/g of faeces). The dosage was 10-15 mg/kg body weight. The faeces was sent for analysis to Universiti Kebangsaan Malaysia and Institute for Medical Research. The nematode worm is akin to the pinworm found in the horse colon. There is a similarity between a horse and a rhino's digestive system. Thus the first conclusion was that the worm belonged to the genus *Probstmayria*. After detailed analysis it was found that the nematode was quite different from those found in this country. In fact according to experts it has never been encountered here before. Both UKM and IMR parasitologists, Dr. Inder Singh (IMR) and Dr. Zahidi (UKM) agreed that the nematode was from the *Crossocephalus* genus.

However the species have not been identified as with the cestode found in the faeces. Some specimens have been sent to the United Kingdom for identification.

The faeces was then analysed once a fortnight and was observed to be clear of worms. At the end of August a few worms were again spotted in the faeces. The presence of worms were expected because although the animal was dewormed the worm's eggs and cysts must still be present in the animal's system. But because they was no reinfection as the animal was kept in captivity, the infestation was very little. However the animal is being dewormed once a month.

Further Studies

At the moment samples of the animal's urine is being collected for analysis of reproductive hormone metabolites. The assay will be carried out in San Diego Zoo, California, U.S.A. As an attempt to study the animal's reproductive cycle which will help us to determine when the animal is in oestrus such that when a male is available, the pair can be mated. This will prevent accidents that are known to occur in the African species when a male was released into the paddock of a non-receptive female. The Sumatran rhino may react differently from the African as observation have shown this animal to be more docile and appear closer in behaviour to the Indian rhino.

The Temporary Enclosure**The Temporary Enclosure**

The temporary enclosure is made of wood, 45' x 25' wide. The sleeping stall is covered with attap roof and the floor concreted. The door of the stall is opened from the outside and the door also slides out. The 'playing and resting' area is exposed and include a wallow, a concrete water container and a number of trees. The wallow is drained daily in the evening after the animal has been placed in the sleeping stall. Feeding during the day was usually done in a crate at one corner of the enclosure.

It was suggested that the animal be allowed to sleep on a soft litter bed. It was experimented with wood-wool which was placed at one corner where the animal usually slept. This was observed to be unsuitable as the animal littered the whole stall and so the idea was abandoned. Experiments with straw and fronds from oil palm will be carried out.

The sleeping stall was cleaned daily with antiseptic agents to minimise infection that can arise from her own urine and faeces.

DISCUSSION AND CONCLUSION

The above is only a preliminary observation on a sumatran rhino held captive in Zoo Air Kroh Malacca. The animal was observed at close quarters daily and all the physical parameters recorded. This is the first time detailed direct observation was possible since the last specimen died in Copenhagen Zoo. No detailed research has been done on the animal as it has been allowed to acclimatize itself to a new environment in captivity. Construction of a permanent paddock and stalls are under way. Trapping work is being done to capture more rhinos so that captive propagation can be started.

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