

**ON THE EFFORTS TO BREED THE SUMATRAN RHINO
(*Dicerorhinus sumatrensis*)
IN CAPTIVITY IN INDONESIA**

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SUMMARY

In order to conserve the Sumatran rhino *Dicerorhinus sumatrensis* (Fisher, 1814), the Governments of the Republic of Indonesia and the United Kingdom entered into an agreement to breed in captivity, four pairs of animals from the Torgamba production forest in Riau, Sumatra. Two pairs of the rhino were to be sent to the Howletts and Port Lympne Zoo Park in England, while the others were to be sent to the Ragunan Zoo in Jakarta. Efforts to breed the rhino under captive conditions in the Ragunan Zoo were made since the arrival in May 1986 of a 2.5 years old male called "Jalu" that was caught in Torgamba on 25 March 1986. From the initial observations on "Jalu" it became clear that the animal could easily adapt itself to the cage conditions in captivity. The animal became very tame within the first two months. The cage in which the animal was kept measured 25 x 30 m. Within the cage itself, the conditions were made to simulate as much as possible the animal's natural habitat. A shelter was provided which consisted of a resting compartment and also places for drinking, feeding and wallowing. The daily activity of "Jalu" was monitored. "Jalu" was fed with a variety of leaves from 14 species of plants such as *Artocarpus integra*, *A. champeden*, *Psidium guajava*, *Sondoricum koetjape*, *Nephelium lappaceum* and *Manilkara* sp. In addition, the animal was given fruits and vegetables. The initial results indicate a healthy growth.

1.0 INTRODUCTION

The efforts to conserve the Sumatran rhino *Dicerorhinus sumatrensis* (Fisher, 1814) by breeding some in captivity were implemented through a joint collaborative programme between the Governments of the Republic of Indonesia and the United Kingdom. These efforts are important from the point of Nature Conservation in Indonesia. This cooperative venture is a reflection of the growing public awareness of conservation of wildlife in Indonesia.

The policy of the Indonesian Government in pioneering and developing the breeding of wildlife in captivity is based on the desire to achieve a number of development objectives such as :

- (a) to maintain and enhance the existence of wildlife and so prevent their untimely extinction
- (b) to increase the wildlife populations in order to obtain an added value in the form of rational and continuous utilization.
- (c) to increase the productivity of land especially of the critical land that is unsuitable for agriculture.
- (d) to provide increased job opportunities.
- (e) to increase the capability of the Zoological Gardens in wildlife conservation.

In Sumatra, at present the forest vegetation that forms the habitat for the rhino can be classified as one of two types : either conservation forests such as those found in Gunung Leuser National Park, Kerinci—Seblat National Park, Barisan Selatan National Park, Berbak Game Reserve or Production forests such as the one in Torgamba in the lowlands of Riau province. A part of Torgamba forest is currently being converted to oil palm plantation.

In general, the population of rhino in conservation forests can be expected to increase compared to those that are found in production forests, where threats such as poaching and habitat loss are serious. In view of these threats, the aim of the captive breeding programme is to breed doomed animals *ex situ* in the Zoos, such as the one in Jakarta. The purpose of this exercise is to save the doomed animals and to re-introduce the captive population into the wild at a later stage to replace those that are killed by poachers. This paper reports the initial efforts in preparation for such a scheme in the Ragunan Zoo in Jakarta.

2.0 ECOLOGY OF SUMATRAN RHINO

Detailed information on the animal's biology and ecology is limited. The Sumatran rhino *Dicerorhinus sumatrensis* (Fischer, 1814) is known locally as "badak kerbau" and is a Perissodactyl herbivore. It is the smallest

of the extant rhinos. The body length (from head to tail) ranges between 250 - 280 cm; shoulder height is from 110 - 150 cm, and the maximum weight is 1000 kg. The skin is quite smooth with thin black hair. The pointed and oval head has two horns: the front horn lies above the eyes. The front horn in females is about 150 mm in length and the one behind, 50 mm. In the males, the horn can be three times as long as that in females.

2.1 HABITAT

Sumatran rhino can live in lowlands as well as in the mountains. It prefers dense forests which provide sufficient food, water and shade. Although basically an animal of the primary forest, it has adapted well to a habitat in the transitional area between primary and the more open secondary forests. It frequents river banks far away from human settlements.

2.2 BEHAVIOUR

The Sumatran rhino is nomadic, solitary and nocturnal. In order to obtain its food, the animal travels over quite an extensive area. The distance covered each day could be as high as 7 km and the total area covered may, on an average be 10 km². In the field, the animal has been observed to feed on more than 100 species of plants. It eats parts such as leaves, flowers, fruits and twigs. The animal prefers among others, plant such as *Glutea renghas* (rengas), and *Laportea stimulans* (pulus). The animal frequents sources of mineral water for drinking. It feeds usually very early in the morning and at nightfall. The animal rests during most of the daytime, preferring to wallow in the shade. The rhino usually spends several days in one place before moving to another area. While moving about, it has the habit of spraying its urine as a marker and as signal to other rhinos, especially during mating season. The rhino has an acute sense of hearing and smell, while its vision remains poor. In times of danger it can run really fast. The animal however is not as aggressive as the African species.

The Sumatran rhino is solitary, and stays with its mate only during the breeding season, which is usually in August. The animal can reproduce from the age of 4 years up to 20 years of age. The gestation period is about 7 - 8 months but it can be as high as 12 - 14 months according to van Strien (1985). One young is produced which is suckled by the mother until it is 4 years old. The mother does not mate while the calf is suckled.

3.0 BREEDING IN CAPTIVITY

According to the agreement made between Indonesia and United Kingdom, four pairs of Sumatran rhino from the Torgamba production forest were to be bred in captivity. Two pairs were to be sent to the Howletts and

Port Lympne Zoo Park in England, while the other two pairs remained in Ragunan Zoo, in Jakarta. Currently there is only one animal (a young male) in Ragunan Zoo.

3.1 CAPTURE AND TRANSPORTATION

The animal was caught in a pit trap in Torgamba, after which it was kept for a week in a pen near the site of capture so as to let it gradually become adjusted to the new environment. After this initial period of adaptation, the rhino was brought to Ragunan Zoo by truck. In transit, the animal was kept in a narrow compartment to prevent it from moving freely. The animal travelled with its head facing the front of the truck. En route, it was given sufficient food and water as was done when it was kept in the holding pen. Leaves of the 'jackfruit' (*Artocarpus* sp.) and 'petai cina' (*Leucaena leucocephala*) were obtained easily on the way. To maintain the humidity inside the cage, the animal was doused with cold water every two hours.

3.2 BREEDING CAGE

The breeding cage was constructed inside the Ragunan Zoo at a site far away from the main exhibiting areas. The cage measures 8000 m² and has 5 units, with a door connecting one unit with the other. A corridor separates these units and links these units with the breeding cage. It also functions as an observation room and clinic and is equipped with some medical equipment. The cage was designed so as to simulate as much as possible the animal's natural habitat, with ample vegetation to provide cover and shade. The whole unit includes a shed, wallowing area, source of drinking water and a cage to treat the animals.

3.3 METHOD

The rhino is caged alone as long as it does not show any obvious inclinations to mate. Each cage holds one rhino. As soon as signs of reproductive activity are seen, the door connecting the animal's cage is opened to let a pair meet and mate. After mating, the animals are separated and kept in cages. Food and water are provided from outside in the morning, noon and in the afternoon. The food consists of a compromise between what the animal prefers in the wild and what is actually available nearby. To improve the nutrition, fruits and vegetables are also added.

4.0 IMPLEMENTATION

The rhino was caught on 25 March 1986. The first cage at the Ragunan

Zoo, houses this animal (a young male) since 27 May 1986. The cage measures 25 x 30 m and is made of concrete 40 cm thick and 100 cm high. Atop the wall is an iron fence 60 cm high. The inner wall is made smooth in order not to damage the rhino's skin. Inside the main cage is a shed (3 x 4 m). The floor is made of reinforced concrete and covered by an asbestos roof. Columns are made of iron pipes, 10 cm in diameter. The cage in the inner court is provided with a water trough 4 x 6 x 0.8 m, and a wallowing area 2.5 x 3.5 x 0.5 m. Inside the cage can be found vegetation, large and small, comprising species such as *Eugenia malaccensis*, *Bambusa* sp. (Bamboo), *Psidium guajava* (guava) and *Musa paradisiaca* (banana). In addition, the shrubs consist of *Imperata cylindrica* (alang alang), *Widelia trilobata*, *Chromolaena odorata* etc.

The second unit cage measuring 47 x 47 m is at the right of the first one and is connected by a door. The vegetation within this cage consists of species such as, *Lucuma nervosa*, *Mangifera odorata*, *M. foetida*, *Bambusa* sp., *Nephelium lappaceum*, *Cocos nucifera*, *Eugenia malaccensis*, *Psidium guajava*, *Albizia falcata*, *Acacia multijuga*, and *Musa paradisiaca*. The shrubs consist of *Pennisetum purpureum*, *Philodendron undulatum*, *Imperata cylindrica*, *Diffenbachia* sp., *Chromolaena odorata*, *Widelia trilobata*, and other grasses.

4.1 OBSERVATIONS ON "JALU"

So far five Sumatran rhinos have been captured from Torgamba forest (3 males and 2 females). The female that was caught on 23 January 1986, died soon afterwards and so there are only four animals surviving. Of the four, one pair has been sent to England, one male to Ragunan Zoo, while the other is still being looked after in Torgamba base camp. The male rhino that is in Ragunan was caught on 25 March 1986 and was named "Jalu" by the Director General of Forest Protection and Nature Conservation. It was brought to the zoo on 27 May 1986.

Results of the observations that were made on "Jalu" from the day of its arrival in Ragunan, to the end of September 1986 are as follows :

On entering the cage, "Jalu" was restless, running around the cage trying to escape. After sometime however it calmed down and finally settled near the water trough. Then it began to eat the leaves and fruits of various plants that were offered. On 29 May 1986, it was 200 cm long, and 100 cm in height. The animal was extremely curious.

At night, its feeding time was irregular so that it had only very little sleep. After one and a half months, it became so tame that its keepers could ride on it. Its daily activities are as follows: Between 0600 - 0700 h, it defaecates in the water trough, and wallows in the water. Then it seeks some shelter and feeds on the leaves provided. In the meantime, the trough is cleaned and fresh water supplied. At 0730 h, it feeds on fruits

and then goes to wallow again for hours. At 1100 h, it goes back to the shelter and feeds on twigs and leaves. After eating, it wallows again. At 1400 h, it is fed with fruits and vegetables. Then it walks around for 20 m and wallows again. Usually it eats at 2100 h and goes to sleep afterwards. Sometimes the rhino awakes between 2300 and 0100 h, walks about for 15 m and finally goes to sleep until 0600 h.

While being cared for in the cage, the animal did not show any fear of the frequent thunder and lightning. To date, there are no signs that the animal has reached sexual maturity. The animal was measured once again on 22 September 1986. The new measurements are: body length 206 cm, height 120 cm, length of head 50 cm, length of front horn 75 mm, the rear horn 45 mm, circumference of body 226 cm, length of ear 20.5 mm, and tail length 60 cm.

5.0 FOOD AND FEEDING

When the animal arrived in Ragunan Zoo, it was given several kinds of leaves. Each day the preferred species were recorded. To date, the animal has fed on the leaves and twigs of 14 species (Table 1), of which some are preferred. viz., *Artocarpus integra*, *A. champedon*, *Hibiscus* sp., *Xylopia glauca*, and *Ceiba pentandra*. However, these were restricted in an effort to let the animal get used to other species as well. The animal ate almost all the fruits and vegetables such as papaya, banana, cucumber, pineapple, cashew, guava, jackfruit, citrus, mango, apple, carrot, long beans, cabbage, lettuce, spinach etc. The fruits and vegetables were chosen because of their easy availability and low cost. "Jalu" consumes 34 kg of leaves and twigs, 14 kg of fruits and about a kg of vegetables in a day.

6.0 DISCUSSION

The animal has shown that it can adapt well to cage conditions. The personnel in Ragunan Zoo with their previous experience on other large mammals (e.g: elephant, tiger, tapir, orang utan etc) are confident that rhinos can be maintained successfully and bred in captivity. So far good results have been obtained in rearing "Jalu". The animal became tame within 2 months. It grew well during the four months it spent in captivity (it increased its body length by 6 cm, and its height by 20 cm). However, there were also problems such as the danger of communicable diseases being transmitted to the animal from outside.

Table 1. List of plant species eaten by the Rhino ("Jalu") in captivity.

No.	Local name	Scientific name	Parts eaten
1	Nangka	<i>Artocarpus integra</i>	leaves, fruits, twigs
2	Sawo	<i>Manilkara</i> sp.	do
3	Jambu bili	<i>Psidium guajava</i>	do
4	Kecapi	<i>Sandoricum koetjape</i>	do
5	Rambutan	<i>Nephelium lappaceum</i>	leaves & twigs
6	Sawo manila	<i>Achras sapota</i>	leaves, fruits, twigs
7	Cempedak	<i>Artocarpus champeden</i>	leaves & young twigs
8	Alkesa	<i>Lucuma nervosa</i>	leaves, fruits, twigs
9	Buni	<i>Antidesma bunius</i>	leaves & young twigs
10	Waru	<i>Hibiscus tiliaceus</i>	do
11	Salopa	<i>Xylopia glauca</i>	leaves, fruits, twigs
12	Randu	<i>Ceiba pentandra</i>	leaves & young twigs
13	Dadap raja	<i>Erythrina</i> sp.	leaves & twigs
14	Pule	<i>Alstonia</i> sp.	Leaves & young twigs

7.0 CONCLUSIONS

- 7.1 The cooperation between Indonesia and United Kingdom in the establishment of a captive breeding programme for the Sumatran rhino represents a new effort to conserve the wildlife in general.
- 7.2 Initial results in Ragunan Zoo appear promising.
- 7.3 The Sumatran rhino is being reared in captivity in conditions that simulate as much as possible its natural habitat.
- 7.4 Major short comings in the programme in Ragunan Zoo concern the lack of technical equipment and finance.

8.0 RECOMMENDATION

As far as Indonesia is concerned, the most important aspect would be the transfer of technology so that the local personnel would be able to handle the entire operation successfully. It is hoped that the British partners would appreciate the need for this technological know-how to be transferred to the Indonesians and would therefore help develop the infrastructure and build up an efficient captive breeding centre in Indonesia.

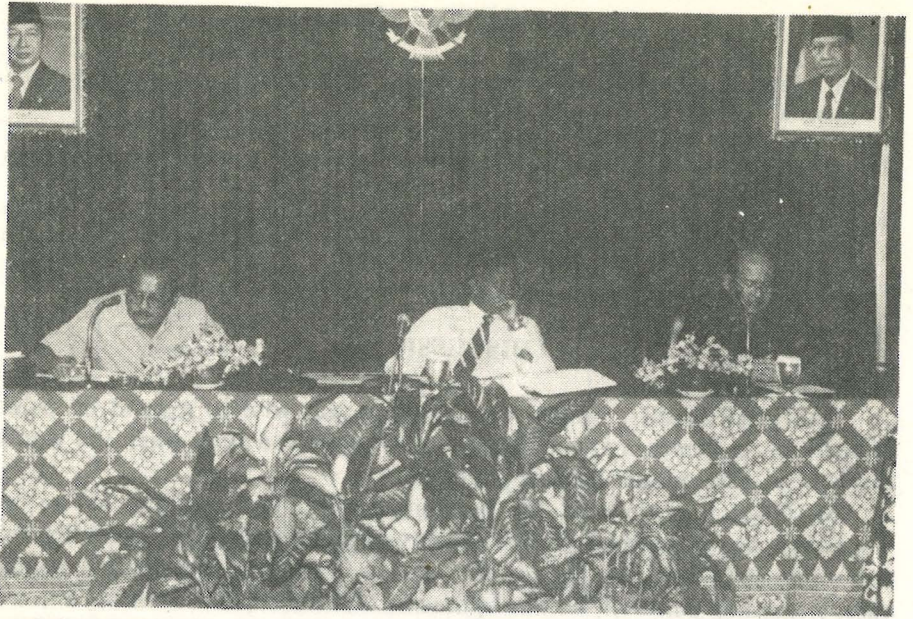
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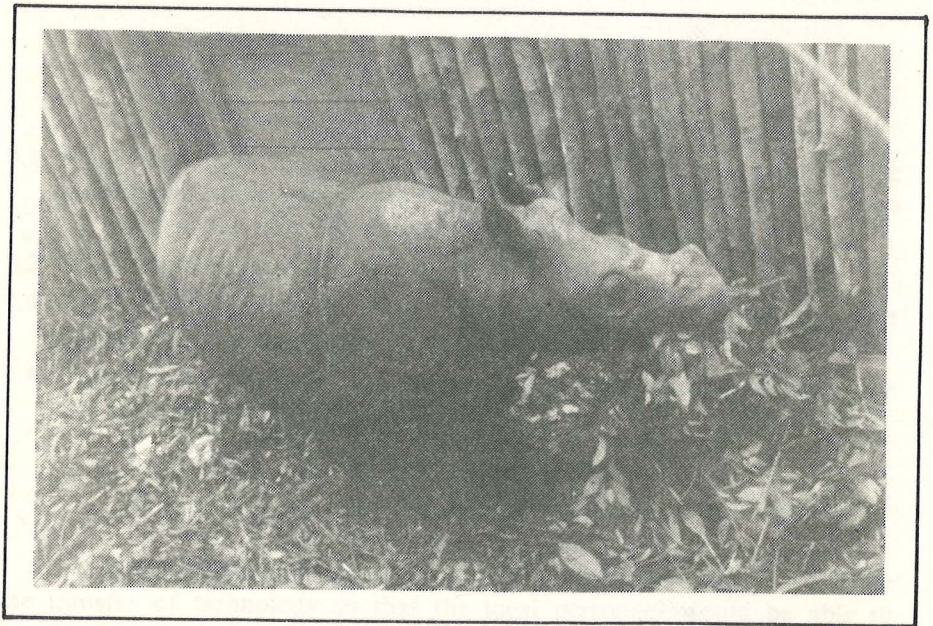
DISCUSSION

SANTIAPILLAI : wanted to know if it was wise to expand oil palm plantations in Sumatra at the expense of wildlife at a time when the world market for palm oil had become glutted ?

MANAN : appreciated the problem and pointed out that as far as Torgamba was concerned, it had already been designated as a conversion forest and so it would be put to other uses than wildlife conservation in any case. Regarding palm oil, he was optimistic that the current downward trend in world market price would be halted and that the demand would once again increase in the future.



Dr. Rubini Atmawidjaja, Director General of Forest Protection and Nature Conservation, Ministry of Forestry, delivering his Closing Address at the Meeting.



A young male Sumatran rhino (Dicerorhinus sumatrensis) at the Torgamba base camp, Riau, Sumatra.