

### CAPTIVE BREEDING POPULATIONS

Given one Indian rhino pair composed of animals of about the same age, and good luck, a breeding unit can be established. This has been proved in Basle. The ideal unit is a trio of one male and two females. Zoological gardens with enough room to keep larger breeding groups comfortably form the exceptions. Much could be achieved, however, if neighbouring gardens were prepared to work together. In this connection, I would like to recall the praiseworthy example of Berlin. When we lost our bull "Gadadhar" in 1964 there were only two specimens in Europe suitable to replace him, the roughly 7-year-old "Arjun" in the Berlin Zoo and a somewhat older bull in Rome. When the matter was put to him, Heinz Klos, the director of the Berlin Zoo, immediately recognized the necessity of continuing the Basle breeding group and convinced his Board that the bull "Arjun" should be placed at Basle's disposal. In return, we presented the young female to Berlin and made arrangements for a young male, which had been sired by our first bull and, in the meantime, delivered to Hamburg, to be transferred to Berlin. Thus another potential breeding unit was established.

We have made a point of selling Indian rhinos to zoos where they are kept in pairs. The first-born male "Rudra" went to Milwaukee with a female, born in Whipsnade. A calf produced by this pair was unfortunately stillborn (30 January 1967). As yet no further birth has been recorded. We have delivered young pairs to Houston, USA and Stuttgart, as well as partners for single animals in Hamburg-Stellingen, Berlin and Paris-Vincennes.

Zoological gardens should be aware of the responsibility they assume in keeping Indian rhinos. If we had room, we would install a second bull or even a second breeding pair. With only one bull available, the breeder always has the disconcerting feeling of standing on one leg! But the cooperative example set by Berlin Zoo is indeed very encouraging.

Within a span of 15 years, 12 Indian rhinos—with one male and one female during the first 5 years, then with one male and two females—have been born in Basle. In captivity, the Indian rhino has a life-expectancy of 40 years (Crandall, 1964). The gestation period lasts 478 days, which allows for one calf about every 2 years. With careful management, the present captive population (24, 20 in 25 zoos) could produce sufficient offspring to cover zoo requirements and for subsequent release in the wild. The preservation of this species would then be ensured for generations to come. An international studbook has now been established for the Indian rhinoceros, and this should be of great value in coordinating any long-term programme (see Table 1).

## Breeding the Indian Rhinoceros at Delhi Zoological Park

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The great Indian one-horned rhinoceros (*Rhinoceros unicornis*), the largest of all Asian animal species (see Prater, 1971), is commonly exhibited in the Zoological Gardens and Parks of the world. But like all rhinoceroses, the great Indian rhinoceros does not breed readily in captivity (see Crandall, 1964). Until recently, births of Indian rhinoceroses in captivity were very rare. Up to 1960, only five calves had been born in captivity. One reason for the rarity of rhino births in captivity might be the violent battles that take place between male and female, which discourage zoo authorities from keeping them together. Over the last 10 years, however, more Indian rhinos have been bred in captivity. According to the *International Zoo Yearbook* (Volume 10, 1970) there have been 12 births of Indian rhinoceroses in captivity during that time (see also Tong, 1960).

The Delhi Zoological Park obtained Mohan, a male great Indian rhinoceros, in December 1965. It was 3½ years old when it came to the zoo. Later, in March 1968, a female rhinoceros Rongi of about 6 years of age was brought to the zoo from Gauhati, Assam.

The rhino enclosure at Delhi Zoological Park is an open-air enclosure of about one acre in area (Fig. 1). The enclosure has luxuriant growth of naturally growing trees and undergrowth of mesquite (*Prosopis juliflora*). In the centre of the enclosure, a muddy depression has been provided where the animals can wallow. The enclosure has a few cells and a large enclosed paddock where the animals may be kept separately if the need arises. Details of the diet are provided in Table 1.

Rongi, the female rhinoceros, arrived at the zoo in the evening of 28 March 1968, and was kept in the paddock. Mohan was at that time kept in the outer enclosure. It was observed that Mohan was very much interested in meeting Rongi, but she was not very keen and remained restless for the first few days. Later on, both animals began to sniff and to look at each other regularly. It was then decided to introduce the female to Mohan. However, this decision was not taken without apprehension, as it was known that rhinoceros do not readily live

in captivity together. In fact, a pair at Whipsnade Zoo had fought and the female was eventually removed to Regent's Park, London. A pair at Chicago, USA, never became reconciled to each other.

Due precautions were therefore taken to avert any possible trouble. In the early morning hours of 14 April 1968, about 20 animal keepers and attendants were kept in readiness with loud explosive crackers, tin cans and bamboo sticks. The partition door between the paddocks and the main enclosure was gradually

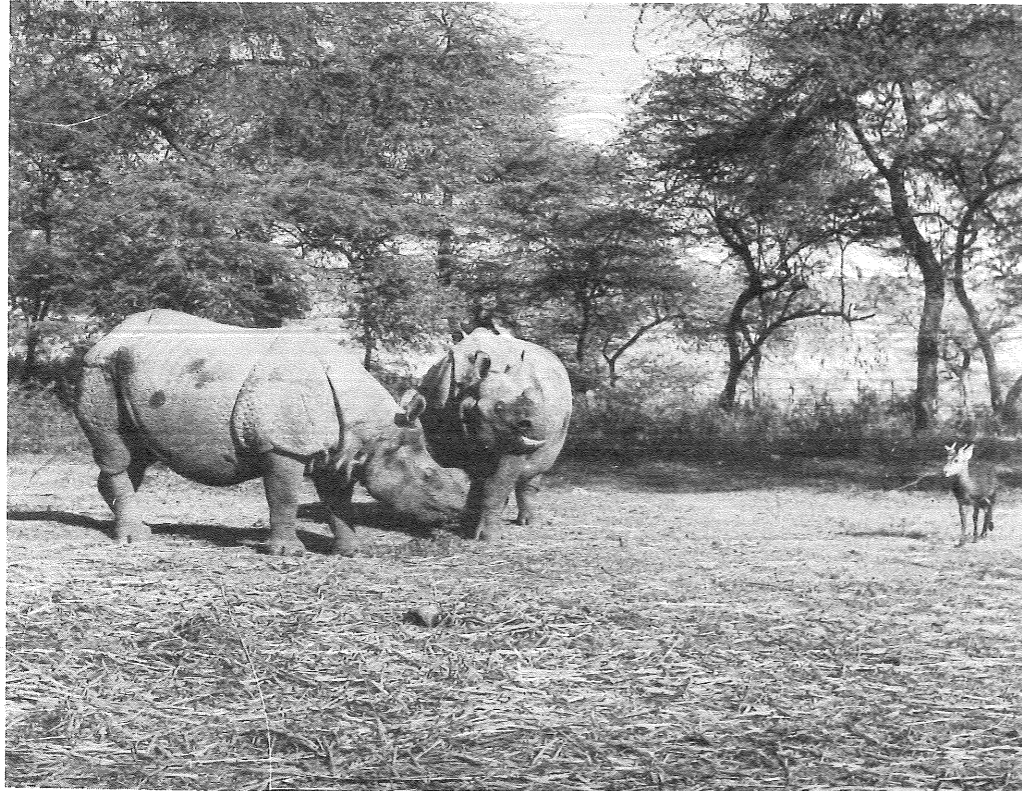


FIGURE 1. Great Indian rhinoceros (male Mohan and female Rongi) in the large open-air enclosure at Delhi Zoological Park.

opened. At 7.00 a.m. Mohan and Rongi met for the first time in the middle of the enclosure. The male was interested in mounting, but the female kept him at a distance. She looked apprehensive, broke off and ran away several times. After about an hour, both settled down, the male went to the mud wallow and the female was seen eating green fodder given to her. Fortunately, there was no fighting and the two settled down together in the course of time.

The female came into oestrus on 4 January 1969 for the first time; but the male remained indifferent to her, and no mating took place. She came into oestrus again on 22 September 1969. This time, the male was seen continuously chasing the female in the enclosure and also in the water moat. The female,

however, broke off and ran away several times. At about 1.00 p.m. a very fierce battle took place between the two. Both were mildly injured during the fight and, later on, the male was shut in the paddock as it was feared that one of them might be very seriously injured. Two days later the male was released again with due precautions and there was no fighting. Then again on 1 October 1969, hard blowing and shrill whistling noises were heard from the male as well as female. Both of them ran about in the enclosure and in the water moat. Several confrontations took place between the two, but this time it was not necessary to shut either of them inside. At 2.40 p.m. the first mating took place on hard ground.

TABLE 1. Diet of the Indian rhinoceros at Delhi Zoological Park, New Delhi.

Foodstuff	Quantity per animal per day
Bananas	6
Green fodder	150 kg
Leaf fodder	40 kg
Molasses	1 kg
Green gram ( <i>Phaseolus aureus</i> )	1 kg
Rice	1 kg
Turmeric powder	100 g
Linseed	100 g
Common salt	100 g

Cooked together and mixed with one litre of mustard oil or any edible oil

The whole act lasted for about 30 min. In the afternoon another similar mating was observed. No mating was observed from 2 October 1969 onwards and both animals became calm and quiet. It was hoped that successful mating had taken place, and in the late winter it became apparent that the female was pregnant.

The two rhinos were nevertheless kept together in the same enclosure till July 1970 when Mohan was shut in the paddock. The female was now definitely in calf. Her mammary glands increased in size and became active. She also stopped showing any interest in the male in the adjoining paddock.

On 27 January 1971, she took her usual food at 11.30 a.m. and retired into the bushes. At about 3.00 p.m. she became very restless and emitted bleating sounds from time to time and it was apparent that she was in labour pains. At 4.00 p.m. she went to the far corner of the enclosure, away from the public, and sat in a small wet depression. A watery discharge was seen from her vulva. She stood up at 4.15 p.m. when birth became imminent. The front legs and head of the infant were seen emerging while she was standing. At 4.20 p.m. she exerted herself a little and the calf was born. The mother was totally exhausted and sat down. She showed little interest in the calf for the first 5 min and then she started licking the baby. The duration of gestation in this case was 484 days, as calculated from the day of last mating to the day of birth.

The baby was pink in colour at birth. At 5.05 p.m. the calf made attempts to stand up but could not succeed. However, at 6.00 p.m. the baby was seen standing on all fours.

The last observation of the mother and calf was made at 7.00 p.m. on 27 January 1971 and by then she still had not nursed the calf. Next day, in the early morning hours, the calf was seen suckling. The vulva of the baby appeared very clearly and it was hence possible to sex her on 28 January 1971. The colour of the skin also appeared to be slightly darker than on the previous day. The mother was very protective of the calf and did not even come for feeding during the daytime. However, at about 7.00 p.m. she came for feeding along with the calf. She first made the calf sit down on the straw bedding in the enclosure and then went to be fed. This procedure was followed till the middle of February 1971. On 20 February, she came out of the bush with the baby in broad daylight at about 1.00 p.m. (see Fig. 2).

On 27 February, at 6.00 p.m. the calf was seen nibbling green fodder for the first time. She took some fodder leaves in her mouth and attempted chewing. She continued to play like this for about 15 min. However, since 17 March 1971, the calf has been observed to take and eat some green fodder. The calf and mother were kept together for almost 2 years in the large outdoor enclosure, and in February 1973 the calf was sent to Whipsnade Park in England.

On 15 March 1972, it was observed that the female was in heat. The male, who was still kept in the paddock, tried to join her and both adult animals became restive. The calf was separated from the mother on the 21 March 1972 and taken inside the cells. The calf, which apparently looked docile, became restless and both the mother and the calf went on calling to each other throughout the day and night of 21 March 1972. The mother did not even take food offered to her. Next day, however, both stopped calling to each other and ate their rations separately.

On 6 April 1972, the sliding door between the paddock and the main outdoor enclosure was opened at 8.30 a.m., but the male rhino did not come out. Repeated attempts to lure him out were made by offering him his favourite tit-bits. Fresh green fodder was put near the sliding door, but even that failed to bring him out. The female subsequently came near the door herself, and this also failed to bring him out. The female started eating the fodder. In course of time the two animals saw each other, but the female did not take any notice of the male. The male ventured twice to put his snout outside the sliding door but did not come out. The female did not go inside the paddock and after completing her feed went away to her favourite spot, the wallow pit, in the outdoor enclosure. The male remained seated in one corner of the paddock.

At sunset the sliding door between the paddock and the main enclosure was shut, but left unlocked, and three animal keepers were kept at the enclosure to keep an eye on the animal during the night. At about 9.15 p.m. the male rhino got up and opened the sliding door by pushing with his snout and came out into the main enclosure. He approached the female. Both sniffed each other and there

was a short fight between them. The female kept chasing the male all around the enclosure. This went on for about half an hour and then both quietened down. During the night the male made two unsuccessful attempts to mount the female

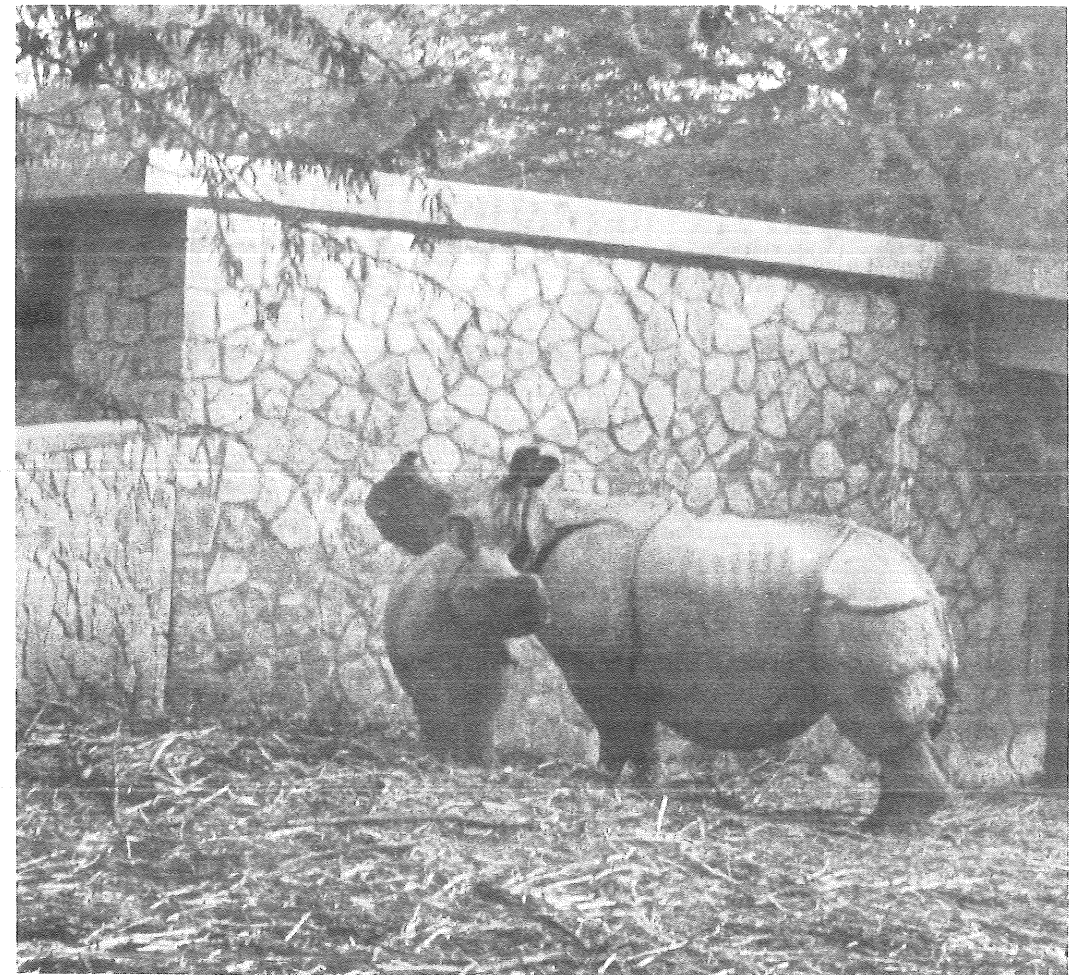


FIGURE 2. Female Indian rhino Rongi with her captive-born calf on the straw bedding provided in the enclosure.

but she shrugged him off. The female was expected to come into heat during the next 10 days and it was thought that mating might take place then. In fact, matings were subsequently observed in November 1972 and again on 20 February 1973, and the latter mating seems to have been fertile.