

## TWENTY YEARS OF RHINO RE-INTRODUCTION PROGRAMME IN DUDHWA NATIONAL PARK

by Satya Priya Sinha, V.B. Sawarkar and P.P. Singh

The Great Indian one-horned rhinoceros (*Rhinoceros unicornis*) once roamed over the Indus, Gangetic and Brahmaputra flood plains of the Indian sub-continent. Among the relics of the Mohenjo-Daro era, some rhino seals were found, which are preserved in the Indian National Museum in New Delhi. The records say that the invading Emperor Timor hunted and killed many rhinos on the frontier of Kashmir in AD 1398, and there is evidence that rhino existed in the western part of the subcontinent as far northwest as Peshawar until the 16th century. Babur, the founder of the Mughal Empire in India, in his famous memoirs "The Baburnamah" described how he hunted rhino in bush country near the Indus as late as 1519 AD.

Of the three species of rhino that roamed the Indo-Gangetic and Brahmaputra floodplains Javan rhinoceros (*Rhinoceros sondaicus*), which was once fairly common in the Sundarbans, became extinct in India about 1900 AD and the Sumatran rhino (*Didermocerus sumatrensis*) disappeared from the Lushai hills of Assam around 1935.

The causes of the disappearance of the Great Indian one-horned rhinoceros from several locations in its former range of distribution and the decline of the remaining populations were primarily due to:

- destruction and fragmentation of rhino habitat, primarily for extension of agriculture;
- hunting of rhino for sport during the Mughal period and early days of British rule in India; and
- poaching of rhino for horns and other body parts attributed to have magical medicinal values.

The Great Indian one-horned rhinoceros would also have undoubtedly ceased to exist but for the

strict protection given to it when its population fell to a very low level at the beginning of this century. Although there is no precise documentation regarding the number of rhino that existed in India at the turn of the 20th century, its population was believed to be around 100 in the beginning of the current century, with roughly 50 to 60 in Assam and 40-50 in West Bengal. At present, the Great Indian one-horned rhinoceros has total population of about 2,500 animals in the world. In India its distribution is restricted to four natural populations in Assam, viz Kaziranga, Manas, Orang (Rajiv Gandhi Wild Life Sanctuary) and Pabitora, two natural populations in West Bengal, viz Jaldapara and Gorumara, one re-introduced population in Dudhwa National Park, and one migratory population in Katerniaghat in Uttar Pradesh. A few rhino also occur in Bhutan adjacent to Manas Tiger Reserve, Assam.

In Nepal, the country's three rhino populations are located in Royal Chitwan National Park, Royal Bardia National Park and Sukhlaphanta Wild Life Sanctuary. The rhinos in Royal Chitwan National Park belong to a natural population, while Royal Bardia National Park and Sukhlaphanta Wild Life Sanctuary have re-introduced populations.

Kaziranga National Park in Assam (India) has the biggest rhino population (about 1,600), followed by Royal Chitwan National Park in Nepal with about 600 rhinos)

### The need for rhino re-introduction

Conservationists generally agree that an endangered species whose habitat type has, due to human impact, been reduced and split up into separate "islands" should live in as many of those islands as possible to reduce the risk of extinction.

This applies to Great Indian rhinoceros and it became imperative to create as many islands as possible, especially in its former ranges of distribution (Schenkel, 1981). Re-introduction is necessary mainly to establish new viable breeding populations and safeguard the species from poaching and natural calamities (Mishra and Dinerstein, 1987).

Due to concerted efforts to protect the rhinos in Kaziranga National Park, Pabitora Wild Life Sanctuary and other protected areas in Assam, the population is now high and during recent years a population surplus has been observed. These animals have spread up, down and across the Brahmaputra valley. However, most areas into which the rhinos move are used for agriculture (Schenkel, 1981) Kaziranga has an unusually high density rhino population and Pabitora has about 85 rhinos in a 16 sq. km. area. From the point of view of conservation, the only alternative is to translocate them to other protected areas where they can thrive.

Despite the extremely strong protective measures, the persecution of this animal continues due to the exceptionally high price of its horn. In Kaziranga National Park during the period 1983-1989, 235 animals were killed by poachers and in the same period 368 animals died due to natural causes related to floods, old age and illness (Dutta, 1991). In the recent past poachers wiped out the entire population of rhinos in Laokhowa Wild Life Sanctuary. Rhinos are also poached from other protected areas as well.

The one-horned rhinoceros is a hardy animal and seldom falls victim to diseases that affect other herbivores, either domestic or wild. But any epidemic outbreak can cause great losses to the animal's numbers. In 1944 and 1947, due to suspected cases of Anthrax and another unidentified disease, several rhinos died in Kaziranga National Park (Dutta, 1991). In 1979, hemorrhagic septicemia was detected in Kaziranga National Park in 10 cases among the rhinos (Sinha, 1999) and one male died in Dudhwa National Park in 1988.

## Selection of Dudhwa Tiger Reserve for rhino re-introduction

Following up on the recommendation of the Asian Rhino Specialist Group, the wildlife status evaluation committee of the Indian Board of Wildlife appointed a sub-committee to consider alternative areas for establishing a rhino population by translocation into suitable habitats. This sub-committee considered the ecological requirements of potential areas for the re-introduction of Indian rhinoceros and established the following criteria:

- diversity of habitat, including flooded grasslands with a variety of food plants;
- ample shade and water bodies for wallowing and drinking, especially in the hot season;
- protection from all forms of human disturbance and harassment, including pollution, poaching and the introduction of disease via domestic stock;
- avoid conflicts with cultivations adjacent to areas of re-introduction, especially in view of the rhino's liking for crops such as paddy and sugarcane; and
- translocation to an area that is not presently inhabited by rhinos, but which falls under the former range of rhino distribution in the past.

On the basis of the above criteria, some of the possible alternative habitats that were suggested included Dudhwa National Park (Uttar Pradesh), Jaldapara (West Bengal), Champaran (Bihar), Intaki (Nagaland) and Laligabari Sanctuary (Arunachal Pradesh). The sub-committee decided that Dudhwa National Park was the most promising and met all the above-mentioned criteria.

Dudhwa National Park was considered to be the most suitable because of significant similarities to habitats in Kaziranga National Park. Dudhwa National Park contains a diversity of habitat, including flooded grasslands, a variety of food plants and ample shade and water for wallowing and drinking. Adequate protection is also available in Dudhwa Tiger Reserve because of its status as a National Park and also as a Tiger Reserve. The area is part of the historic range of the rhino, the

last one having been shot in 1878 in Pilibhit district, which is close to the proposed re-introduction site.

A vegetation survey conducted by Dr. Hazra and his team of botanists from the Botanical Survey of India revealed the presence of several food species preferred by rhino that are common to Dudhwa, Kaziranga and Manas National Park.

Rhinos generally prefer grasses like *Saccharum* spp., *Cynodon dactylon*, *Arundo donax*, *Polytoca digitata*, *Hygroryza aristata*, *Vetiveria zizanioides*, *Imperata cylindrica*, *Themeda* spp., *Chrysopogon aciculatus*, *Paspalidium flavidum*, *Narenga porphyrocoma*, *Phragmites karka*, etc.

They preferred sedges like *Cyperus* spp. and herbs, shrubs and saplings of species such as *Polygonum plebelium*, *Ageratum conyzoides*, *Erigeron* spp., *Artemesia nilagirica*, *Eupatorium odoratum*, *Solanun* spp., *Colebrookia oppositifolia*, *Murraya koenigii*, *Trewia nudiflora*, *Litsaea* spp., *Premna* spp., etc.

They also prefer aquatic plants like *Hydrilla verticillata*, *Vallisneria spiralis*, *Hygroryza aristata*, *Potamogeton* sp. and *Trapa* sp. It is estimated that the rhino population in Kaziranga takes about 77% grasses and 23% herbs and shrubs. The wide range of materials eaten by rhinos suggests that the animal is not very specific in its food choices. The majority of the above-mentioned food plants are available in Dudhwa National Park (Hazra and Shukla, 1982).

The re-introduction of rhino into Dudhwa took place in two phases - the first one in 1984 and the second in 1985. The rhino re-introduction program in India was possible due to the keen interest of the former Prime Minister of India, Smt. Indira Gandhi and her full support of the rhino re-introduction programme.

#### The 1984 translocation from Assam

Early in 1984, a group of about 10 rhinos living outside Pabitora Wild Life Sanctuary in Assam was selected by the Assam Forest Department for the capture operation. The fact that these rhinos

were causing considerable damage to cultivated crops and proving difficult to protect, provided added justification for the translocation experiment. It remains a mystery as to why the translocation of rhinos took place from Pabitora Wild Life Sanctuary, because one of the main reasons for undertaking translocation and the creation of another viable breeding population was to reduce the high density of rhinos in Kaziranga National Park and to protect the rhino population from natural calamities. Between 11-21 March 1984, six animals were captured by drug immobilization and crated, revived and transported to stockades a few kilometers from the capture area and released. After release, the animals were encouraged to wallow and in most cases satisfactory feeding was established within two to three days. A team of veterinarians rendered necessary health care, mostly consisting of treatment of superficial lacerations received during the capture. The first animal captured, a large male, escaped from its stockade during the night.

On 30th March, the five remaining animals (a sub-adult, two elderly females, a young adult and one older male) were crated, driven in trucks to Guwahati Airport and loaded onto a cargo aircraft chartered by the Government of India. Three of the animals were lightly sedated prior to loading and they all remained calm during the two and a half hour flight from Guwahati to New Delhi. After being given food and water at Delhi Airport, the rhinos were driven through the night to Dudhwa National Park, where they were uncrated into individual stockades. One female died due to a stressful miscarriage after 11 days, but the remaining four settled in well; three were released from the stockades on 20 April 1984 and the large male was released on 9 May, after being fitted with radio collar. Another female died on July 31 1984 after a bid to tranquilize her to treat a wound. This left only three rhinos, one female and two males.

#### The 1985 translocation from Nepal

In order to establish a rigorous breeding nucleus of rhinos in Dudhwa, it was decided to introduce more stock from a different population. The

(cont on p.17)

(cont. from p. 16)

collaboration of His Majesty's Government of Nepal was obtained in the exchange of four adult female rhinos from the Royal Chitwan National Park for 16 domesticated Indian elephants. By selecting only females, the reproductive potential in Dudhwa would be more than doubled and the eventual mating of these animals with the totally unrelated Assam males would ensure maximum genetic vigor. Capture took place on 28-31 March 1985. All four female rhinos, estimated to be between 5 and 7 years old, were immobilized, loaded into crates, and revived. They were immediately driven 720 km to Dudhwa and all withstood the 24-hour journey. They were released into the wild after a week.

### **Present status – a success story**

Of the total of nine rhinos translocated to Dudhwa Tiger Reserve, seven survived in excellent health, i.e. the young female and both the males of the 1984 translocation from Assam, and all four young females from the 1985 translocation from Nepal. Thus, these seven rhinos constituted the seed population of rhinos at Dudhwa National Park. In 1988, one adult male from Assam died after fighting with another dominant male. In 1991, one of the females from Nepal died due to internal infection and miscarriage. Her male calf was killed by the dominant male in 1993. The present total population of 21 rhinos comprises 16 calves born in this area and 5 rhinos of the founder population.

The first evidence of breeding in the re-introduced population was detected in the form of the remains of a newly born calf in a patch of tall grass in August 1987. There were no signs of predation; hence, it may have been a case of premature birth or death due to other natural circumstances. The first successful calving occurred in early 1989. Three more calves followed in the same year. The breeding success has continued and the seed population of 5 increased to 21 rhinos in November 2004 (4 females:1 male rhino of the founder population; 16 calves survived in Dudhwa National Park out of a total 28 calves born).

After the death of a male in 1988 and a failed attempt to introduce another male from Kanpur Zoo, Dudhwa has not seen any other adult males

introduced from the outside, even after a lapse of about 14 years. As a consequence, only one male is mating with all the females of the population and single male sires all the calves born in the rhino re-introduction area (RRA) in Dudhwa Tiger Reserve. This has resulted in a slow rate of population build up, and severe inbreeding.

Had there been a few more males capable of participating in breeding, the birth rate in the population might have been much higher. At the same time, there might have been a genetically healthy population. As the same male sires all the calves, and that male continues to dominate, the females of the progeny are mating with their sire. This is a very sad part of the entire programme. The population as of now is heavily inbred and this trend should not be allowed to continue. This is a classic example of how small populations suffer the threat of extinction. Nobody knew that out of the two males only one would participate in all breeding activities. An attempt to solve this problem was made by bringing a male from Kanpur Zoo in 1992, but the resident male did not allow the newcomer to even settle down in Dudhwa. The new male was seriously injured by the founder male and was sent back to Kanpur Zoo after treatment. Now we are faced with a situation in which even if Dudhwa-born males establish themselves, they will be mating with close relatives, which is a totally undesirable genetic proposition.

### **Fence maintenance**

The re-introduced rhino population is enclosed within a 27.11 km<sup>2</sup> area surrounded by a four-strand energized fence. Two energizers power this fence, one each at Salukapur and Base Camp. There is a facility of solar power-run chargers for charging the batteries. This system is effective and useful in open weather, but during the rainy season arrangements are made to get the batteries charged at Dudhwa or Palia.

### **Monitoring**

Due emphasis is given to regular and thorough monitoring of the rhino population at Dudhwa. This monitoring is based on surveying the area from atop elephants, from watchtowers, on foot and on

motorbike. There are four elephants deployed for this purpose – two elephants are camped at Salukapur and two at Base Camp. Four teams monitor different areas within the RRA. They try to locate rhinos, identify them and observe their activity. Each of the adult rhinos is well known by all of the monitoring staff. Daily observation of sighting location, activity while sighted and any unusual behavior are recorded in registers maintained at the two camps. A consolidated monitoring report is made by the Range Officer and submitted to the Deputy Director every fortnight. This fortnightly rhino monitoring report is forwarded to the Director, Dudhwa Tiger Reserve and to the Chief Wild Life Warden, U.P.

## Problems

### *In-breeding*

As discussed earlier, all calves of the Dudhwa bred population are sired by a single male rhino. There is currently no other unrelated male and all the mating of the Dudhwa-bred population is taking place between close relatives. This is certainly a very discouraging reality.

The original target was aimed at releasing 30 rhinos, but due to financial and administrative constraints only 10 could be released from 1984 to 1992. Four out of these ten have died and another one from the Kanpur Zoo had to be sent back to its origin. So, breeding started with one male and four females. During 20 years of breeding, a total of 28 calves were born, out of which 16 survived. There have been 4 recorded cases of miscarriages. The population size as of now stands at 21 (November 2004). It is also expected that within 6 months at least 4-6 calves will be born and added to the current population.

### **Intra specific fight**

Since the very beginning of the re-introduction program there have been serious intra-specific fights between males as well as between male and female. As a consequence of such fights, one of the two males of the first group was killed. Another male from Kanpur Zoo was seriously injured by the dominant male from Assam and

finally had to be sent back. Owing perhaps to this very reason, Narayani, a female from Nepal, is presently staying outside the fenced area. Narayani even gave birth to her last calf in a sugarcane field in Bela Kalan village about 4 km from the RRA.

### **Rhinos straying out of the park**

For the last two years some rhinos, in particular Narayani, have started straying out of the park. A rapid survey in the villages Bela Kalan, Bela Tapar and Gulra Tanda and an interaction with the forest staff of Gulra Chowki indicated that there have been 11 recorded cases of straying out of rhinos. There has been crop damage but no other damage has been reported.

It is both interesting and disturbing that Narayani prefers to live outside the fenced area and even gave birth to a calf during October 2001 in a sugarcane field in Bela Kalan village about 4 km away from the RRA.

Recently in October 2004, one of the male rhinos born in Dudhwa was sighted near Sitapur township in a sugar cane field. Later it was darted and immobilized on 2 November, but escaped due to a faulty gate. This male rhino has killed two persons and injured another person. One of the female rhinos accompanied by a small calf has been staying outside the rhino fence in the southern part of Dudhwa NP in the buffer forest and has already killed two persons. In October 2004, another person was killed by the same female rhino. In the future, such incidents may jeopardize the conservation efforts made regarding the conservation of rhinos in Dudhwa National Park.

Whatever the reason, the fact that the protected area management is not in a position to maintain the 9 km elephant proof trench is disheartening. The trench has to be maintained at all costs if the programme is to be a success.

An alternative rhino re-introduction site at Bhadi Tal in Belraiyan range has been selected and fencing work is in progress. This new site may prove helpful in providing a home to such animals.

## Resource crunch

The park management faces a lot of difficulties in procuring money for fence maintenance, wages for fence watchers, maintaining elephants for rhino monitoring and the recent need for tourism.

## Tourism

Park authorities opened the RRA for tourism in December 2001. Earlier this area was supposed to be a restricted zone and nobody was allowed to enter the RRA. When the RRA was opened for tourism, there were four elephants engaged for monitoring duties. Unfortunately, because of bad health, one female elephant died in February 2002 and another is too weak to stand. These monitoring elephants are kept on long duty hours in locating rhinos. The same elephants are used to make a number of trips for the tourists in rhino shows. This practice should be discontinued or reduced to three days per week.

## Poaching

At present, the park management is very much on the alert; patrol duties are being carried out religiously but the rhinos straying out is a problem. There is the possibility of retaliation by the local people, which would be detrimental to rhino conservation in Dudhwa National Park. In view of this, the relocation of rhinos back into the Dudhwa NP should be carried out on a priority basis.

## Biotic pressure

Villages like Bela Kalan, Bela Tapar, Gulra Tanda, etc. are located near the southern fringe of the power fence. At times people from these villages venture into the RRA to collect thatch grass, fodder and sometimes fuel wood and also to fish in the swamps.

## Lack of a veterinary facility

There is a sanctioned post for a veterinarian in Dudhwa Tiger Reserve, but no one has applied, considering the current low salary scale and bleak promotional prospects. Veterinary doctors are

called in from Chandan Chowki or sometimes from Palia when required. From time to time veterinary officers and veterinary scientists from Lucknow Zoo and Indian Veterinary Institute, Izzatnagar, Bareilly visit this area.

## Conclusions

- A few more (in the ratio of 1 male:3 females) males and females from the wild, or wild captive rhinos should be procured.
- In all future re-introductions, only sub-adult individuals in the same age group should be chosen, as there is less chance of casualties and they adapt better to new conditions. Moreover, having males of the same age group may reduce the possibility of over-dominance by one individual.
- Develop an alternative rhino area within Dudhwa National Park.
- Maintain the rhino-proof trench on the southern side of the RRA.
- Restrict rhino watches to 4 days per week within the RRA until the necessary infrastructure facilities are properly developed
- Procure additional riding elephants (4 for daily monitoring and 2 elephants for tourists).

*Authors' addresses: Dr Satya Priya Sinha, Consultant, Rhino Reintroduction Programme in Uttaranchal & Project Coordinator, SOS Rhino Project in Dudhwa National Park, Uttar Pradesh, c/o Wildlife Institute of India, Chandrabani, Dehra Dun 248001, Uttaranchal State, India, Email: [sinhasp@yahoo.com](mailto:sinhasp@yahoo.com) or [sinhasp@hotmail.com](mailto:sinhasp@hotmail.com); Prof. V.B. Sawarkar, IFS, Former Director Wildlife Institute of India Chandrabani, Dehra Dun, Uttaranchal, India; P.P. Singh, IFS, Deputy Director, Dudhwa National Park / Tiger Reserve, Palia Kalan (District Kheri), Uttar Pradesh, India.*

