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## ON CHEMICAL IMMOBILIZATION AND CAPTURE OF RHINOCEROS IN NEPAL

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### Background Information :

In accordance with the decision of His Majesty's Govt. of Nepal, the expertise of Smithsonian/Worldlife Fund/Nepal Tiger Ecology Project were called upon to capture 5 rhino calves. This paper is an attempt to describe the techniques involved in using drugs and other procedures adopted. In the past rhino calves were captured manually, after the mother was either killed or isolated from its calves by rounding it with large number of domestic elephants.

This present paper describes the method of capture by chemical immobilization and the process for taming rhinoceros.

### Description of the Area :

The area of operation was the Royal Chitwan National Park in the subtropical region of the Kingdom of Nepal. The vegetation is mosaic riverine forests with dense undergrowth and tall *Savannah* type grassland collectively known as elephant grass along the northern edge of the park. Sal forest (*Shorea robusta*) is the predominant species found alone in the higher grounds throughout the park. However, the rhinoceros are mainly concentrated in the riverine forest and grassland covering about 30% of the park area of 967 sq. km. (Bolton, 1975). Presently the population of rhinos is estimated to be 300 (Laurie, 1978). Based upon 3 1/2 years deep study of rhinoceros in Chitwan, Laurie (1978) estimated that the population is increasing at a rate between 2 to 6 per annum. Detail description of the area is given by Bolton (1975), and Laurie (1978).

### Objectives of the Capture :

Except for the first animal immobilized, the main objective was to provide a pair to the Government of Burma for captive breeding.

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In addition the zoo in Kathmandu had also requested for rhinoceros for their own programmes.

### Description and distribution of *Rhinoceros unicornis* :

During the Mughal era in India the rhinoceroses were distributed from the Indus Valley in present day Pakistan to Northern Burma (Laurie, 1978). Babur, the first Mughal Emperor is reported to have hunted Rhino near Peshawar in 1519 (Ali, 1927). Guggusberg (1966) reports that the invaders of India hunted rhinos near Kashmir border as early as 1398. Presently the ranges have shrunk to two major populations in Kaziranga (Assam), India and Chitwan, Nepal. In the former, the estimated population is about 600 animals (Laurie, 1978). In addition to the main strong holds there are about 100 rhinoceroses scattered in several pockets of West Bengal, Bihar and Assam states of India.

Out of the three Asian rhinoceros, *Rhinoceros unicornis* is the biggest amongst the Sumatran or Asiatic two horned rhinoceros *Dicerorhinus sumatrensis* and the Javan or lesser one horned rhinoceros, *Rhinoceros sondaicus*. It is a much massive and heavier animal with more developed skinfolds around the neck (Laurie, 1978). An average adult weighs between 1,600 and 2000 kg. (Prater, 1965; Laurie, 1978, Mishra and Mireow, 1964). Both sexes have nasal horns and a maximum length of 60 cm, has been recorded (Ward, 1955).

### Methods, Equipments and Drugs :

The method consisted of approaching rhinos at close range and immobilizing by darting them from elephant back. The dart gun, equipments used were the 'capchur' gun, syringes and projector manufactured by Palmer Chemical and Equipment, Douglasville, Georgia, U.S.A. Description of the standard syringes used and the capture equipments are given by Young (1973). The drug used was M. 99 or Etrophine mixed with Acepromyzine and the antidote used to revise the state of narcosis was M 50-50 (Diprenpephine). M. 99 is a morphine based drug and has been extensively used on Rhinos in Africa (King and Carter, 1965; Wallach, 1966). It has been used on the Asian Elephants (*Elephas maximus*; Oliver, 1978) and Axis deer (Mishra and Wemmer, 1980). Detailed description of all the three drugs and their effects are reviewed by Young (1973) and described by Alford *et al.* (1974). The drugs M. 99 and M. 50 : 50 are manufactured by D.M. Pharmaceuticals Inc., Rockville, U.S.A. Table 1 (page, 472) gives their doses of different animals and details are given below :

**Rhino No. 1 :** It was an adult healthy rhino. Estimated weight was about 1800-2000 kg. The animal had a severe infected wound on its rump caused by a 16" spear embedded on its body. Since this male was first sighted near the fringes of the National Park, it is suspected to have been speared by an angry villager when the animal was on its regular nocturnal raid of the agricultural land. Thus the object of immobilization was to take the spear out and treat its wound.

The animal was darted on May 28, 1979 about 15 cm. below its wound using a mixture equivalent to 1.2 mg. of M. 99 and 10 mg. of Aceprom-

zine. This animal was drinking water on the bank of the Rapti river. When the dart hit it. It walked across the river and climbed into shady patch of the forest, and stood in the patch. It began to stagger for about 6 minutes. In 14 minutes it was standing quietly as we approached it. We threw sticks at it but they did not seem to bother him though the animal was still on its legs. In 22 minutes we took the spear out and cleaned the wound while the animal was still standing, and then pushed the animal down to a resting position. A veterinary surgeon treated the wound and injected it with  $25 \times 10^6$  units of penicillin. To monitor its future movements a collar was fixed around its neck. After 42 minutes of darting 3 mg. of M. 50-50 solution was administered intravenously through a vein on its right ear. The animal then started to move in 1 minute 40 seconds and was on its legs within 4 minutes. It then started to walk and grazed in a shady patch of the forest for next few hours. The wound was completely healed in a week's time.

**Rhinos No. 2 and 3:** The mother was darted on March 25 with 1.5 mg. of M. 99 at 0:8:35:15 hours. On impact the animal started to move with the calf following it. At 08:48 hours after moving about 500 metres it stopped moving and at 08:50 it went down. The calf was following the mother who also sat down near her. This was the first calf which was captured. The estimated age of it was 3-5 months and the weight was about 80 kg. It was decided to capture it manually. This was just to compare the efficiency of the old method of capture with the new one using chemical restraints. The traditional old method consisted of roping the calf on all its four legs with separate ropes. Each end of the rope which is longer than 3 metres is held tightly. A female domestic elephant is then walked in front of the calf and for some reasons not understood the calf followed the elephant. People holding the end-ropes extending from the calf's feet ensured that a minimum distance of about 2-3 metres is maintained between the leading elephant and the rhino calf as there is danger of the domestic elephant hurting or even killing the rhino-calf. It took about 20 people, a net and about 15 minutes to subdue this male calf. By the time we had roped its legs the calf was already panicking. Since a river had to be crossed to bring the calf into the camp, we decided to inject it with 50 mg. of acepromazine. The calf followed the elephant as anticipated and was transported easily to the camp.

By then one of us was ready to administer the antagonist, M 50-50 on the mother and while trying to find a vein in one of her ears she jerked her head towards the person and stood up. The drug did not complete effect. However, nobody was hurt. It was impossible to administer M 50-50 manually or intravenously. The rhino was also moving slowly and did not like the idea of being approached too close. As 41 minutes had passed since it was darted and 26 minutes had passed since it went down, therefore, we were compelled to administer M 50-50 through its muscle by darting. A barbless needle was used in the dart and the dose of M 50-50 was 4 mg. Within 20 minutes the animal started grazing and headed towards the wallow to cool herself. The dart had dropped off as the animal brushed part of the thicket. The dart was recovered later.

### Rhinos 4, 5, 6

Table 1 gives the doses of drugs used on rhino no. 4. Though the drug had taken full effect, it took us about an hour to catch her calf (rhino No. 5). The effect of M. 99 seemed to have worn out from the mother (No. 4) by then and then again an antidote had to be administered intravenously in a similar manner as in rhino no. 1. Since rhino no. 5 was the first calf to be darted we had used only half of the dose for adults. This dose seemed to have little effect and the calf was captured by trapping into a net. Then a second shot consisting of 0.5 mg. M 99 and 5.0 mg. of acepromazine of dose was administered into the animal's body. Within 5 minutes, drug seemed to have taken complete effect. The calf was transported on the back of the landrover and it was during transportation that the vehicle got stuck in the middle of the river. Since it took some time to get the vehicle out, a third dose consisting of the same drug was again given to the animal after 39 minutes of the 2nd dose. Then it was transported back to the base and transferred into the taming pit (Description of pit and procedure of taming are given below). 2 mg. of M 50-50 was injected intravenously and the animal was on its feet in 61 seconds. In total the animal was completely sedated for 2 hours, 4 minutes after the second dose. Unfortunately, this calf escaped from its pit by scrapping the mud wall of the pit and climbing out later in darkness of the night of the same day. The calf did not make it back to its mother and was only about 2-3 km. away therefore, we located it again in the next two days and captured it again on 29th March, 1980. The doses of the drug and their effect on the rhino (Refer rhino no. 6) is given in Table 1 (Page 472).

### Rhino No. 7 and Rhino No. 9.

Both these animals were captured without immobilizing their mothers. The calves were darted and once it got under the state of narcosis their mothers were chased away wounding a herd of domestic elephants. Table 1 gives the details of these animals drug-doses and their effects.

### Rhino No. 8.

The mother of this female calf was poached and the calf was first sighted near its mother's body in an area about 15 km., outside the National Park's boundary. About 10 days after its mother's death, the calf was found again lying in proximity to its mother's rotting body. It was in a very weak condition and was unable to move. Thus it was lifted and transported to the camp where it was nourished with regular supply of milk and water. In a week's time it regained its strength and by then it was completely used to human beings so to say it had become tame.

### Description of pit enclosures and process of taming.

Past experiences had revealed that rhinos tame easily. Therefore, the next procedure we were involved in was to get them used to human beings for granting a safe transportation to their destination. As described above the captured calves were transported to the camp

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situated between 2-5 km. from the captured sites and transferred in the rearing pit enclosures. Each pit is 4 m. in length 1 m. breadth and 1.22 m deep.

Once they are transferred in the pit the effect of the drug is revised as described above. Immediately upon recovery the calves are in a state of confusion and start running round the pit. They huff, puff, grunt and often start calling. They make several attempts to climb out of the pit. After an initial attempt lasting between 15-60 minutes, they get tired and rest. Water is poured over them at this stage to cool the body. However, during the next 24-48 hours the animal constantly tries to escape. It refuses to take food or water during this period. By 72 hours it becomes docile and starts taking its food and water. During this time the caretaker also makes several attempts to touch, scratch and let the animal lick his hand; the hand being previously immersed in a solution of sugar and water. Once it starts licking the hands and let its caretaker to scratch the body, the animal is then bottle-fed with milk. Within a week's time the animal becomes completely tame and even allows its care-taker to rest with him in the pit. It is during this process that extreme caution has been taken against infectious diseases. The calves are washed several times a day and any cuts and wounds are all cleaned and treated. Visitors are strictly prohibited to disturb the animal. One caretaker is assigned to each calf at a time.

The rhinos are fed with a beer-bottle 750 ml. of lactogen milk powder every 2 hours in addition to keeping a constant supply of fine grasses in the pit. Once the animal is completely tamed it is put into a crate and transported by pick-up trucks to Kathmandu zoo from where they are dispersed to the final destination. It is not necessary to drug the animal while putting into the crate during transportation. A narrow passage leading into the pit is dug and the crate is placed at the mouth of this passage. In a day or two the rhino gets used to walking in and out of the crate and often rests inside.

All the calves we have captured behaved similarly except rhino No. 7, which took about 2 weeks to be tamed.

#### Discussion and Conclusion:

The operation went very well and all the immobilized animals did not suffer any side effects. The first dose of drugs used on the rhino No. 5 (Table 1) indicates that the dose consisting 0.5 mg. of M. 99 and 5 mg. of acepromazine may not have been adequate but 1 mg. of M. 99 + 10 mg. of acepromazine for calves seems to be the optimum dose. Similarly a dose of 1.2-2 mg. of M. 99. mixed with 10 mg. of acepromazine for adults is recommended. Our finding also indicates that the induction time for the drug to take complete effect is between 10-15 minutes for adults and 4-6 minutes for calves. The administration of M. 99 on free ranging animals is somewhat unique in that it is safer to give a maximum dose rather than the minimum effective dose (Young, Alfred *et al.*, 1914) and the dose we have used seems to have higher than the ones prescribed by the manufacturer (D.M. Pharmaceu-

ticals, Inc., Md. USA) and by Alfred *et al.* (1974). They have listed a dose of 1 mg. M-99 for all including *Rhinoceros unicornis*, the black African Rhino (*Diceros bicornis*) and the white African Rhino (*Diceros sp.*)

Similarly the doses of antidote, M-50-50 seems slightly higher in our case than those recommended in literature. But we presume these recommendations are based upon captive animals or extrapolated from experiences in Africa. Table 1 also indicates that all animals administered M 50-50 intravenously recovered within 2 minutes except for rhino No. 6. In this case only 1 mg. of M 50-50 was injected and it took 6 minutes 30 seconds for the animal to recover. This could have resulted due to a small dose of antagonist.

On the care and training process the method we have undertaken seems adequate and less expensive, except the walls of the pit enclosures have to be reinforced with smooth wooden planks as we did later after rhino No. 5 escaped. We are not aware if lactogen is the right food but since that was the only milk available in Chitwan at that time, so we had very little alternatives. We did not risk using the milk of domestic cows or buffaloes without the knowledge of their medical conditions. Experiences on capture of Rhino No. 5, indicates that man handling causes more disturbances to the animal, and chemical immobilization causes less trauma to the animal.

Thus we conclude the use of chemical restraints for capturing of free ranging rhinos and the drugs prescribed is 1, 2 to 2 mgs. of etrophine (M. 99) mixed with 10 mg. of acepromazine for adults and 1 mg. of etrophine mixed with 5-10 mg. of acepromazine for calves. The recommended dose of antagonist is M 50-50 about double the dose of M. 99 used.