

## Chemical Restraint and Translocation of a Bull Asian Elephant that Strayed into a Zoo

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### Introduction

Incidences of wild pachyderms straying into human habitation are on the rise especially in areas bordering forests. Male Asian elephants (*Elephas maximus*) leave their family group as they approach sexual maturity and spend as much as 90% of their lives alone or in loose association with other bulls (Subramanian 2010). Some males, to gain in size and reproductive advantage raid crops causing human injury and death, thus are considered 'problem-elephants' (Fernando *et al.* 2012). Some such 'problem-elephants' are captured and relocated as a management measure (Nigam 2009; Fernando *et al.* 2012).

Nandankanan Zoological Park lies between 20° 23' 08" to 20° 24' 10" N and 85° 48' 09" to 85° 48' 13" E in the Khurdha District of Odisha, India, and is situated within the Nandankanan Wildlife Sanctuary. Another Wildlife Sanctuary, known for its elephant population, the Chandaka-Dampara Wildlife Sanctuary is contiguous with Nandankanan Sanctuary. On several occasions in the past wild elephants have been observed in the vicinity of the Nandankanan Zoo. The last such incident was in December 2004 when a group of three elephants came near the zoo.

The elephants in the zoo are housed in an enclosure, 20,000 m<sup>2</sup> in extent, with natural vegetation, tall trees and a pond. A night shelter is situated in the middle of the enclosure where the elephants are tethered when the zoo is closed for visitors. The elephants are taken for a walk of about 4 km daily into the sanctuary forest area, after returning they are let loose during daytime.

On 29.12.2014 early morning, a wild Makhna (tusk-less male) was discovered by the animal

keepers, hiding behind the bushes inside the elephant enclosure. The Makhna had entered the enclosure by breaking a 1.5 m high brick wall and crossing a 3 m wide 1 m deep dry moat. He had injured a female elephant housed there. The female named Basanti suffered superficial skin lacerations on the left pinna and left forelimb. She was about 50 years old and was in oestrous on that day. She had previously given birth to three offspring, all of whom were independent and not housed with her. She was not bred after the third parturition, due to the absence of a suitable male, but she came into oestrous regularly.

The intruder was driven out of the zoo by means of firecrackers and beating of drums. He was very agile and ran very fast with his tail raised when chased. When confronted, he did not display any aggression towards us, but tried to move stealthily, hiding behind bushes. It took about 5 h for the zoo staff to drive the Makhna out of zoo boundary and about 2 km into the sanctuary forest area. The drive was called off after that presuming that it will go away in the night.

However, it returned on the intervening night of 1<sup>st</sup> and 2<sup>nd</sup> January 2015, further injured the same female elephant and went away. The left pinna was severely injured this time and a piece of cartilage was severed (Fig.1) probably due to biting and pulling of the pinna. There was also a puncture wound on the right pinna. During the incident Basanti's left forelimb and right hind limb were chained to iron poles located in front and back of the elephant. At the time, there were two more female elephants, aged about 61 years and 18 years, tethered in the same shelter. But the Makhna only injured Basanti on both the occasions.

Considering the situation and the danger to the female, it was decided to capture and relocate the male.

### Capture and translocation

On 2<sup>nd</sup> January 2015 morning, a capture team of fourteen, composed of a Forest Officer, a veterinarian, a biologist and other field staff searched for the male and found it inside the Wildlife Sanctuary forest about 1000 m from the zoo. It was then decided to allow the Makhna to re-enter the elephant enclosure and prevent its escape, so that it can be immobilised. Two Kunkies (trained elephants) were brought from the nearby Chandaka-Dampara Wildlife Sanctuary for the operation. In the intervening night of 2<sup>nd</sup> and 3<sup>rd</sup> January 2015, staff was stationed at vantage points all around the enclosure to detect the entry of the Makhna. Communication within the capture team members was maintained through VHF handsets.

On 3<sup>rd</sup> January 2015 about 2:00 a.m. the Makhna again entered the elephant enclosure along the same route it had followed previously. Upon entry, the escape routes were sealed by the capture team and the elephant kept under surveillance. Then the Makhna tried to escape through the same route, but all the exits were guarded and blocked by burning wood and tyres. Then the Makhna stood calmly behind the bushes inside the enclosure. At dawn, he once again tried to flee, but failed. A 5 ml dart was prepared with 4 ml Ilium Xylazil-100 (xylazine HCl 100 mg/



**Figure 1.** Basanti's left pinna showing wrinkles after losing a piece of cartilage.

ml, Troy Laboratories Pty Limited, NSW 2164) and 1 ml of Ketamil-100 (ketamine HCl 100 mg/ml, Troy Laboratories Pty Limited), with 63 mm long collared needle. The doses were determined based on an assessed body weight of 3000 kg and xylazine HCl @ 0.13 mg/kg body weight and ketamine HCl @ 0.03 mg/kg body weight.

Chemical immobilization is commonly used in capture and translocation of elephants. In the present case xylazine HCl and ketamine HCl were successfully used to achieve standing sedation. Xylazine HCl has been used at a dose rate of 0.08 mg/kg to 0.14 mg/kg in sedating elephants due to its excellent analgesic and muscle relaxant properties, high therapeutic index and ability to induce trunk immobilization (Sarma & Pathak 2001; Fowler & Mikota 2006). When used alone, it produces hypothermia and decreased heart rate and cardiac output, followed by hypotension and respiratory depression (Fowler & Mikota 2006). Ketamine HCl on the other hand produces increased respiratory and heart rate, muscular tremors and stiffness of skeletal muscle (Pathak 1991; Fowler & Mikota 2006). Hence, when used in combination, ketamine HCl mitigates the hypotension and respiratory depression property of xylazine HCl (Nath *et al.* 2010) to achieve effective standing sedation. It also reduces the required dose of the individual drugs up to 50% (Nair *et al.* 2009). Xylazine HCl and ketamine HCl mixture has been extensively used in elephants to obtain an effective and balanced sedation where the animal can be coaxed to obey commands and retains the vital functions (Cheeran 2008; Nath *et al.* 2010).

The Makhna was darted employing a Dist-inject™ Model 60N syringe projector using a white cartridge from a distance of about 20 m. The drug was injected deep intramuscularly in the left thigh. As the dart hit, the elephant moved forward about 50 m, then remained standing there. The elephant showed signs of sedation ten minutes post injection, manifested by slowing of tail, trunk and ear movements and partial relaxation of penis. After another ten minutes there was complete protrusion of penis, flaccid trunk and salivation. The rectal temperature was recorded as 36.5°C, respiration

7 breaths/min, and heart rate 40 beats/minute. Rectal temperature was within the normal range (36–37°C). Respiration rate and heart beat, were on the higher side as against the reference value of 4–6 breaths/min and 25–30 bpm respectively (Subramanian 2010), possibly as a result of the excitement during tranquilisation. The elephant was approached from three sides using two Kunkies and a captive female elephant of our zoo. Bedi chains (chains meant for close tying of fore and hind limbs) were tied onto both rear and forelegs. Bedi chains of an 18-year old female elephant of the zoo fitted the Makhna. It was then made to move forward by pushing with Kunkies (Fig. 2) for about 30 m to reach the tethering place in the enclosure where the four legs were tethered separately. After tethering securely, the sedation was reversed using 50 mg of the antidote Reverzine (yohimbine HCl, Bomac Pty Limited, NSW 2077 Australia) intravenously. The elephant was kept tethered until the next morning. He accepted banana stems, *Ficus* branches, other fodder and water provided during the period.

Early morning the next day, the elephant was again sedated with the same drug and dose employing the syringe projector. After standing sedation was achieved, the four limbs were tied separately with thick sling straps and iron chains and then the four straps were gathered together at the top of the elephants back to facilitate hanging in a crane hook. For balancing, a conveyor belt was wrapped under the abdomen of the elephant with the help of thick sling straps. All the straps and chains were united by a safety strap and attached to the crane hook. The elephant was lifted off its



**Figure 2.** Makhna under sedation being guided by the Kunkies to the tethering place.



**Figure 3.** Lifting of the elephant in standing sedation.

feet in a standing position using a crane (Fig. 3) and placed in a truck. The procedure adopted for lifting the elephant was practiced previously by Nath *et al.* (2010) in the case of an aggressive captive male elephant. After placing in the truck, the straps on the four limbs of the elephant were tethered to hooks in the truck so that it could not move during transportation. Then the truck carrying the sedated elephant in standing position proceeded towards core forest area of Chandaka-Dampara Wildlife Sanctuary, about 50 km from the zoo.

After travelling for about 45 min, the elephant was found to be reviving and becoming aggressive. It was immediately re-anesthetized with 300 mg of xylazine HCl and 100 mg of ketamine HCl and transport was resumed. After another one hour of travel, we reached the release location. The four limbs of the elephant were freed from truck. The belts and ropes were fixed again in the crane hook and the sedated elephant was lifted and taken out of the truck using a crane. Five litres of fluid including dextrose normal saline, normal saline (0.45% w/v of NaCl) and Ringer's lactate were administered intravenously into an ear vein to reduce translocation stress and 50 mg of yohimbine HCl was administered to achieve reversal of anaesthesia. Seven minutes post injection, the sedation waned off and the elephant moved away slowly into the forest.

After about one month of its release into the Chandaka-Dampara Wildlife Sanctuary, villagers of Patharagadia, a village on the outskirts of

the sanctuary, reported a Makhna attacking and killing buffaloes. More such reports of buffalo attack by a Makhna were received from other nearby villages also, and forest officials of Chandaka Sanctuary confirmed that it was the same Makhna that was released, as it was of same height and there were no tusk-less males found in the herd of elephants inside the sanctuary.

In April 2015, three months after the release, a portion of the boundary wall of the sanctuary area of Nandankanan was found broken and elephant dung was found near it. Such incidents were repeated at intervals. On 11<sup>th</sup> January 2016, three sub-adult elephants (two males and one female) of 6–7 years age, from the ‘Rearing Centre’ of the Nandankanan Zoo, were moved to the enclosure. All six elephants in the enclosure were tethered in the same shed. On 23<sup>rd</sup> February 2016 morning, the keepers reported that the male tethered opposite Basanti had suffered injuries on the trunk and base of right pinna. The brick wall of the enclosure was also broken, elephant dung was found in the enclosure and there were signs of a fight between the two elephants. However, on searching no additional elephants were found in the sanctuary area. Similar incidences happened on 9<sup>th</sup> May 2016 and 26<sup>th</sup> November 2016 and the same male elephant tethered near Basanti was injured, with injury to pinna, trunk and there was bleeding from the base of the left tusk. It was assumed that the same Makhna was coming time and again to confront the zoo male.

Subsequently in December 2016, the boundary of the elephant enclosure was reinforced with strong iron bars and cross angles. After that, till now the Makhna has not been seen again near the sanctuary or zoo area.

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