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# First extant record of Royal Bengal Tiger (*Panthera tigris*) in Dibang valley of Arunachal Pradesh, India with a note on translocation using Xylazine and ketamine anaesthetics

**Jahan Ahmed, Nupur Buragohain, Ipra Mekola, Sunil Kyarong, Bhaskar Choudhury and Nekibuddin Ahmed**

**Abstract**
This paper represents the first documentation of Bengal tiger and challenges encountered during chemical immobilization and translocation of two Bengal tiger cubs in Dibang Valley district, Arunachal Pradesh, India. Two darts of 2 ml volume each were prepared for both the cubs with chemical immobilization drugs *viz.*, xylazine hydrochloride and ketamine hydrochloride at the dose rate of 1.5 mg/kg body weight (Total dose 50 mg or 0.5 ml) and 5 mg/kg body weight (Total dose 150 mg or 1.5 ml) respectively. The cubs were anaesthetised after 20 and 27 minutes of dart injections respectively. Cubs were carefully shifted to the iron cage. The recovery of the cubs was uneventful. This rescue operation confirmed the distribution of Bengal tiger in the hilly snowfall area of Arunachal Pradesh, India.

**Keywords:** Bengal tiger, first documentation, Arunachal Pradesh, rescue, translocation

## Introduction
The north east India is one of the major biodiversity hotspots of Indian subcontinent. This region is ecologically represented by the eastern Himalayan biome and is rich in a number of endemic flora and fauna. The Bengal tiger (*Panthera tigris*) is most numerous subspecies of Tiger in Asia. Bengal tiger is considered as endangered species due to poaching, loss and fragmentation of habitat based on the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species [1]. Bengal tiger is distributed to Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Mizoram, Orissa, Rajasthan, Tamil Nadu, Uttarakhand, Uttar Pradesh and West Bengal states of India as per the List of Core and Buffer areas of Tiger Reserves in India, notified under the Wildlife Protection Act, 1972, as amended in 2006. In December, 2012, three Bengal tiger cubs were found trapped in an abandoned water tank in Angrim valley, Arunachal Pradesh, India. This paper represents the details about first documentation, successful chemical restraining, rescue and translocation of the Bengal tiger cubs in Dibang Valley district, Arunachal Pradesh, India.

## Materials and Methods
### Geographical location
Three tiger cubs of 4–6 months old were found trapped on 11 December 2012 in an abandoned water tank in Angrim Valley located about 23 km away from the headquarters of Dibang Valley District, Arunachal Pradesh. The GPS location of the place was $28^0$53’ 11’ N and $95^0$58’ 54’ E. The depth, length and breadth of the tank were about 2.4, 3.1 and 1.5 m respectively.

### Observations
Out of the three cubs, one cub was in very bad health condition. It was in lateral position and gasping. We located the place at around 17.30 h on 12 December 2012. Due to bad weather and low visibility, it was decided to start the rescue operation early in the morning on the next day.

**Tranquilization and rescue operation**

Tranquilizing the cubs with Dist-inject N60 rifle was not a viable option so we had to look for an alternative as we didn't have a pneumatic gun. We prepared plastic darts and put in the bamboo after cutting it at the inter-nodal space leaving one inch from the node so as to fit the dart therein. The diameter of the hole inside the bamboo was about the same size as the diameter of the darts. At 5.30 h of December 13, 2012, the persons who were guarding the cubs at night reported that the sick cub was dead at round 2.30 h of December 13, 2012 (Figure 1). A cage measuring 2.4 m in length, 0.61 m in breadth and 0.76 m in height was prepared for transportation. The floor of the cage was made of Galvanized Iron sheet. Wooden planks were put on the floor of the cage and thatch was layered on it to make it comfortable. Also, two stretchers were prepared out of a blanket, cutting it into two equal pieces and fixing the two cut pieces into two bamboo poles with steel wires separately.

The estimated body weight of each cub was around 30 kg. Accordingly, we prepared 2 ml darts separately for each cub with anaesthetics, *viz*., xylazine and ketamine hydrochloride @ 1.5 mg/kg body weight (total dose 50 mg or 0.5 ml) and 5 mg/kg body weight (total dose 150 mg or 1.5 ml), respectively. The darts were fitted to bamboo poles and adhesive tape was applied.

The cubs were sitting in a dorsal recumbent position exposing their buttocks. Slowly, bamboo poles were lowered towards the buttocks. At about 09.15 h, 13 December 2012 we successfully injected the darts into the buttock region of both the cubs.

**Fig 1:** Trapped Bengal tiger cubs in the water tank.

**Results and discussion**

The effect of the drugs on one cub started to show by 09.23 h (8 minutes) and the down time was recorded at 09.35 h (20 minutes). As the other cub was not completely sedated, it was a difficult situation for us to fetch the cub from the water tank, so we used a rope which was put into the right foreleg and pulled up to the half of the tank from where on we took it into our arms, placed it over the stretcher and then put it into the cage. It was a female cub.

The second cub was not sedated so we had no option but to dart it again. A dart of the same dose and anaesthetic was prepared. The cub was successfully tranquilized at 09.40 h and complete sedation was achieved at 09.47 h (27 minutes). The sedated cub was fetched from the tank and carefully carried to the iron cage. Upon examination, it was a male cub of similar age group with the previous cub.

The dart injuries of the cubs were cleaned and sprayed with topical antiseptic spray. Both the Cubs were carefully examined for any external injuries (Figure 2). Both the cubs were then medicated with dexamethasone (Total dose 4.4 mg), long acting antibiotics (enrofloxacin, at the dose rate of 5 mg/kg body weight), chlorpheanarmine maleate (at the dose rate of 1 mg/kg body weight) and multi vitamins (Total dose 3 ml) parentally (Figure 3). The vital parameters of the cubs were found to be normal (Table 1). After 45 minutes of sedation, both the cubs showed palpebral reflex and signs of recovery from the effects of the anaesthetic agents. The cubs were uneventfully recovered from anaesthesia 63 and 68 minutes of sedation respectively (Figure 4).

**Table 1:** Recorded vital parameters of the rescued cubs

| Cubs | Temperature (°C) | Heart rate (beats per minute) | Respiration rate (breaths per minute) |
|---|---|---|---|
| Male cub | 33.8 | 54 | 11 |
| Female cub | 34.7 | 52 | 9 |

The post mortem of the dead cub was carried out at 15.15 hrs of December 13, 2012 under the supervision of District Veterinary Officer, Anini, and Government of Arunachal Pradesh, India and based on necroscopic examination the cause of death was recorded as pneumonia and starvation. The carcass was buried off in Anini, Arunachal Pradesh, India on the same day in presence of Circle Officer, Anini, and Government of Arunachal Pradesh, India. The rescued cubs were successfully translocated to the Mini Zoo, Roing, and Arunachal Pradesh, India.

Initially, there was a doubt that the tiger cubs could have been Indo Chinese subspecies as the landscape was nearer to China border but the genetic study of the blood sample by mitochondrial DNA sequencing confirmed it to be a Bengal Tiger [2]. This rescue has confirmed the distribution of the Bengal Tiger in the hilly snowfall areas of Arunachal Pradesh and this was the first record of the Bengal Tiger in Dibang Valley District, Arunachal Pradesh, India at an altitude of 1,525-2,285 m. Previously, there was speculation of the presence of Bengal Tiger in that area but never documented until we rescued the live tiger cubs and obtained the photographs on 13 December 2012.

Limited information on chemical restraining and immobilization is available in wild felids like Bengal tiger (*Panthera tigris*). Chemical restraining is one of the safest methods of immobilization and rescue of wild felids as it induces less stress, less morbidity and mortality due to trauma induced by dashing against the cages and vigorous struggling [3, 4]. Ketamine is a specific anesthetic for feline species @ 7 mg/kg for tigers [5]. Use of xylazine @1 mg /kg has reduced the dose of ketamine to 2.5 mg/kg and produced suitable results with sufficient duration in the tiger [6]. Xylazine is preferred as an integral agent of immobilization due to its potential sedative and analgesic action with less complication [7]. The demerits of xylazine were recorded as salivation, vomition, arterio-ventricular block, paralytic ileus on repeated administration and arousal to auditory, visual and external stimuli [8, 9]. Xylazine when administered along with ketamine prolonged the plasma half-life of ketamine diminished the hypertonicity and tremors of skeletal muscles induced by ketamine [10]. Whereas, ketamine moderated the bradycardic effect of xylazine by cardiotonic action mediated through sympathetic stimulation and vagolyticaction [11]. Thus xylazine and ketamine acts as a useful and safe combination for chemical immobilization of large felids. In the present case, the immobilization of the Bengal tiger was satisfactory.

**Fig 2:** Monitoring of anaesthetised cubs inside cage.

**Fig 3:** Medication of the rescued tiger cub.

**Fig 4:** Recovered Bengal tiger cubs.

## Conclusion

Xylazine and ketamine combination was frequently used as anaesthesia in wild felids like Bengal tiger for immobilization as well as in rescue operations. This case represents challenges encountered and successful chemical immobilization and rescue of two Bengal tiger cubs in Arunachal Pradesh of India. Moreover, this rescue operation was the first documentation of presence of Bengal tiger and confirmed their distribution in the hilly snowfall area of Arunachal Pradesh, India.

## Competing interests

The authors declare that they have no competing interests.

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