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NOTE

FIRST PHOTOGRAPHIC RECORD OF TIGER PRESENCE AT HIGHER ELEVATIONS OF THE MISHMI HILLS IN THE EASTERN HIMALAYAN BIODIVERSITY HOTSPOT, ARUNACHAL PRADESH, INDIA

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FIRST PHOTOGRAPHIC RECORD OF TIGER PRESENCE AT HIGHER ELEVATIONS OF THE MISHMI HILLS IN THE EASTERN HIMALAYAN BIODIVERSITY HOTSPOT, ARUNACHAL PRADESH, INDIA

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The Tiger *Panthera tigris* is a large and wide-ranging cat that occupies a variety of habitats, where it generally serves as the top predator. The tiger is also a flagship species (Dinerstein et al. 2007), and attention to protecting tiger populations and their habitats in Asian eco-regions has increased over the past few decades. India harbors more than 70% of the total global wild tiger population in five major areas containing habitats ranging from dry to moist deciduous forest, evergreen to mangrove forests, and Terai grasslands to mixed conifer-broadleaf forests (Jhala et al. 2015). Literature suggests that the ranges of the Royal Bengal Tiger *Panthera tigris tigris* and the Northern Indochinese Tiger *Panthera tigris corbetti* may overlap in northeast India and Myanmar (Luo et al. 2004). Limited ecological information exists on tiger ecology from the temperate forests of the Eastern Himalayan Biodiversity Hotspot (Jhala et al. 2011), which is located at the confluence of the Palearctic and

Indo-China realms (Chatterjee et al. 2006). Biological surveys in the region, particularly in Arunachal Pradesh, have been hampered by the rugged and largely inaccessible landscape. Thus faunal diversity has remained poorly surveyed, and large areas remain unstudied.

Study Area: The Dibang Wildlife Sanctuary (DWS) (95°17'–96° 38'E and 28°38'–29°27' N latitudes) located in the Dibang Valley District of Arunachal Pradesh, India covers an area of 4,149km². It partially falls within the Dihang-Dibang Biosphere Reserve, and mostly extends over the Mishmi Hills. The northern and eastern parts of DWS are surrounded by China. The altitude ranges from 1,800–5,000 m, and the area receives an annual rainfall of 2,500mm from occasional rains and the southeast and northeast monsoons. The vegetation is broadly classified as temperate broad-leaved forest dominated by *Michelis* spp., *Quercus* spp., *Coptis teeta* and *Magnolia* spp., temperate conifer forest dominated by *Rhododendron arboretum*, *Taxus baccata* & *Pinus wallichiana*, and alpine forest dominated by *Saussurea* spp., *Sedum* spp. & *Saxifraga* spp.

Camera trapping: A three-year long study was recently carried out in the Dibang Wildlife Sanctuary and the Mishmi Hill range to strengthen the ecological baseline information on tiger, co-predators and prey ecology. As a part of this study, camera traps were laid to monitor wildlife in and outside DWS. To cover maximum area of DWS and its adjoining landscapes, a



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single-sided camera trap was deployed for every 3km² grid for three years (2015–2017). A total of 108 camera traps were deployed in 336km² with 13,761 trap nights inside and outside the protected area.

A total of 42 left sided photographs (Image 1) of tigers were recorded. With further image processing we were able to identify 11 unique individual tigers including two cubs. Two male tigers were captured in the Mishmi Hills at 3,246m on 29 May 2017 (Image 2a) and 14 January 2017 (Image 2b). One of the males (Image 2b) was recaptured at 3,630m on 07 June 2017 (Image 2c) in an area with different vegetation type: the higher elevation is sub-alpine forest comprising mainly of *Abies densa* and dwarf *Rhododendron* spp. While the lower elevation has mixed vegetation dominated by *Rhododendron arboreum*, Bamboo and Pine.

Our study provides photographic evidence for the presence of tiger in the Eastern Himalaya at 3,630m, within the biodiversity hotspot. Tiger tracks have been reported in winter snow in Indian Himalaya at 3,050m (Prater 1980), and pugmarks were reported from Temengor Forest Reserve, Malaysia at 1,700–1,945 m

(Mohamad et al. 2013). In Bhutan, Jigme & Tharchen (2012) found photographic evidence of tigers up to an altitude of 4,200m. This information and our findings indicate that tigers may utilize high altitude habitats close to the tree line, where shrubs and grasses dominate and provide cover for prey and predators alike.

Captain F.M. Bailey of the Indian Army mentioned the occurrence of tigers in the high altitude forests of the Mishmi Hills (Bailey 1912). Aiyadurai (2007, 2014) provided information from the Idu Mishmi tribe that suggested the presence of tigers in Dibang. In December 2012, two tiger cubs were rescued from Angrim Valley of Anini Tehsil, located at 1968m in Dibang Wildlife Sanctuary (CMS ENVIS 2012). Thereafter, a preliminary rapid survey was carried out by the Wildlife Institute of India (WII) in collaboration with National Tiger Conservation Authority (NTCA) and Department of Environment and Forests, Arunachal Pradesh. The survey report (Gopi et al. 2014) mentions about the image of an adult tiger captured at an altitude of 1,765m at the Chelo Pani camp (page 12 and 18), and pugmark and scat evidence of Tiger at 2,065m in the Ange Pani

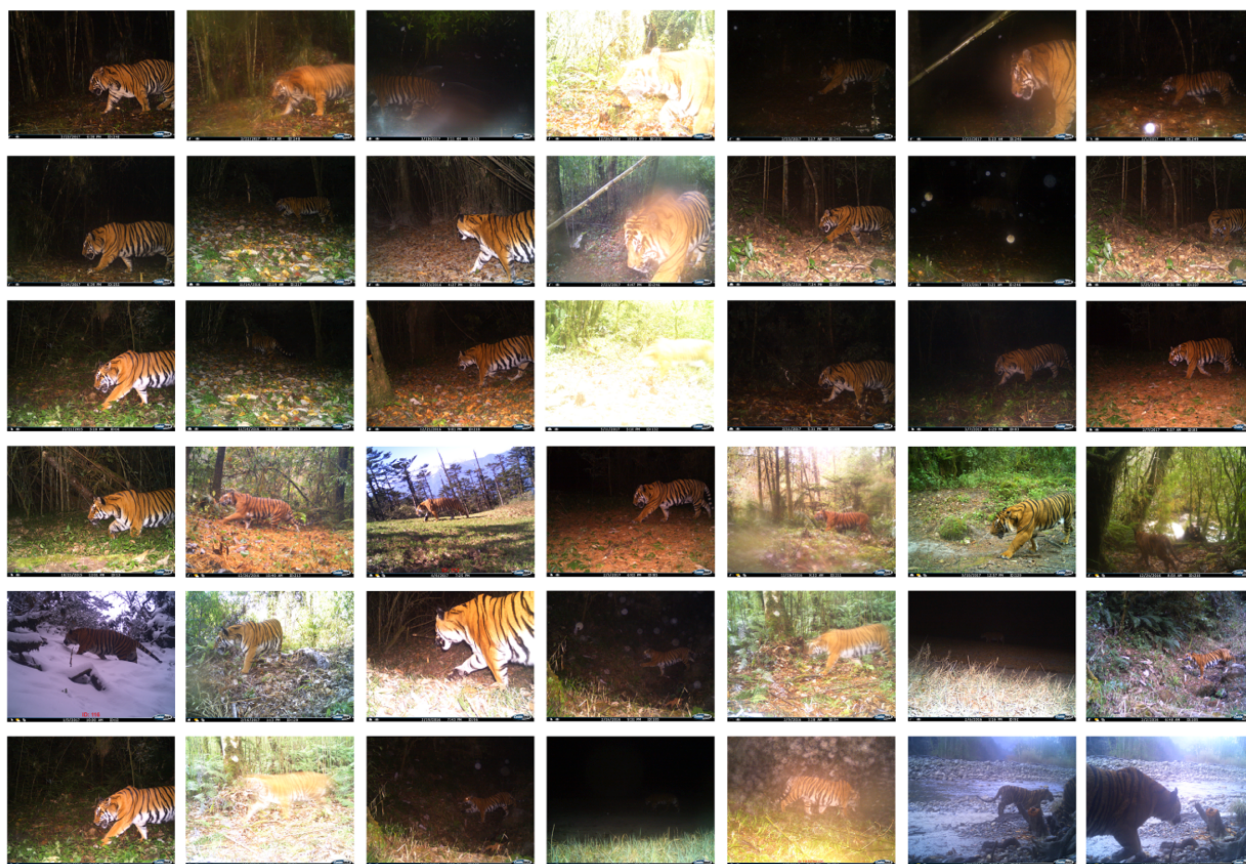


Image 1. Forty-two left sided photographs obtained from 108 camera traps deployed in 336km² with 13,761 trap nights inside and outside Dibang Wildlife Sanctuary, Arunachal Pradesh. Nine adults and two cubs were identified from the images.

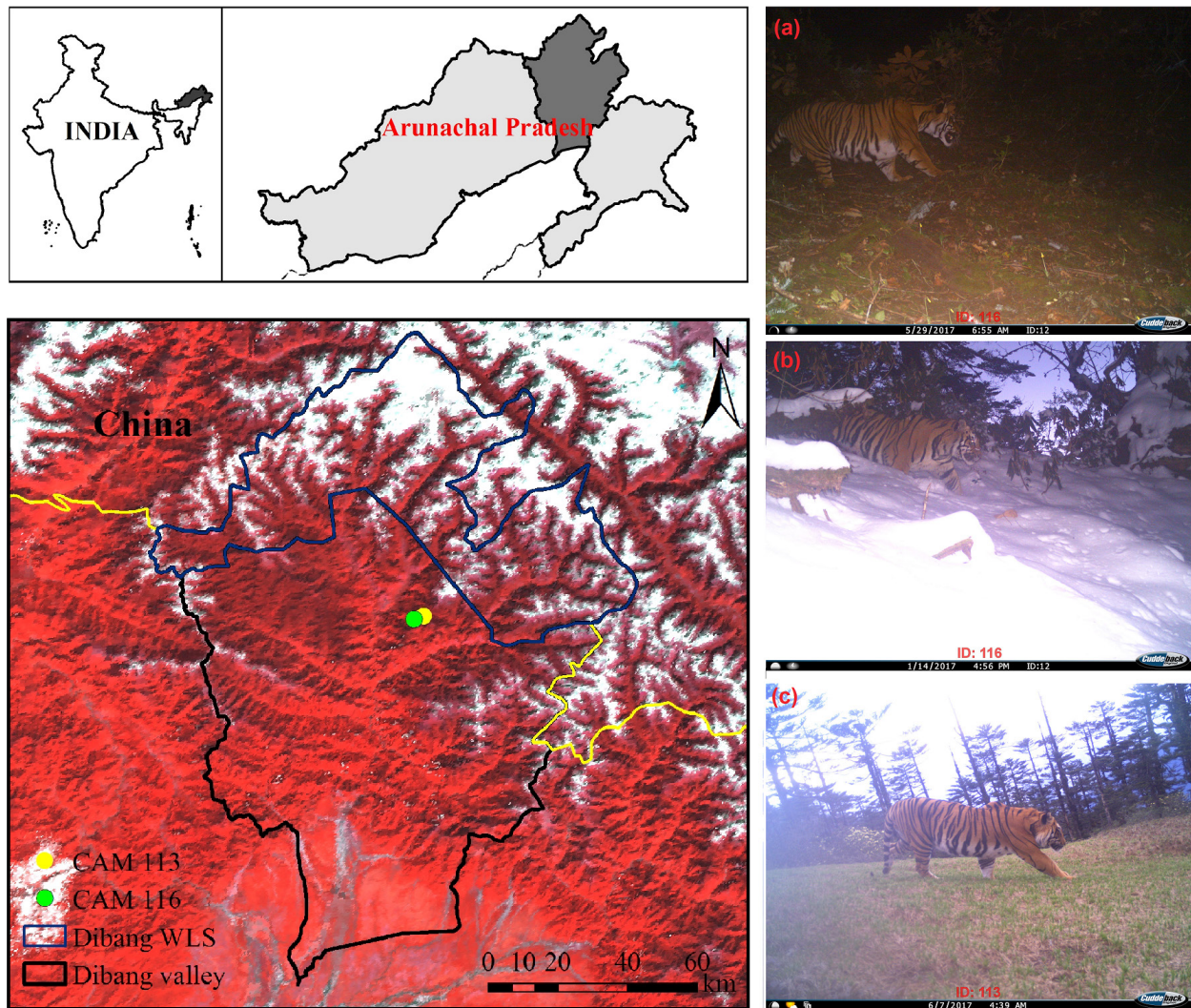


Image 2. Map showing the high altitude location where tigers were photographed; (a & b) Two different individuals captured at 3,246m; Tiger in (b) was recaptured at 3,630m (c).

area (pages 15 and 18). The team concluded that Dibrang Wildlife Sanctuary holds the highest range for the tigers in India.

The all India tiger population estimation in 2006, which used camera traps for the first time, estimated a population of 84–118 tigers in the North Eastern Hills and Brahmaputra plains. The number increased to 118–178 in the 2010 estimate, and Jhala et al. (2011) suggested that these numbers are likely underestimates since the surveys did not systematically cover the entire landscape. In 2014, 201 tigers were reported for the North Eastern Hills and Brahmaputra plains. From Arunachal Pradesh 18 individual tigers were identified, and genetic analysis of scats indicated that five Tigers were from Dibrang DWS (Jhala et al. 2015). After the launch of Project Tiger in 1973, monitoring systems evolved from traditional methods using pugmarks

until camera trapping was introduced in 2006. Project Tiger highlights the conservation issues in a wide array of habitats in India. Knowledge of tiger ecology at higher elevations of the Himalayan region is currently inadequate, but is expected to improve in the future.

The Global Tiger Recovery Plan was initiated in 2010 by the 13 tiger range countries to double the number of wild tigers by 2022, popularly known as “TX2”. Confirmed tiger presence in high altitude montane habitats in the Himalaya presents opportunities and challenges for the conservation of tigers and their habitats. The Mishmi Hill ranges are now documented to have more tigers than other designated tiger reserves in Arunachal Pradesh, including Pakke (9 Tigers), Namdapha (4 Tigers from scat genetic analysis) and Kamlang (not assessed) (Jhala et al. 2015). The immediate priority must be to ensure that the newly-discovered populations are protected

and monitored to identify potential genetic uniqueness. Other promising areas should also be surveyed to identify possible tiger presence. There is an urgent need for monitoring the tiger metapopulation in the northeastern hills range by assessing the functionality of corridors connecting local populations.

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