

# Headlines Himalaya

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For the 647<sup>th</sup> - 648<sup>th</sup> issues of Headlines Himalaya, we reviewed researches from five sources and selected seven researches from four countries. We selected three researches from Nepal and four researches from other Himalayan countries (India, China, and Bhutan).

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## Nepal-Himalaya

### **EQUITABLE SHARING OF BENEFITS FROM TIGER CONSERVATION: BENEFICIARIES' WILLINGNESS TO PAY TO OFFSET THE COSTS OF TIGER CONSERVATION**

Babu Ram Bhattarai, Damian Morgan, and Wendy Wright

*Journal of Environmental Management* 284: 112018

Costs of large predator conservation may not be equitably distributed among stakeholders; these include farming communities, tourism business owners and visitors. Financial redistribution mechanisms based on accrued benefits and costs of conservation require relevant data unavailable in many locations. To address this, a contingent valuation method identified willingness to pay (WTP) among national park visitors and connected tourism business owners. Both groups derive benefit from government-funded conservation policies. The study was conducted in Bardia and Chitwan National Parks, Nepal 2017–2018; two locations world-renowned for tiger conservation. Local and international park visitors (N = 387) provided WTP for ongoing conservation via additional park entry fees. Tourism business owners (TBOs; N = 74) proximate to the parks stated their WTP for compensation funding provided directly to farmers. The majority (65%) of park visitors were willing to pay extra to support conservation (sample mean US\$ 20) while 85 percent of TBOs supported their payment of funds for compensating farming communities (sample mean annual contribution being US\$ 156). Valid WTP regression modelling found that visitor WTP was predicted by international travel costs and environmental organization affiliation. For TBOs indicating WTP, the amount to pay was predicted by annual net income from the tourism business. Application of study data indicates US\$ 25 average increase to visitor park fees would maximise revenue and contribute a further US\$ 495,000 available for conservation activities. Similarly, a flat-rate tariff on TBOs at the mean WTP amount would contribute more than double the annual budget available for farmer compensation (providing approximately US\$ 43,000). More generally, the study findings are informative for policy-makers seeking equitable conservation outcomes while maintaining viable populations of critically endangered wild tigers. They should however be interpreted with caution given limitations of the sampling frame and method of data elicitation. Regardless, any policy decision effects require careful scrutiny to ensure desired outcomes are realized.

For further reading: <https://doi.org/10.1016/j.jenvman.2021.112018>

#### **CHARACTERIZING CHANGES IN LAND COVER AND FOREST FRAGMENTATION FROM MULTITEMPORAL LANDSAT OBSERVATIONS (1993-2018) IN THE DHORPATAN HUNTING RESERVE, NEPAL**

Yali Zhang, Sandeep Sharma, Manjit Bista, and Mingshi Li

*Journal of Forestry Research* 2021: 1-12

Natural forces and anthropogenic activities greatly alter land cover, deteriorate or alleviate forest fragmentation and affect biodiversity. Thus land cover and forest fragmentation dynamics have become a focus of concern for natural resource management agencies and biodiversity conservation communities. However, there are few land cover datasets and forest fragmentation information available for the Dhorpatan Hunting Reserve (DHR) of Nepal to develop targeted biodiversity conservation plans. In this study, these gaps were filled by characterizing land cover and forest fragmentation trends in the DHR. Using five Landsat images between 1993 and 2018, a support vector machine algorithm was applied to classify six land cover classes: forest, grasslands, barren lands, agricultural and built-up areas, water bodies, and snow and glaciers. Subsequently, two landscape process models and four landscape metrics were used to depict the forest fragmentation situations. Results showed that forest cover increased from 39.4% in 1993 to 39.8% in 2018. Conversely, grasslands decreased from 38.2% in 1993 to 36.9% in 2018. The forest shrinkage was responsible for forest loss during the period, suggesting that the loss of forest cover reduced the connectivity between forest and non-forested areas. Expansion was the dominant component of the forest restoration process, implying that it avoided the occurrence of isolated forests. The maximum value of edge density and perimeter area fractal dimension metrics and the minimum value of aggregation index were observed in 2011, revealing that forests in this year were most fragmented. These specific observations from the current analysis can help local authorities and local communities, who are highly dependent on forest resources, to better develop local forest management and biodiversity conservation plans.

For further reading: <https://doi.org/10.1007/s11676-021-01325-9>

### **DISTRIBUTION AND HABITAT ATTRIBUTES ASSOCIATED WITH THE HIMALAYAN RED PANDA IN THE WESTERNMOST DISTRIBUTION RANGE**

Saroj Shrestha, Arjun Thapa, Damber Bista, Natasha Robinson, Ang Phuri Sherpa, Krishna Prasad Acharya, Shant, Raj Jnawali, Sonam Tashi Lama, and Sony Lama

*Ecology and Evolution* 11: 4023-4034

The Himalayan red panda (*Ailurus fulgens*), a recently confirmed distinct species in the red panda genus, is distributed in Nepal, India, Bhutan, and south Tibet. Nepal represents the westernmost distribution of the Himalayan red panda. This study aims to determine important habitat features influencing the distribution of red panda and recommend possible habitat corridors. This manuscript described current potential habitat of 3,222 km<sup>2</sup> with the relative abundance of 3.34 signs/km in Nepal. Aspect, canopy cover, bamboo cover, and distance to water were the important habitat attributes. It suggested five potential corridors in western Nepal. Overall, the study has important implications for conservation of the Himalayan red panda in western distribution range.

Further reading: <https://doi.org/10.1002/ece3.7297>

## **India-Himalaya**

### **SEROPREVALENCE AND RISK FACTORS OF BRUCELLA INFECTION IN DAIRY ANIMALS IN URBAN AND RURAL AREAS OF BIHAR AND ASSAM, INDIA**

Ram Pratim Deka, Rajeswari Shome, Ian Dohoo, Ulf Magnusson, Delia Grace Randolph, and Johanna F. Lindahl

*Microorganisms* 9: 783

This study assessed seropositivity of Brucella infection in dairy animals and risk factors associated with it. The cross-sectional study used multi-stage, random sampling in the states of Bihar and Assam in India. In total, 740 dairy animals belonging to 534 households of 52 villages were covered under this study. Serological testing was conducted by indirect enzyme-linked immunosorbent assay (iELISA). Animal-level Brucella seropositivity was found to be 15.9% in Assam and 0.3% in Bihar. Seropositivity in urban areas (18.7%) of Assam was found to be higher than in rural areas (12.4%). Bihar was excluded from the risk factor analysis, as only one Brucella seropositive sample was detected in the state. A total of 30 variables were studied for assessing risk factors, of which 15 were selected for multivariable regression analyses following a systematic process. Finally, only three risk factors were identified as statistically significant. It was found that animals belonging to districts having smaller-sized herds were less likely ( $p < 0.001$ ) to be Brucella seropositive than animals belonging to districts having larger-sized herds. Furthermore, the chance of being Brucella seropositive increased ( $p = 0.007$ ) with the increase in age of dairy animals, but decreased ( $p = 0.072$ ) with the adoption of artificial insemination (AI) for breeding. We speculated that the identified risk factors in Assam likely explained the reason behind lower Brucella seropositivity in Bihar, and therefore any future brucellosis control program should focus on addressing these risk factors.

Further reading: <https://doi.org/10.3390/microorganisms9040783>

## **China Himalaya**

## CAMERA-TRAP SURVEYS REVEAL HIGH DIVERSITY OF MAMMALS AND PHEASANTS IN MEDOG, TIBET

Xueyou Li, William V. Bleisch, Xinwu Liu, and Xuelong Jiang

*Oryx* 55: 177-180

Medog County lies within the Eastern Himalaya biodiversity hotspot, but biodiversity in the region remains largely unexplored as there was no permanent road access until 2014. Here we present data from camera-trap surveys in five areas of Medog County, to ascertain the occurrence and occupancy of threatened wildlife species. With a total survey effort of 4,570 trap days we detected 23 medium and large terrestrial mammal species and six pheasant species, 13 of which are categorized as Endangered, Vulnerable or Near Threatened in the IUCN Red List and 19 of which are categorized as regionally threatened on the China Species Red List. Carnivora was the most diverse order, with 15 species recorded. Our study produced the first camera-trap photographic evidence of the Bengal tiger *Panthera tigris tigris* in China. In addition, we detected the dhole *Cuon alpinus*, golden cat *Catopuma temminckii*, marbled cat *Pardofelis marmorata* and mainland clouded leopard *Neofelis nebulosa*, highlighting the conservation value of the region. The occupancy of muntjac *Muntiacus spp.* was high (52.7%), indicating prey for large carnivores was abundant. People, livestock and domestic dogs were also recorded frequently, suggesting the fauna are potentially threatened by human disturbance. In the light of recent development in the region, conservation efforts are urgently required, to prevent prey depletion and habitat degradation in this priority region for conservation.

Further reading: <https://doi.org/10.1017/S0030605319001467>

## SPATIAL PATTERN AND DRIVING FACTORS OF MIGRANTS ON THE QINGHAI-TIBET PLATEAU: INSIGHTS FROM SHORT-DISTANCE AND LONG-DISTANCE POPULATION MIGRANTS

Wei Qi and Jiawei Yi

*Journal of Geographical Sciences* 31: 215-230

As one of the most ecologically sensitive issues in the world, migration now plays an important role in population growth on the Qinghai-Tibet Plateau. To promote sustainable development in the world's third pole, it is necessary to investigate population migration on the Plateau. Using 2010 census data, a spatial database of county-level migrants on the Plateau was constructed, and migrants were divided into short-distance and long-distance migrants according to the *hukou*-registered origins. Measuring migration intensity allowed the spatial pattern of population migration on the Plateau to be ascertained. The driving factors were identified using spatial regression models, and the main conclusions are as follows: (1) In 2010, there were 1.23 million inter-county migrants on the Qinghai-Tibet Plateau, and the overall migration intensity reached 10.50%. There existed significant spatial differences in population migration intensity on the Plateau at that time, and the provincial or prefectural capitals were attractive destinations for migrants. Northwestern Qinghai, which boasted mining industries, constituted a significant spatial cluster with a relatively high migration intensity. However, most areas on the Plateau attracted relatively few migrants, especially in western and northern parts of Tibet, which were sparsely populated and uninhabitable. (2) There were 0.95 million short-distance migrants and 0.28 million long-distance migrants. The short-distance migration intensity was 8.14%, while the long-distance migration intensity was only 2.36%. Short-distance migration was the main form of population migration, with a pattern similar to the layout of overall population migration intensity. Only a few county-level units strongly attracted long-distance migrants, which were

mostly distributed in northwestern Qinghai. (3) Economic factors were considered fundamental drivers for migrants to live on the Plateau. Destinations with high levels of economic development and more opportunities in non-agricultural jobs proved more attractive for migrants. For short-distance migrants, urbanization level also proved a considerable driving factor for in-migration. However, long-distance migrants were mainly affected by the job chances of the secondary industry on the Qinghai-Tibet Plateau.

Further reading: <https://doi.org/10.1007/s11442-021-1843-y>

## Bhutan-Himalaya

### CEREBRAL CYSTICERCOSIS IN A WILD BENGAL TIGER (*PANTHERA TIGRIS TIGRIS*) IN BHUTAN: A FIRST REPORT IN NON-DOMESTIC FELIDS

Yoenten Phuentshok, Kinley Choden, Cristian A. Alvarez Rojas, Peter Deplazes, Sonam Wangdi, Kuenzang Gyeltshen, Karma Rinzin, Nirmal Kumar Thapa, Tenzinla Tenzinla, Dechen Dorjee, Marc Valitutto, Martin Gilbert, Boripat Siriaroonrat, Waleemas Jairak, Chutchai Piewbang, Puspa Maya Sharma, Tshewang Dema, and Ratna Bahadur Gurung

*International Journal for Parasitology: Parasites and Wildlife* 14: 150-156

The endangered Bengal tiger (*Panthera tigris tigris*) is a keystone species playing an essential role in ecology as well as in the social and spiritual lives of the Himalayan people. The latest estimate of the Bengal tiger population in Bhutan accounts for 103 individuals. Infectious organisms, including zoonotic parasites causing high burden in human health, have received little attention as a cause of mortality in tigers. Taeniosis/cysticercosis, caused by the cestode *Taenia solium*, is considered one of the major neglected tropical diseases in Southeast Asia. We present here a case of neurocysticercosis in a Bengal tiger showing advanced neurological disease outside Thimphu, the capital city of Bhutan. After palliative care, the animal died, and necropsy revealed multiple small cysts in the brain. Here we show the presence of two genetic variants of *T. solium* in the parasite material collected based on PCR and sequencing of the complete *cox1* and *cytB* genes. The sequences form a discrete branch within the Asia plus Madagascar cluster of the parasite. On other hand, tests for feline morbillivirus, feline calicivirus, canine distemper virus, Nipah, rabies, Japanese encephalitis, feline leukaemia and feline immunodeficiency virus were negative. In contrast, PCR for feline herpesvirus was positive and a latex agglutination test revealed an elevated antibody titer against *Toxoplasma gondii* (titer 1:256). The molecular examination of taeniid eggs isolated from the tiger faeces produced sequences for which the highest homology in GenBank is between 92% and 94% with *T. regis* and *T. hydatigena*. This fatal case of *T. solium* neurocysticercosis, a disease previously unrecorded in tigers or other non-domestic felids, demonstrates an anthropogenically driven transmission of a deadly pathogen which could become a serious threat to the tiger population.

Further reading: <https://doi.org/10.1016/j.ijppaw.2021.02.003>

## Highlight of the Issue

### COVID-19 variant hits India hard

The second wave of COVID-19 with Indian variant (B.1.617) erupted in February 2021, flooding patients in hospitals, dead bodies in crematories and morgues. Death toll due to COVID-19 crossed 250,000 in India since the

beginning of pandemic in early 2020. Most of the hospitals lacked beds, medicines and oxygen supply, and ICU for the infected people. Since funeral sites were packed and expensive, relatives were compelled to discard the dead bodies in holy river Ganges. India accounts for half of COVID-19 cases and 30% of deaths worldwide in the first week of April, 2021. It is believed that rise of COVID-19 cases in India was due to crowded events organized including election, Holi and *Kumbh* festival in March.

Further reading:

<https://www.reuters.com/world/india/indias-covid-deaths-cross-quarter-million-mark-no-sign-peak-2021-05-12/>

<https://www.scmp.com/news/asia/south-asia/article/3133641/bodies-found-indias-ganges-river-are-coronavirus-victims>

<https://www.aljazeera.com/features/2021/4/25/why-does-india-have-so-many-covid-cases>