

Headlines Himalaya

March 1-15 (2023)

No. 737–738

Editorial Team: Dipa Rai and Manisha Sherpa

For the 737th-738th issues of Headlines Himalaya, we reviewed research papers from six sources and selected 9 research papers from four countries. We selected three papers from Nepal and six from other Himalayan Countries (India, China and Pakistan).

Headlines Himalaya, a weekly research-based fact file is an attempt to keep our global readers abreast with the happenings in the Himalaya. Please share it with your colleagues and friends. Also, subscription is free. Enjoy!

NEPAL *FACTOR INFLUENCING THE HABITAT OF MUGGER CROCODILE (CROCODYLUS PALUSTRIS) AND ITS CONSERVATION THREATS IN THE RAPTI RIVER OF CHITWAN NATIONAL PARK, NEPAL*

A REVIEW ON ANALYTICAL PERFORMANCE OF MICRO- AND NANOPLASTICS ANALYSIS METHODS A REVIEW ON ANALYTICAL PERFORMANCE OF MICRO- AND NANOPLASTICS ANALYSIS METHODS

SEROPREVALENCE OF CANINE DISTEMPER VIRUS (CDV) IN THE FREE-ROAMING DOG (CANIS FAMILIARIS) POPULATION SURROUNDING CHITWAN NATIONAL PARK, NEPAL

INDIA *WILDLIFE HABITAT MAPPING USING SENTINEL-2 IMAGERY OF MEHAO WILDLIFE SANCTURAY, ARNUACHAL PRADESH, INDIA*

SEASONAL DIVERSITY AND DIETARY GUILD STRUCTURE OF BIRDS IN TWO VINDHYAN GORGE FOREST OF RAJISTAN, INDIA

DIFFERENTIAL KLEPTOPARASITIC INTERACTIONS OF HIMALAYAN VULTURE GYPS HIMALAYENSIS WITH CONSPECIFICS AND HETEROSPECIFICS DURING VARIOUS STAGE OF BREEDING

CHINA *UPGRADING PROTECTED AREAS CAN IMPROVE OR REVERSE THE DECLINE IN CONSERVATION EFFECTIVENESS: EVIDENCE FROM THE TIBETAN PLATEAU, CHINA*

THE FIRST DNA BARCODE LIBRARY OF CHIRONOMIDAE FROM THE TIBETAN PLATEAU WITH EVALUATION OF THE STATUS OF THE PUBLIC DATABASES

PAKISTAN *EFFECTS OF RIPARIAN BUFFER AND STREAM CHANNEL WIDTHS ON ECOLOGICAL INDICATORS IN THE UPPER AND LOWER INDUS RIVER BASINS IN PAKISTAN*

FACTOR INFLUENCING THE HABITAT OF MUGGER CROCODILE (CROCODYLUS PALUSTRIS) AND ITS CONSERVATION THREATS IN THE RAPTI RIVER OF CHITWAN NATIONAL PARK, NEPAL

Nishan K.C., Bijaya Neupane, Bibek Belbase, Bijaya Dhami, Bhuwan Singh Bist, Chitra Rekha Basyal, and Santosh Bhattarai

Global Ecology and Conservation 42: e02406

Mugger crocodiles (hereafter called muggers) are the apex predator and keystone species in slow flowing freshwater ecosystem. They play an important role in its functioning by distributing nutrients and increasing primary productivity. Muggers have a sympatric distribution with gharials in the Rapti and Narayani River of Chitwan National Park, but more research and conservation attention has been focused on gharials in Nepal. The inadequate availability of information on the occupied habitats of muggers restrict their evidence-based conservation and management. Therefore, we investigated the ecological factors affecting the habitat selection of muggers and its conservation threats in the Rapti River. We conducted a preliminary survey, followed by a detailed habitat survey, conducted in February and March 2022. During the detailed habitat survey, the pre-defined habitat characteristics were recorded at each station spaced at 500 m intervals along the river as well as the locations where muggers were sighted. We used a generalized linear model (glm) under the binomial family with a logit link function to analyze the factors influencing the habitat selection of muggers. The dependent variable was the presence or absence of muggers at sampling points and the independent variables included: river bank aspect, river width, mid-river depth, river bank substrate type, river bank slope, water current, invasive alien plant species, and anthropogenic disturbances. In addition, a relative whole-site ranking method was employed to determine the most prevalent threats to the mugger. During the survey period, we recorded a total of 46 mugger individuals, 74% were observed basking and 26% were observed submerged in the river. The highest percentage of muggers (39.1%) was observed on the sandy river bank, followed by the grass and forest bank (19.5%), and clay and sandy bank (15.1%), respectively. Only the river banks with moderate (15–25°) and moderately steep (25–35°) slopes were found to be the significant factors influencing the occurrence of muggers. Fishing and extraction of river materials, and disposal of garbage and solid waste were ranked as the most prevalent conservation threats. For the long-term conservation of muggers in the Rapti River, effective habitat management plans and strategies are required to control illegal anthropogenic activities such as fishing, sand mining, and boulder quarrying. Research on spatio-temporal partitioning between mugger and gharials is recommended to understand how resources are shared by the species.

For further reading: <https://doi.org/10.1016/j.gecco.2023.e02406>

A REVIEW ON ANALYTICAL PERFORMANCE OF MICRO- AND NANOPLASTICS ANALYSIS METHODS

Bishan Man Thaiba, Thakur Sedai, Smriti Bastakoti, Asmita Karki, Anuradha K.C., Gaurav Khadka, Shishir Acharya, Baburam Kandel, Basant Giri, and Bhanu Bhakta Neupane

Arabian Journal of Chemistry 16: 104686

Micro- and nanoplastics have been detected in diverse matrices. Recent studies have suggested their health impact on humans, animals, plants, and environment which depends on the size, concentration, chemical nature, and the mode of interaction of the plastic particles. Detection and quantification of these particles are often challenging due to their small size and complexity of the matrix in which they exist. The concentration and size of

the particles combined with the nature of the matrix determines an analytical method to be followed. In recent years, many review articles focusing on origin, fate, and health effects of micro- and nanoplastics are already published. A systemic review focusing on analytical performance of currently available micro- and nanoplastics analysis methods would be useful for the scientific community. In this article, we reviewed papers and reports published in recent decades focusing on the sampling, concentration, detection, and chemical identification methods. We also reviewed the emerging new methods for micro plastic analysis. Finally, we provide advantages and limitations of the methods and future perspectives on micro plastic analysis.

For further reading: <https://doi.org/10.1016/j.arabjc.2023.104686>

SEROPREVALENCE OF CANINE DISTEMPER VIRUS (CDV) IN THE FREE-ROAMING DOG (CANIS FAMILIARIS) POPULATION SURROUNDING CHITWAN NATIONAL PARK, NEPAL

Inga McDermott, Martin Gilbert, Manoj Kumar Shah, Amir Sadaula, and Neil E. Anderson

PLoS ONE 18: e0281542

Canine distemper virus (CDV) is a global multi-host pathogen that is capable of causing considerable mortality in a range of species and is important in the field of conservation medicine. Nepal's Chitwan National Park is a protected area providing habitat for 32% of the country's mammal species including endangered carnivores such as the Bengal tiger (*Panthera tigris tigris*) that are susceptible to CDV. The presence of free-roaming dogs around protected areas could represent a source of infectious disease for transmission to local wildlife. A cross-sectional demographic and canine distemper virus seroprevalence study of 100 free-roaming dogs from the Chitwan National Park buffer zone and surrounding area was conducted in November 2019. The overall seroprevalence indicating past exposure to canine distemper virus was 80.0% (95% CI: 70.8–87.3). Of the host variables assessed, sex and age were positively associated with seroprevalence at the univariable level, with male dogs demonstrating lower seroprevalence than females (OR = 0.32, 95% CI: 0.11–0.91) and adult dogs demonstrating higher seroprevalence than juveniles (OR = 13.94, 95% CI: 1.37–142.29). The effect of sex was no longer significant at the multivariable level, but the direction of the effect remained the same. The effect of age remained significant after multivariable analysis (OR = 9.00, 95% CI: 1.03–192.75). No spatial associations were demonstrated in relation to the buffer zone area or boundary of Chitwan National Park. Free-roaming dog neutering and vaccination programmes can provide a useful baseline for future CDV studies in the region, and a proxy to monitor disease threats to susceptible wildlife.

For further reading: <https://doi.org/10.1371/journal.pone.0281542>

India-Himalaya

WILDLIFE HABITAT MAPPING USING SENTINEL-2 IMAGERY OF MEHAO WILDLIFE SANCTURAY, ARNUACHAL PRADESH, INDIA

Arif Ahmad, Rajapandian Kanagaraj, and Govindan Veeraswami Gopi

Heliyon 9: e13799

Mehao Wildlife Sanctuary, situated in the state of Arunachal Pradesh, is part of an important biodiversity hotspot in the north-eastern part of India in the Himalayas. The current study deals with the identification of important wildlife habitats in the sanctuary. We used a supervised classification technique to delineate these habitats in the

sanctuary, which are used by several mammals and bird species encountered during camera trap and sign surveys conducted between November 2017 and May 2020. Satellite images from Sentinel – 2A were used to classify the land use land cover (LULC) of the sanctuary. The LULC information was generated by using a maximum likelihood classifier. We classified a total of thirteen LULC classes, i.e., water, built-up, agriculture, orchard, grassland, bamboo forest, bamboo-mixed forest, riverbed, barren land, snow, wild banana, riverine forest and mixed forest. LULC classification reveals a high percentage of mixed forest, about 69.9%, followed by wild bananas at 7.2%. The commission and omission error rates, however, are high for riverbed and agriculture (0.5) and bamboo forest (0.5), respectively. The accuracy assessment showed an overall classification accuracy of 88.5% with a Kappa coefficient of 0.87. The abundance of mammals was high in the mixed forest, but Ivlev's electivity index shows that species generally avoided this habitat and preferred specialized forest habitats, such as bamboo forest, bamboo-mixed forest, grassland, riverbed and riverine forest. Our LULC map will provide a baseline for potential planning and monitoring changes of wildlife habitats in Mehao WLS.

For further reading : <https://doi.org/10.1016/j.heliyon.2023.e13799>

SEASONAL DIVERSITY AND DIETARY GUILD STRUCTURE OF BIRDS IN TWO VINDHYAN GORGE FOREST OF RAJISTAN, INDIA

Ashvini Kumar Joshi

Journal of Threatened Taxa 15: 22597-22605

Habitat is the key factor of biodiversity conservation. In Vindhyan mountain range of India, there are many perennial and seasonal rivers which create deep gorges in their course of flow. Two Vindhyan gorges—Tahla and Chainpuriya—were studied to know their potential as bird habitat from July 2016 to June 2018 using line transect method during three season survey basis. The Tahla gorge had 74 bird species of 35 families (67 resident and 7 migratory). The Chainpuriya gorge had 60 bird species belonged to 31 families (53 resident and 7 migratory). Highest bird diversity (HT = 3.55, HCh = 3.29) and richness (dT = 9.63, dCh = 8.28) was found in summer and the least diversity (HT = 3.40, HCh = 3.19) and richness (dT = 7.95, dCh = 7.49) was found in monsoon. Birds of family Muscipidae had highest relative diversity (T = 9.45, Ch = 13.33) in both the gorges. Insectivorous guild was most abundant followed by omnivorous, carnivorous, granivorous, frugivorous, and nectarivorous guilds. Wide range of habitats, variety of food, life resources, and undisturbed self-sustained ecosystem were important key factors for the rich diversity of birds in the gorges.

For further reading : <https://doi.org/10.11609/jott.7103.15.2.22597-22605>

DIFFERENTIAL KLEPTOPARASITIC INTERACTIONS OF HIMALAYAN VULTURE *GYPS HIMALAYENSIS* WITH CONSPECIFICS AND HETEROSPECIFICS DURING VARIOUS STAGE OF BREEDING

Hameem Mushtaq Wani

Journal of Threatened Taxa 15: 22606-22610

Reports of kleptoparasitic events involving *Gyps himalayensis* (Himalayan Vulture) are limited. In this article we document intraspecific and interspecific kleptoparasitic interactions at nesting sites, and analyse factors influencing this behaviour. The study was carried out at Hirpora Wildlife Sanctuary of Kashmir Himalaya, at an elevation of about 2,546 m. We observed 61 instances of food theft involving conspecifics (n = 12) and heterospecifics (n = 49). The highest number of incidents were observed during the chick rearing period (n=40),

followed by incubation (n = 10) and pre-laying periods (n = 5). We observed the highest number of attacks at nesting sites (n = 30) and the lowest in flight (n = 9).

For further reading : <https://doi.org/10.11609/jott.8172.15.2.22606-22610>

China-Himalaya

UPGRADING PROTECTED AREAS CAN IMPROVE OR REVERSE THE DECLINE IN CONSERVATION EFFECTIVENESS: EVIDENCE FROM THE TIBETAN PLATEAU, CHINA

Ting Hua, Wenwu Zhao, Francesco Cherubini, Xiangping Hu, and Paulo Pereira

Science of the Total Environment 873: 162345

Protected areas (PAs) are considered essential for maintaining biodiversity. Several governments would like to strengthen the management levels of their PAs (as shorthand for a hierarchy in PA administrative governance) to consolidate their conservation effectiveness. This upgrade (e.g., from provincial- to national-level PAs) means stricter protection and increased funds for PA management. However, confirming whether such an upgrade can produce the expected positive outcomes is key given limited conservation funds. Here, we used the Propensity Score Matching (PSM) method to quantify the impacts of upgrading PAs (i.e., from provincial to national) on vegetation growth on the Tibetan Plateau (TP). We found that the impacts of PA's upgrading can be divided into two impact types: 1) curbed or reversed declines in conservation effectiveness and 2) rapidly increased conservation effectiveness before the upgrade. These results indicate that the PA's upgrading process (including the pre-upgrade operations) can improve PA effectiveness. Nevertheless, the gains did not always occur after the official upgrade. This study demonstrated that in comparison to other PAs, those with more resources or stronger management policies were more effective.

For further reading: <http://dx.doi.org/10.1016/j.scitotenv.2023.162345>

THE FIRST DNA BARCODE LIBRARY OF CHIRONOMIDAE FROM THE TIBETAN PLATEAU WITH EVALUATION OF THE STATUS OF THE PUBLIC DATABASES

Wu Han, Hongqu Tang, Lili Wei, and Enlou Zhang

Ecology and evolution 13: e9849

The main aim of this study was to curate a COI barcode library of Chironomidae from the Tibetan Plateau (TP) as an essential supplement to the public database. Another aim is to evaluate the current status of the public database of Chironomidae in aspects of taxonomic coverage, geographic representation, barcode quality, and efficiency for molecular identification, the Tibetan Plateau, China. In this study, 512 individuals of Chironomidae from the TP were identified based on morphological taxonomy and barcode analysis. The metadata of public records of Chironomidae were downloaded from the BOLD, and the quality of the public barcodes was ranked using the BAGS program. The reliability of the public library for molecular identification was evaluated with the newly curated library using the BLAST method. The newly curated library comprised 159 barcode species of 54 genera, of which 58.4% of species were likely new to science. There were great gaps in the taxonomic coverage and geographic representation in the public database, and only 29.18% of barcodes were identified at the species level. The quality of the public database was of concern, with only 20% of species being determined as concordant between BINs and morphological species. The accuracy of molecular identification using the public database was

poor, and about 50% of matched barcodes could be correctly identified at the species level at the identity threshold of 97%. Based on these data, some recommendations are included here for improving barcoding studies on Chironomidae. The species richness of Chironomidae from the TP is much higher than ever recorded. Barcodes from more taxonomic groups and geographic regions are urgently needed to fill the great gap in the current public database of Chironomidae. Users should take caution when public databases are adopted as reference libraries for the taxonomic assignment.

For further reading: <https://doi.org/10.1002/ece3.9849>

Pakistan-Himalaya

EFFECTS OF RIPARIAN BUFFER AND STREAM CHANNEL WIDTHS ON ECOLOGICAL INDICATORS IN THE UPPER AND LOWER INDUS RIVER BASINS IN PAKISTAN

Amin Hira, Muhammad Arif, Nowsherwan Zarif, Zarmina Gul, Liu Xiangyue and Cao Yukun

Frontiers Environmental Science 11: 1113482

Riparian buffers and stream channel widths along river networks have extremely significant ecological influences on parameters and stressors associated with riparian health indicators (RHIs). It is imperative for countries that rely heavily on rivers for irrigation to protect RHIs such as habitat, plant cover, regeneration, exotics, and erosion. It is unclear which protection methods are most effective for RHIs in less developed countries, such as Pakistan. This study fills this gap by using a quick field-based technique that includes 273 transects and examines the response of RHIs in the upper and lower Indus River basins (IRB). In the lower Indus basin (LIB), riparian buffer and stream channel widths had the most considerable influence on RHIs using Pearson's correlations, ranging from $-0.47 < r < 0.71$ and $-0.41 < r < 0.32$, respectively. There was a significant relationship between stressors and RHIs in the LIB when these widths were changed, and stressors had a significant influence on habitat $-0.37 < r < 0.41$, plant cover $-0.32 < r < 0.38$, regeneration $-0.29 < r < 0.25$, erosion $-0.34 < r < 0.49$, and exotics $-0.39 < r < 0.24$. In contrast, these stressors in the upper Indus basin (UIB) also adversely affected habitat $-0.28 < r < 0.27$, plant cover $-0.34 < r < 0.26$, regeneration $-0.19 < r < 0.26$, erosion $-0.38 < r < 0.23$, and exotics $-0.31 < r < 0.30$. It was found from the principal component analysis that the responses of RHIs and stressors varied considerably between the UIB and LIB. Additionally, the agglomerative hierarchical cluster analysis of the RHIs and stressor indices revealed dissimilarities in the UIB and LIB. This study supports the need to examine riparian regions along long rivers, which are subject to the same administrative strategies. Large river ecosystems need revised standards to prevent further degradation based on ecological indicators.

For further reading: <https://doi.org/10.3389/fenvs.2023.1113482>

Highlight of the Issue

Celebrating World Wildlife Day

Our planet is home to thousands of mesmerizing wildlife, ranging from tiny insects to massive blue whale. They are an essential component of human existence because they provide different ecosystem services. In recognition of the importance of wildlife, the United Nations started to celebrate the World Wildlife Day annually on March 3 since 2013. This day was chosen in honor of the establishment of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which was signed for the first time on March 3, 1973. On March 3, 2023

CITES completed 50 years of its establishment. Every year World Wildlife Day is celebrated under a different theme. The theme for 2023 was “Partnership for Wildlife Conservation”. Different organizations throughout the world celebrated World Wildlife Day 2023 by organizing different wildlife-related programs. In the context of Nepal, World Wildlife Day was celebrated by embracing and promoting Community Based Anti-Poaching Unit (CBAPU), which was initiated by the Government of Nepal from 2015. The main objective of CBAPU is to engage a significant number of local communities and youth on wildlife conservation and anti-poaching efforts.

<http://www.wwfnepal.org/>

<https://wildlifeday.org/en>