

Headlines Himalaya

January 16 – January 31 (2021)

No. 635-636

Editorial Team: Lila Paudel and Bimal Sharma

For the 635th - 636th issues of Headlines Himalaya, we reviewed journal articles from five sources and selected nine researches from five countries. We selected two researches from Nepal and seven researches from other Himalayan countries (India, China, Bhutan and Pakistan).

Headlines Himalaya, a weekly research based information 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 *MOLECULAR AND MORPHOLOGICAL REVISION OF SMALL MYOTINAE FROM THE HIMALAYAS SHED NEW LIGHT ON THE POORLY KNOWN GENUS SUBMYOTODON (CHIROPTERA: VESPERTILIONIDAE)*

HYDROCHEMISTRY OF RARA LAKE: A RAMSAR LAKE FROM THE SOUTHERN SLOPE OF THE CENTRAL HIMALAYAS, NEPAL

INDIA *ASSEMBLING MITOGENOME OF HIMALAYAN BLACK BEAR (U. T. LANIGER) FROM LOW DEPTH READS AND ITS APPLICATION IN DRAWING PHYLOGENETIC INFERENCES*

GEOLOGICAL AND PLEISTOCENE GLACIATIONS EXPLAIN THE DEMOGRAPHY AND DISJUNCT DISTRIBUTION OF RED PANDA (A. FULGENS) IN EASTERN HIMALAYAS

CHINA *MORPHOLOGY AND PHYLOGENY OF SCALOPINE MOLES (EULIPOTYPHLA: TALPIDAE: SCALOPINI) FROM THE EASTERN HIMALAYAS, WITH DESCRIPTIONS OF A NEW GENUS AND SPECIES*

BHUTAN *GEOTECHNICAL PARAMETER ASSESSMENT OF SEDIMENT DEPOSIT: A CASE STUDY IN PASAKHA, BHUTAN*

AWARENESS AND PRACTICE OF MEDICAL WASTE MANAGEMENT AMONG HEALTHCARE PROVIDERS IN NATIONAL REFERRAL HOSPITAL

CLIMATE WARMING DECREASES PLANT DIVERSITY BUT INCREASES COMMUNITY BIOMASS IN HIGH-ALTITUDE GRASSLANDS

PAKISTAN *FEEDING HABITS AND HABITAT USE OF BARKING DEER (MUNTIACUS VAGINALIS) IN HIMALAYAN FOOTHILLS, PAKISTAN*

MOLECULAR AND MORPHOLOGICAL REVISION OF SMALL MYOTINAE FROM THE HIMALAYAS SHED NEW LIGHT ON THE POORLY KNOWN GENUS *SUBMYOTODON* (CHIROPTERA: VESPERTILIONIDAE)

Manuel Ruedi, Uttam Saikia, Adora Thabab, Tamás Görföl, Sanjan Thapa, and Gábor Csorba

Mammalian Biology 2021: 1-16

The systematics status of the constituent species of the *M. mystacinus* morphogroup in the Himalayan region has long been marred by uncertainty. Lack of integrative studies combining morphological and genetic data from specimens recently collected in this region has hampered our understanding of cryptic variations in this complex taxonomic group. To address this issue, new material from the Himalayan region of India and Nepal was obtained and vouchered specimens in the holdings of various museums were also re-examined. As comparative material, a large series of relevant specimens from South and Southeast Asia were also included in this revision. Using a combination of multivariate analysis of craniodental characters and molecular reconstructions, we critically evaluated the systematic position of the small Myotinae in the Himalayas. We establish that *M. nipalensis* forms a very distinct lineage (which also includes the recently described *M. annatessae*) and refute previous taxonomic suggestions that it is related to *M. davidii*. Our study also conclusively proved the common occurrence of the poorly known genus *Submyotodon* in the Himalayan region (Afghanistan, Pakistan, India, Nepal and China) and evidenced species-level divergences within that genus. *Submyotodon* species share nyctalodont or semi-nyctalodont lower molar configuration with few other small and unrelated Myotinae from Asia suggesting that these unusual dental characters are homoplasious in this subfamily. We also noticed a very confused taxonomic situation associated with many DNA sequences of Asian *Myotis* deposited in public repositories and call for possibilities of better data curation.

Further reading: <https://doi.org/10.1007/s42991-020-00081-3>

HYDROCHEMISTRY OF RARA LAKE: A RAMSAR LAKE FROM THE SOUTHERN SLOPE OF THE CENTRAL HIMALAYAS, NEPAL

Binija Kaphle, Jun-bo Wang, Jin-lei Kai, Xin-miao Lyu, Khum Narayan Paudyal, and Subash Adhikari

Journal of Mountain Science 18: 141–158

High-altitude Himalayan lakes act as natural storage for environmental evidence related to climate change and environmental factors. A great number of lakes are distributed in the southern slope area of the central Himalayas; however, research concerning the hydrochemical processes of these lakes is still insufficient. Herein, we present a comprehensive study on the water chemistry of the lake waters and the inlet stream waters from Rara Lake in western Nepal based upon samples collected in November 2018. The pH, dissolved oxygen, chlorophyll-a concentration (chl-a), water temperature, electric conductivity (EC) and total dissolved solids (TDS) were measured in situ, and the concentrations of major ions (Ca^{2+} , Mg^{2+} , K^+ , Na^+ , Cl^- , SO_4^{2-} , and NO_3^-) were analyzed in the laboratory. The results revealed that the water in Rara Lake is slightly alkaline, with pH values ranging from 7.6–7.98. The cations, in decreasing order of concentration in the lake water, are $\text{Ca}^{2+} > \text{Mg}^{2+} > \text{K}^+ > \text{Na}^+$ with average concentrations of $20.64 \text{ mg}\cdot\text{L}^{-1}$, $11.78 \text{ mg}\cdot\text{L}^{-1}$, $1.48 \text{ mg}\cdot\text{L}^{-1}$ and $0.72 \text{ mg}\cdot\text{L}^{-1}$, respectively; the order and

concentrations for the anions is $\text{HCO}_3^- > \text{SO}_4^{2-} > \text{Cl}^- > \text{NO}_3^-$, with average concentrations of $122.15 \text{ mg}\cdot\text{L}^{-1}$, $2.15 \text{ mg}\cdot\text{L}^{-1}$, $0.46 \text{ mg}\cdot\text{L}^{-1}$ and $0.55 \text{ mg}\cdot\text{L}^{-1}$, respectively. The dominant cation and anion in the lake water are Ca^{2+} and HCO_3^- , and they account for 48.14% and 71.8% of the totals, respectively. The range of lake water TDS is from $95 \text{ mg}\cdot\text{L}^{-1}$ to $98 \text{ mg}\cdot\text{L}^{-1}$, with an average of $96.85 \text{ mg}\cdot\text{L}^{-1}$. The high ratio of $(\text{Ca}^{2+} + \text{Mg}^{2+})$ to total cations and the low ratio of $(\text{Na}^+ + \text{K}^+)$ to total cations indicate that Rara Lake receives ions from rock weathering, especially from carbonate rocks. Similarly, Gibbs boomerang diagrams and Piper diagrams also support the hydrochemistry of Rara Lake as being dominated by rock-weathering patterns. Likewise, other statistical analysis tools, such as Principal Component Analysis (PCA) and correlation strongly suggest the dominance of weathering of calcium and magnesium bicarbonate rocks as the major source of ions in Rara Lake. However, several traces of anthropogenic inputs into the lake were noticed, and the hypolimnion in the lake appears to be oxygen deficient, which may not be an issue at present but cannot be ignored in the future.

Further reading: <https://doi.org/10.1007/s11629-019-5910-0>

India-Himalaya

ASSEMBLING MITOGENOME OF HIMALAYAN BLACK BEAR (*U. T. LANIGER*) FROM LOW DEPTH READS AND ITS APPLICATION IN DRAWING PHYLOGENETIC INFERENCES

Amrita Bit, Mukesh Thakur, Sujeet Kumar Singh, Bheem Dutt Joshi, Vinay Kumar Singh, Lalit Kumar Sharma, Basudev Tripathy, and Kailash Chandra

Scientific Reports 11: 1-11

The complete mitogenome of Himalayan black bear (*Ursus thibetanus laniger*) from Indian Himalayan region was assembled following the modified approach of mitochondrial baiting and mapping using the next-generation sequencing reads. The complete mitogenome was of 16,556 bp long, consisted of 37 genes that contained 13 protein-coding genes, 22 tRNAs, 2 rRNAs and 1 control region. The complete base composition was 31.33% A, 15.24% G, 25.45% C, and 27.98% T and gene arrangement was similar to the other sub-species of Asiatic black bear. The relative synonymous codon usage analysis revealed the maximum abundance of Isoleucine, Tyrosine, Leucine and Threonine. The assembled mitogenome of *U. t. laniger* exhibited 99% similarity with the mitogenomes of Himalayan black bear available from Nepal and Tibetan Plateau-Himalaya region. The findings of the present study has proven low depth sequencing data, adequate and highly efficient in rapid recovering the mitochondrial genome by overcoming the conventional strategies of obtaining long-range PCR and subsequently drawing phylogenetic inferences.

Further reading: <https://doi.org/10.1038/s41598-020-76872-y>

GEOLOGICAL AND PLEISTOCENE GLACIATIONS EXPLAIN THE DEMOGRAPHY AND DISJUNCT DISTRIBUTION OF RED PANDA (*A. FULGENS*) IN EASTERN HIMALAYAS

Supriyo Dalui, Sujeet Kumar Singh, Bheem Dutt Joshi, Avijit Ghosh, Shambadeb Basu, Hiren Khatri, Lalit Kumar Sharma, Kailash Chandra, and Mukesh Thakur

Scientific Reports 11: 1-11

Pleistocene glaciations facilitated climatic oscillations that caused for enormous heterogeneity in landscapes, and consequently affected demography and distribution patterns of the mountain endemic species. In this context, we investigated demographic history and population genetic structure of red panda, distributed along the geographical proximity in the southern edge of the Qinghai-Tibetan Plateau. Bayesian based phylogeny demonstrated that red panda diverged about 0.30 million years ago (CI 0.23–0.39) into two phylogenetic (sub) species, that correspond to the middle-late Pleistocene transition. The observed intraspecific clades with respect to Himalayan and Chinese red panda indicated restricted gene flow resulting from the Pleistocene glaciations in the eastern and southern Tibetan Plateau. We found Himalayan red panda population at least in KL-India declined abruptly in last 5–10 thousand years after being under demographic equilibrium. We suggest revisiting the ongoing conservation activities through cross border collaboration by developing multi-nationals, and multi-lateral species oriented conservation action plans to support the red panda populations in transboundary landscapes.

Further reading: <https://doi.org/10.1038/s41598-020-80586-6>

China Himalaya

MORPHOLOGY AND PHYLOGENY OF SCALOPINE MOLES (EULIPOTYPHILA: TALPIDAE: SCALOPINI) FROM THE EASTERN HIMALAYAS, WITH DESCRIPTIONS OF A NEW GENUS AND SPECIES

Zhong-Zheng Chen, Shui-Wang He, Wen-Hao Hu, Wen-Yu Song, Kenneth O Onditi, Xue-You Li, and Xue-Long Jiang

Zoological Journal of the Linnean Society 2021: zlaa172

All scalopine moles are found in North America, except the Gansu mole (*Scapanulus oweni*), which is endemic to central-west China. In 2019, we collected two specimens of Scalopini on Mt Namjagbarwa in the eastern Himalayas, Tibet, China. We sequenced two mitochondrial (*CYT B* and $_{12}S$) and three nuclear (*APOB*, *BRCA₁*, and *RAG₂*) genes to estimate the phylogenetic relationships of the two moles, and also compared their morphology with other genera and species within the Scalopini. Both morphological and molecular analyses strongly suggest that the specimens represent a new monotypic genus and species, which are formally described here as ***Alpiscaptulus medogensis* gen. et sp. nov.** The dental formula of the new mole (44 teeth) is distinct from the Chinese *Scapanulus oweni* (36 teeth) and its hairy and pale brown tail is unique among species of the Scalopini. The Kimura-2-parameter (K_2P) distances of *CYT B* between *A. medogensis* and the four recognized Scalopini genera range from 14.5% to 18.9%. A sister relationship between *A. medogensis* and *Scapanulus oweni* was strongly supported in the phylogenetic trees. The divergence between *A. medogensis* and *Scapanulus oweni* occurred in the mid-Miocene (c. 11.56 Mya), which corresponds with the rapid uplift of the Himalayan-Tibetan Plateau.

Further reading: <https://doi.org/10.1093/zoolinnea/zlaa172>

GEOTECHNICAL PARAMETER ASSESSMENT OF SEDIMENT DEPOSIT: A CASE STUDY IN PASAKHA, BHUTAN

Karma Tempa, Nimesh Chettri, Raju Sarkar, Sunil Saha, Lily Gurung, Tshering Dendup and Bhawani Shankar Nirola

Cogent Engineering 8: 1869366

The research area falls at the downstream level of Bhalujhora landslide area in Alay which is located in Pasakha, Bhutan. Local Government authority proposed for construction of custom station between the commercial town Phuentsholing and Pasakha Industrial estate. However, downstream region which connects the core town to industrial estate are severely affected by the flash floods every year and the runoff causes huge sediment deposits leading risk for community and substantial damages to the infrastructures. The site is seasonally eroded and subsequently deposited by the sediments from upstream. Although, the formation level for infrastructure are proposed on the deposit layer, the assessment of soil parameters is necessary for design and planning to ensure the overall safety and long-term economic benefits. Through this study, the subsurface soil parameters are assessed by in-situ open pit investigation, geophysical survey and Standard Penetration Test (SPT), while the engineering properties of the sediment deposits were determined from laboratory tests. The field investigation was important to decide the suitability of foundation type and depth. Further, soil parameters were determined to classify the soil type, understand permeability characteristics, and predict shear strength parameters and compaction behaviour. The result shows that the sediments consist of mixture of natural aggregates and sand mixed with silt and clay. An estimate of sediment accumulation was carried out to determine the volume of the sediment deposited. The outcome will allow the relevant stakeholders to decide the management of the risk from this future disaster and propose alternative use of the sediment materials in road works.

Further reading: <https://doi.org/10.1080/23311916.2020.1869366>

AWARENESS AND PRACTICE OF MEDICAL WASTE MANAGEMENT AMONG HEALTHCARE PROVIDERS IN NATIONAL REFERRAL HOSPITAL

Zimba Letho, Tshering Yangdon, Chhimi Lhamo, Chandra Bdr Limbu, Sonam Yoezer, Thinley Jamtsho, Puja Chhetri, and Dawa Tshering

Plos one 16: e0243817

The management and treatment of Medical Waste (MW) are of great concern owing to its potential hazard to human health and the environment, particularly in developing countries. In Bhutan, although guidelines exist on the prevention and management of wastes, the implementation is still hampered by technological, economic, social difficulties and inadequate training of staff responsible for handling these wastes. The study aimed at assessing the awareness and practice of medical waste management among health care providers and support staff at the National Referral Hospital and its compliance with the existing National guidelines and policies. An observational cross-sectional study was conducted from March to April 2019. Three research instruments were developed and used; (i) Demographic questionnaire, (ii) Awareness questions, and (iii) the Observational checklist. The data was coded and double entered into Epi data version 3.1 and SPSS version 18 was used for analysis. Descriptive statistics were used to present the findings of the study. The majority of the respondents were female (54.1%) with a mean age of 32.2 (± 7.67) years, most of whom have not received any waste management related training/education (56.8%). About 74.4% are aware of medical waste management and 98.2% are aware on the

importance of using proper personal protective equipment. Only 37.6% knew about the maximum time limit for medical waste to be kept in hospital premises is 48 hours. About 61.3% of the observed units/wards/departments correctly segregated the waste in accordance to the national guidelines. However, half of the Hospital wastes are not being correctly transported based on correct segregation process with 58% of waste not segregated into infectious and general wastes. The awareness and practice of medical waste management among healthcare workers is often limited with inadequate sensitization and lack of proper implementation of the existing National guidelines at the study site. Therefore, timely and effective monitoring is required with regular training for healthcare workers and support staff. Furthermore, strengthening the waste management system at National Referral Hospital would provide beneficial impact in enhancing safety measures of patients.

Further reading: <https://doi.org/10.1371/journal.pone.0243817>

CLIMATE WARMING DECREASES PLANT DIVERSITY BUT INCREASES COMMUNITY BIOMASS IN HIGH-ALTITUDE GRASSLANDS

Kesang Wangchuk, Andras Darabant, Harilal Nirola, Jigme Wangdi, and Georg Gratzner

Rangeland Ecology and Management 75: 51-57

The rugged Himalayan landscape results in large variations in site conditions that regulate plant response to warming. There is lack of deeper understanding on plant response to warming under differing site characteristics in the mountainous terrain. A 2-yr experiment was conducted in the high mountains of Bhutan. The objective was to investigate the effects of short-term artificial warming on high-altitude grassland vegetation at north- and south-facing sites. An artificially warmed environment was simulated using open-top chambers (OTCs) that were compared with control chambers experiencing ambient conditions. Variables measured were species diversity, species richness, and proportions of plant functional groups, forage dry matter, and forage quality. Generally at the north-facing site, OTC treatment showed a lower species diversity (OTC treatment $H' \approx 2.35$; Control treatment $H' \approx 2.75$), species richness (OTC treatment $MI \approx 1.38$; Control treatment $MI \approx 1.45$), sedge abundance (OTC treatment sedge cover $\approx 14.5\%$; Control treatment sedge cover $\approx 25\%$), and crude protein content (OTC treatment $CP \approx 6.60\%$; Control treatment $CP \approx 7.70\%$). On both sites, OTC treatment had a higher grass abundance (OTC treatment grass cover $\approx 24.0\%$; Control treatment grass cover $\approx 17.0\%$) and higher dry matter content (OTC treatment $DM \approx 1.70 \text{ t ha}^{-1}$; Control treatment $DM \approx 1.50 \text{ t ha}^{-1}$). The study suggests that climate warming triggers shifts in vegetation characteristics of high-altitude grasslands in the rugged mountainous terrain, but the magnitude of shift varies according to site characteristics. Under warming, the north-facing site could experience greater vegetation change, characterized by reduced species diversity, species richness, proportion of sedge, and crude protein content.

Further reading: [10.1016/j.rama.2020.11.008](https://doi.org/10.1016/j.rama.2020.11.008)

Pakistan Himalaya

FEEDING HABITS AND HABITAT USE OF BARKING DEER (*MUNTIACUS VAGINALIS*) IN HIMALAYAN FOOTHILLS, PAKISTAN

Ume Habiba, Maqsood Anwar, Rukhsana Khatoon, Majid Hussain, Kamal Ahmed Khan, Sangam Khalil, Syeda Asma Bano, and Ahmed Hussain

Northern red muntjac (*Muntiacus vaginalis*; “barking deer”) is a shy and small-sized cervid mammal, limited to the outer Himalayan foothill forests in Pakistan. Habitat characteristics were measured by locating direct and indirect signs. To quantify habitat utilization of barking deer, 80 field surveys were conducted in the study area along transects. 1200 Quadrats at 50 m intervals were deployed along these transect lines to determine microhabitat factors associated with seasonal distribution. The food composition of the barking deer was determined through fecal droppings analysis by micro-histological technique. Forty-five fecal samples of barking deer were collected from the study area (Murree-Kotli Sattian-Kahuta National Park); summer (28) and winter (17). The micro-histological analysis revealed that more plant species are available in its habitat during the summer season (27) as compared to winter (19). Due to browsing nature barking deer mostly feed on trees in both seasons. While shrubs are slightly higher in winters. In summer barking deer consumed 10 Trees, 6 Shrubs, 5 Herbs, and 6 kinds of grass species. Dominant tree species were *Phyllanthus emblica* and *Acacia modesta*. Dominant shrub species were *Ziziphus nummularia* and *Justicia adhatoda*. In winter barking deer consumed 8 Trees, 7 Shrubs, 3 Herbs, and 1 Grass. Dominant tree species were *Bauhinia variegata* and *Acacia modesta* while shrubs included *Ziziphus nummularia* and *Carissa opaca*.

Further reading: <https://doi.org/10.1371/journal.pone.0245279>

Highlight of the Issue

World is healing through vaccination drive

Different countries have started vaccination against COVID-19. The US president Joe Biden has promised 100 million COVID vaccine shots for the people by the end of April 2021. European Union (EU) has also started vaccination since December 27, 2020 and has signed six advance purchase agreements with vaccine developers so far, securing enough doses for the most promising vaccine candidates. Moving towards Asia, Japan is gearing up to produce AstraZeneca COVID-19 shots as it grows desperate to secure enough vaccine for its population of 126 million amid global supply constraints. Production will be undertaken by JCR Pharmaceuticals, a biotechnology company that does not have experience producing vaccines but can culture the necessary adenoviral vectors. India has also launched world’s largest inoculation drive aiming to vaccinate more than 1.3 billion people against COVID-19. Nepal also have started first phase of COVID-19 vaccination drive from January 27, 2021 with the supplies from India. This vaccination will definitely help to control COVID-19 spread out.

Further readings:

<https://asia.nikkei.com/Spotlight/Coronavirus/Japan-to-produce-90m-doses-of-AstraZeneca-COVID-19-vaccine>

<https://kathmandupost.com/health/2021/01/27/nepal-begins-first-phase-of-vaccination-drive-against-COVID-19>

<https://www.bbc.com/news/av/world-us-canada-55721718>

<https://www.bbc.com/news/world-asia-india-55632782>

<https://www.consilium.europa.eu/en/policies/coronavirus/COVID-19-research-and-vaccines/>

www.nytimes.com