

Birbal Sahni Institute of Palaeosciences
Monthly Summary of Research Activities
(December 2023)

1. Areas of Focus:

The institute carries out research on fundamental as well as applied aspects of Palaeosciences that includes Evolutionary history of biota, Paleoclimate, studies of past civilization, Human history and contemporary Climate Change issues, following an integrated and multi-disciplinary approach.

Key research activities under following objectives:

- Understanding origin and evolution of life through time and space.
- Understanding climate change in recent and deep geological times.
- Understanding past civilization and human history.
- Application of Palaeosciences in exploration of fossil fuel and coal industry.

2. Important Highlights of Major Research Activity

a. Key Scientific Findings of the Month (December 2023)

- i. The study from VARDNAGAR, GUJARAT presents an archaeological and botanical record spanning the last two millennia in northwest India. The temporal scale of these data is unprecedented for the region and provides insight into the ways that variation in agricultural practices allowed responses to Late Holocene climate changes. These long-term data allow insight into resilient responses in food production to meet the challenges of projected future climate change (Pokharia et. al, 2023, QSA)

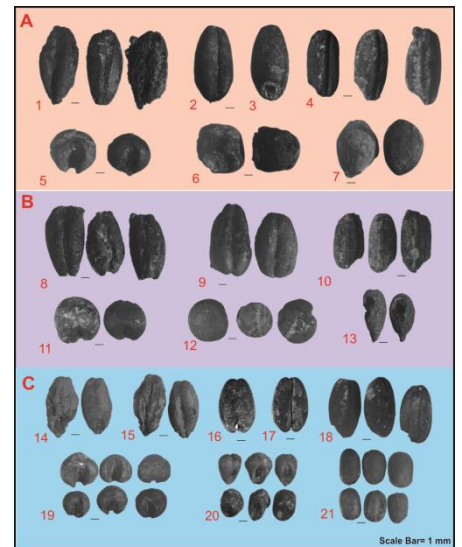


Figure 1: Charred crop remains recovered from the cultural layers of archaeological site Vadnagar, Gujarat: (A) Crop remains recovered from Historic Phase (200 BCE-500 CE); (1) *Hordeum vulgare*; (2) *Triticum aestivum* (Ventral); (3) *Triticum aestivum* (Dorsal); (4) *Oryza sativa*; (5) *Sorghum bicolor*; (6) *Lathyrus sativus*; (7) *Gossypium* sp.; (B) Crop remains recovered from Medieval Phase (500 CE-1300 CE); (8) *Hordeum vulgare*; (9) *Triticum aestivum*; (10) *Oryza sativa*; (11) *Sorghum bicolor*; (12) *Lens culinaris*; (13) *Linum usitatissimum*; (C) Crop remains recovered from Post-Medieval Phase (1300 CE-1900 CE); (14) *Hordeum vulgare* (Dorsal); (15) *Hordeum vulgare* (Ventral); (16) *Triticum aestivum* (Dorsal); (17) *Triticum aestivum* (Ventral); (18) *Oryza sativa*; (19) *Sorghum bicolor*; (20) *Pennisetum glaucum*; (21) *Vigna radiate*

b. 23rd November 2023

The committee on official languages (Hindi), Official language department, Home Ministry, GOI visited BSIP on 23 Nov. 2023 for inspection on the targets laid down for promotion of use of Hindi language in day to day official workings of BSIP. The committee successfully completed the inspection and appreciated the efforts of BSIP staff.

c. Student Interaction Forum (SIF) Lecture (23rd November 2023)

Dr. Anju Saxena Scientist-F, delivered a lecture on “Origin of species: A brief introduction and modern connotations” on 23 November 2023 in BSIP auditorium under SIF. The SIF is a forum for discussion on various aspects of science, completely managed by PhD students with faculty coordinator. The lecture was attended by institute scientists, Post-doctoral fellows and research scholars.

d. Ph.D. Viva-Voce talk (25th November 2023)

Ms. Shalini Parmar, BSRS, successfully delivered and defended her PhD viva-voce talk on the topic “Sedimentology and vegetational study of early Paleogene sequences of Barmer Basin, Rajasthan: Implications to climate and relative sea level fluctuations” on 25th November 2023. Her PhD was registered under the guidance of former Director, BSIP, Dr. Vandana Prasad and Prof. B P Singh, Department of Geology, BHU, Varanasi.

e. Indian Association of Sedimentologists (IAS) Conference at Annamalai University (6th - 8th December 2023)

A group of BSIP scientists and research scholars working in various domains of sedimentology and sedimentary geology participated in 39th IAS convention-cum-international conference on “Voyage of Sedimentology from the Mountains to the Oceans: An Innovative Trajectory” at Department of Earth Sciences, Annamalai University, Chidambaram, Tamil Nadu. BSIP also participated and won the bid to host the 40th Convention-cum-conference of Indian Association of Sedimentologists in BSIP, Lucknow around December 2024. For the first time, BSIP will host the prestigious 40th Convention cum conference of Indian Association of Sedimentologists.

f. 4th Foundation Day Function of AOQR (12th December 2023)

Association of Quaternary Researchers (AOQR) celebrated its fourth foundation day on December 12th, 2023. Prof. Laura Sadori, President, INQUA graced the occasion as a chief guest, who also delivered a talk on “Southern European Quaternary pollen records” The event was attended by professors, scientists and research scholars from various institutes across India and abroad such as Wadia Institute, BSIP, Department of Geology, Lucknow University, Kumaon University, French Institute of Pondicherry, Delhi University etc.

g. Exposure Visit Program for CBSE School Principals (14th -15th December 2023)

BSIP in collaboration with CBSE organized two day exposure visit program for Principals of CBSE affiliated schools. A total of 55 principals belonging to schools of Lucknow, Agra, Gorakhpur, Mirzapur, Meerut, Barabanki, Unchahaar, Firozabad, Hardoi, etc. participated in the program. The program was organized with a motto to understand the current state of technological developments in the field of science and how it will benefit school curriculum. During the program, Principals of various schools also visited the BSIP museum and various scientific laboratories.

h. Inauguration of AcSIR Science Club (20th December 2023)

The Birbal Sahni Institute of Palaeosciences, Lucknow has inaugurated the 'Science Club' for PhD students pursuing PhD in BSIP under the banner of Academy of Scientific and Innovative

Research (AcSIR) on 20th December 2023. The essence and importance of this club is that it will be managed and run entirely by PhD students with the motto to encourage scientific communication and enhance social adaptability so that students feel free to discuss science and improve their scientific skills.

i. Publication of Journal of Palaeosciences (JPS)

Journal of Palaeosciences, published under the BSIP, released its 72nd volume, issue no. 2, for the year 2023. The volume contains 09 papers including research articles, reviews and reports and can be accessed by visiting its website: <https://jpsonline.co.in/index.php/jop>

j. Outstation Scientific Outreach Program

- Prof. Mahesh Thakkar and Dr. Shilpa Pandey visited National Dino Fossil Park in Bagh town, Dhar district, Madhya Pradesh from 7th – 8th December 2023 under the banner of Center for Promotion of Geoheritage and Geoconservation (CPGG-BSIP) to sensitize local villagers about fossilized dinosaur eggs and science behind Kakad Bherav untold story.
- BSIP participated and showcased good scientific practices and unique fossil collection in Bhatiya Vigyan Sammelan 2023 held from 21st to 24th December 2023 in Ahemdabad, Gujarat. The stall was visited by honourable chief minister of Gujarat, Shri Bhupendra Bhai Patel and other dignatories.
- Dr Vivesh Vir Kapur: Attended the 1st session of the 2nd Council of the Asian Palaeontological Association (APA) and the Asian Palaeontological Young Scholars Forum held from 25th to 27th November 2023 at Nanjing, China.

k. Award/Fellowships

Ms. Sandhya Vishwakarma, UGC-SRF and PhD Student of BSIP, received prestigious Lloyd V Berkner Travel Fellowship in Earth and Environmental Sciences category to attend and participate American Geophysical Union 2023 in San Francisco, USA.

List of Research Publications (December 2023):

Original Articles/Reviews/Book Chapters

1. **Kumar, A., Basu, S., Ajay, A., Jha, A. K., and Sanyal, P.** 2023 Quantitative delineation of water sources in the river Ganga using stable water isotopes. River Research and Applications, <https://doi.org/10.1002/rra.4230> (**Impact Factor: 2.78**).
2. **Mandal S., Singh A., Banerjee S., Uddandam P. and Negi R. S.** 2023. Linking the impact of seismicity on palaeogeographic evolution and sedimentary architecture: A case study from Middle Jurassic succession of Spiti Himalaya, Geological Magazine (Accepted: 21 November 2023). (**Impact Factor: 2.656**)
3. **Basumatary S. K, van Asperen EN, McDonald HG, Tripathi S, Gogoi R.** 2023. Pollen and non-pollen palynomorph depositional patterns in Kaziranga National Park, India: implications for

palaeoecology and palaeoherbivory analysis. *The Holocene*. DOI: 10.1177/09596836231211851 (**Impact factor: 3.09**).

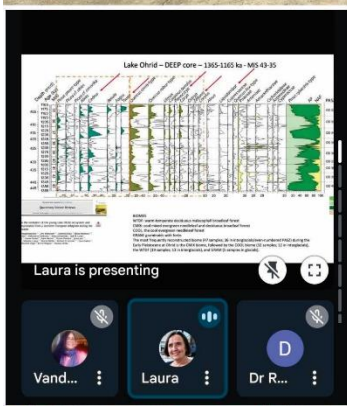
4. Maurya R.S., Misra K.G., Vishwakarma S., Singh V., Misra S., and Yadava A. K., 2023. Analyses of intra-annual density fluctuation signals in Himalayan cedar trees from Himachal Pradesh, western Himalaya, India, and its relationship with apple production. *Frontiers in Forests and Global Change* 6:1243352. (**Impact factor: 3.2**)
5. **Bhandari, A.**, Flynn, L. J., and Lokho, K. 2023: Discovery of *Parapelomys* (Murinae) from the Siwalik Group of Mohand, NW Himalaya: palaeobiogeography implications, *Journal of Palaeontological Society of India* (Doi.org//10.1177/05529360231205119; (**Impact factor 0.652**))
6. Lokho, K., Carrasco, J. F., Biswal, S., Whiso, K., and **Bhandari, A.** 2023: First Report of Eocene Echinoids from the Sylhet Limestone, Mikir Hills of Assam, India: Paleontological, Paleogeography and paleoenvironmental significance, *Journal of Palaeontological Society of India* (Doi.org/10.1177/05529360231205313; (**Impact factor 0.652**)).
7. **Pokharia, A.K., Patel, H.,** Ambekar, A.S., Spate, M., **Tripathi, D.,** Sharma, S., **Agnihotri, R.,** Strickland, K.M., González-Carretero, L., Bhushan, R. and Srivastava, A., 2023. Agricultural adaptation and resilience through climatic shifts in semi-arid India: 2000 years of archaeobotanical evidence from Vadnagar, Gujarat. *Quaternary Science Advances*, p.100155. (**Impact Factor- 4.5**).
8. **Shekhar, M., Sharma, A., Pandey, P., Sharma, A., Dimri, A.P.,** 2024 Assessing the past and future dynamics of the Asian summer monsoon: Insights from palaeomonsoon synthesis and CMIP6 data, *Global Environmental Change Advances*, 2, 100004 (<https://doi.org/10.1016/j.gecadv.2023.100004>).
9. **Kumar, L., Rajpal, R., Ahlawat, B.,** Sehrawat, J. S., Spalzin, S., Fonia, R. S., Thangaraj, K., **Rai, N.,** 2023 The Maternal Genetic Origin and Diversity of the Extant Populations of the Ladakh Region in India, *Mitochondrion*, 101828. (<https://doi.org/10.1016/j.mito.2023.101828>); (**Impact factor 4.4**).
10. Bose, T., and Chakraborty, S. (2023). Demonstration of process-based reconstruction of annual temperatures from tree ring oxygen isotope. *Journal of Palaeosciences*, 72(2), 81–89. <https://doi.org/10.54991/jop.2023.1849>.
11. Farooqui, S., Quamar, M. F., Farooqui, A., Agnihotri, R., and Khan, S. 2023. Palyno–morphological and isotopic characterization of monofloral and multifloral honeys from Lucknow, India. *Journal of Palaeosciences*, 72(2), 91–118. <https://doi.org/10.54991/jop.2023.1858>.
12. Uddandam, P. R., Agnihotri, P., Agrawal, S., and Singh, H. 2023. Early Eocene biotic assemblage from the sedimentary deposits of the Tarkeshwar Lignite Mine, Gujarat and its palaeoenvironmental implications. *Journal of Palaeosciences*, 72(2), 127–139. <https://doi.org/10.54991/jop.2023.1864>.
13. Murthy, S., Agnihotri, D., Uhl, P. D., Jasper, P. A., and Singh, R. K. (2023). Palaeoenvironmental and stratigraphical implications of the palynoflora and macro–charcoal from the early Permian of

the Chuperbhita Coalfield, Rajmahal Basin, Jharkhand, India. *Journal of Palaeosciences*, 72(2), 141–151. <https://doi.org/10.54991/jop.2023.1865>.

Published Reports

1. Phartiyal, B., Tripathi, S., and MC, M. (2023). XXI INQUA Congress 2023 Rome, Italy: India's successful bid to host the INQUA Congress in 2027. *Journal of Palaeosciences*, 72(2), 175–178. <https://doi.org/10.54991/jop.2023.1867>.
2. Bhandari, A., Mohd Hussain, Ashokrao Ingle, P., & Kumar, A. (2023). National Workshop on Biodiversity & Conservation in the Himalayan Region. *Journal of Palaeosciences*, 72(2), 179–181. <https://doi.org/10.54991/jop.2023.1866>.

Photographs showing important highlights of major programs/research activities organized during December, 2023:



Holy 'stone balls' turn out to be fossilised dinosaur eggs

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Lucknow: Faith can move mountains. In MP's Dhar, it was moving palm-sized "stone balls" till a band of experts determined them to be fossilised dinosaur eggs.

Vista Manchali (47) of Puchya village had been worshipping these balls as "Kakar Bhairav" following his forefathers' belief that the "kalkdevta (otem)" would protect his farmland and cattle from problems and misfortunes. "Kakar" means land or farm and "Bhairav" denotes lord. Like Mandoli, many others were hipshot similar balls that they found during digging activities in Dhar and adjoining districts. It was only when experts from Lucknow's Birbal Sahni Institute of Palaeosciences made a field visit recently to the areas that the residents

learnt the balls they'd been worshipping were fossilised eggs of dinosaurs' Titanosaur species.

The team of palaeo scientists from BSIP's Centre for Promotion of Geoheritage and Geotourism (CPGG), led by director MG Thakkar, visited Dhar to prepare a roadmap for the preservation of all such fossils.

With the support of CEO of MP ecotourism development board Samesta Rajora, local palaeontology expert Vishal Verma and MP forest

officials, the BSIP team conducted field visits and talked to locals about the conservation of the fossils. "We are planning to get Dhar district recognised as a Global Geopark by Unesco. We are trying to preserve all fossils and geoheritage sites. Palaeontology expert Vishal Verma informed us that so far around 256 dinosaur eggs have been found in a stretch of 120km in Dhar district," said BSIP director Thakkar.

►New nesting sites, P 5

