Birbal Sahni Institute of Palaeosciences
Monthly Summary of Research Activities
(March 2025)

1. Area 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.

1. Important Highlights of Major Research Activity

a. Key Scientific Findings of the Month (March 2025)

Spinescence—characterized by spines, prickles, and thorns—is a key defensive trait in plants, but is rare among bamboo genera. Its evolutionary history in bamboos remains poorly understood due to limited fossil evidence, with only a single previously documented specimen of a preserved node. Furthermore, the evolutionary ecology and paleoclimatic adaptations of bamboos during the Quaternary in Asia remain unclear due to a lack of fossil records. This study introduces *Chimonobambusa manipurensis* sp. nov., a well-preserved thorny bamboo fossil from the late Pleistocene of eastern India, marking the first Asian fossil record of thorny bamboo and the first Quaternary record from Asia. The fossil features nodes, internodes, nodal buds, and thorn scars, offering novel insights into bamboo spinescence and nodal morphology. C. *manipurensis* displays three well-preserved nodes, two complete internodes, prominently conserved nodal buds, and 3–4 thorn base scars along each nodal rim. Morphologically, it shares traits seen in modern *Chimonobambusa* Makino and is placed within the same genus. Together with a Pliocene–Pleistocene thorny bamboo record from Peru, this discovery suggests spinescence in bamboos likely emerged during the Neogene, with evolutionary adaptations continuing into the Pleistocene potentially as an adaptation to changing climatic conditions and increased herbivory pressures. Furthermore, it suggests that bamboos during Quaternary time in Asia were growing under warm and humid climatic conditions. This finding enhances our understanding of bamboo morphological evolution and paleoclimatic adaptations, filling a critical gap in the global fossil record. (Bhatia et al 2025; Fig 1).

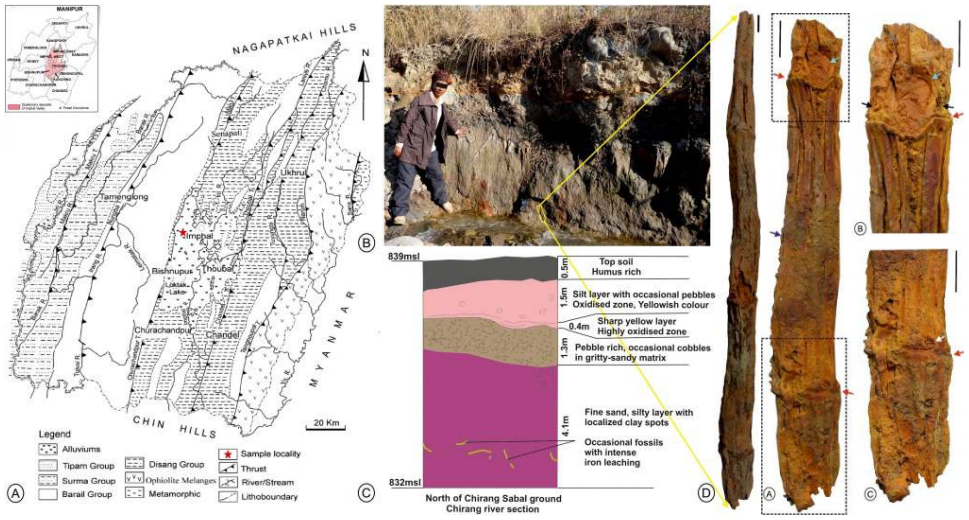

Figure 1: Photo showing geological map and fossil horizon. (A) Geological map of Manipur (Soibam, 1998) showing the Quaternary deposits and sample locality (Red star). (B) Field photograph showing the bamboo fossil in the Quaternary deposits exposed in Chirang river section. (C) Litholog of the sedimentary sequence observed along Chirang River section from where the fossil was excavated. (D) Complete bamboo fossil excavated from the sediments (Bar scale: 1 cm).

b. National Science Day (28th Febraury2025)

BSIP celebrated National Science Day on 28th February, 2025 at its campus. Theme of this year- "Empowering Indian Youth for Global Leadership in Science and Innovation forViksit Bharat," emphasizes the vital role that the youth play in shaping the future of science and innovation in our nation. Dr. Anil Kumar Rastogi, Former Dy. Director and chief scientist, CSIR-CDRI and Sr. Bollywood actor and Theatre Personality, was the chief guest of the occasion. Dr. S. Bikkina, Scientist-F, delivered a popular science talk on "Tracing the impact of wildfires on poles (Arctic and Antarctic): Our efforts from BSIP. Speech competition and Poster competition was also organized for participating school organizations.

c. Seeker's Interaction Forum (SIF) Lecture (March 2025)

S. No.	Name of the Speaker	Topic of Discussion	Date
01	Prashant Mohan Trivedi	Bone vs Tooth: The ultimate palaeo-showdown	27 Feb 2025
02	Dr. Jyoti Srivastava	Mangrove Forest Dynamics	06 March 2025
03	Dr. Shilpa Pandey	Bridging Science and Society: Role of youth in outreach activities	20 March 2025

d. Research Advisory Council (RAC) Meeting (27th – 28th March 2025)

BSIP conducted its 61st RAC meeting headed by Prof. Subir Sarkar to discuss the next Research plan of the BSIP. All the scientific staff presented their findings of the previous project and also elaborated the scientific problems for the next four-year research plan for the term 2025-2029. The meeting concluded on the positive note in the august presence of Director BSIP and RDCC.

e. INQUA On-line Talk Series under INQUA India-2027

S. No.	Name of the Speaker	Topic of Discussion	Date
01	Dr. Gyana Ranjan Tripathy	Pyrite Oxidation in the Himalayas and its environmental effects	29 March 2025

f. Prof. Jagat Bhushan Nadda visit to BSIP, Lucknow (21 March 2025)

Prof. Jagat Bhushan Nadda, Director, Consortium for Educational Communication, UGC, New Delhi visited the Birbal Sahni Institute of Palaeosciences, Lucknow on March 21, 2025. During his visit, he toured the BSIP Museum and had a productive interaction with Prof. M. G. Thakkar, Director, BSIP. We thank Prof. Nadda for his visit and look forward to the potential for further collaboration in the field of educational communication of Palaeosciences.

g. Outreach Activities and Conferences

1. Scientists from BSIP (Dr. Abha Singh, Dr. Ansuya Bhandari, Dr. Mohammad Arif, Dr. Prem Raj Uddandam, and Sanjay Kumar Singh Gahlod) visited the Primary School, Suwagada, Barabanki, on 27.02.2025 under the outreach activity program. In this outreach program, the scientists provided information to the children on various topics of Palaeosciences (fossils, paleomagnetism, and radiocarbon dating etc.).

List of Research Publications (March 2025)

Original Articles/Reviews/Book Chapters

1. TRIPATHI, S., ANIS, N., VAISH, S., KUMAR, A., SINGH, K., & ARYA, A. K. (2025). Potential in Palaeoecological Reconstruction from Modern Pollen Calibrations along the Kukrail Reserve Forest, Central Ganga Plain, India. Journal of the Palaeontological Society of India, 0(0). https://doi.org/10.1177/05529360251320221.
2. Morthekai P, Singhal M, Sharma SK, Sivasubramaniam S, Kamarasu M, Singh P, Chauhan N, Kumar K, Nawaz SA, Khonde N. 2025. Investigating historical attribution: luminescence dating of bricks from a submerged structure in southeastern India. Frontiers in Environmental Archaeology. 4, 1464315. https://doi.org/10.3389/fearc.2025.1464315.
3. Uddandam PR, Samal P, Srivastava J, Singh A, Hari SK, Krishna AS, Morthekai P. 2025. Multidecadal wet and dry phases during the Little Ice Age: Palynofacies, dinoflagellate cysts and palynological evidence from the western Bay of Bengal. Journal of Earth System Science. 34(1):59.
4. Singh SP, Arif M, Singh AK, Mishra S, Kapur VV, Prasad V, Venkateshwarlu M, Naik AS. 2025. Magnetostratigraphic perspectives and palaeoenvironmental implications of Deccan volcano-sedimentary succession within the Malwa subprovince, Central India. Evolving Earth. 100061.
5. Bhatia H, Kumari P, Singh NH, Srivastava G. 2025. Earliest thorny bamboo from Pleistocene of Asia characterizing spinescence and paleoclimatic adaptations in bamboos. Review of Palaeobotany and Palynology. 105347.
6. Basumatary SK, Tripathi S, Basumatary K, Thakur B, Tiwari P. 2025. Modern pollen deposition in relation to different vegetation types in the Jaintia Hills of Meghalaya, Indo-Burma region: implications for palaeoecological reconstructions. Grana. 1-3.
7. Uddandam PR, Samal P, Srivastava J, Singh A, Hari SK, Krishna AS, Morthekai P. 2025. Multidecadal wet and dry phases during the Little Ice Age: Palynofacies, dinoflagellate cysts and palynological evidence from the western Bay of Bengal. Journal of Earth System Science. 2025 Feb 27;134(1):59.
8. Singh A, Uddandam PR, Mazumder A, Manoj MC. 2025. Multiproxy (Calcareous Nannofossil, Benthic Foraminiferal, and Total Organic Carbon) Records from the Eastern Arabian Sea: Implications for Monsoon-Induced Nutrients and Primary Productivity Changes during the Holocene. In Aquatic Ecosystems Monitoring (pp. 32-42). CRC Press.

Photographs showing important highlights of major programs/research activities organized during March 2025: