# Report
## on
# Monthly Seminar
## conducted
## by
# ICFRE-RFRI
# Jorhat (Assam)

## INSTITUTE LEVEL

| | |
|---|---|
| Venue | ICFRE - Rain Forest Research Institute |
| Theme | Tree Improvement |
| Presentation Team | **Dr. Prem Chand Gyani,** Scientist-B, Genetics and Tree Improvement Division of the Institute |
| Broad structure | 1. Opening session: Welcome and overview<br>2. Introductory remarks by the Director (or senior scientist in the Director's absence) of the institute<br>3. Presentations by the speaker<br>4. Discussion on the presentations<br>5. Closing Remarks by the Director (or senior scientist in the Director's absence) of the institute<br>6. Vote of thanks |
| Periodicity | Once in a month |
| Duration | Half day |
| Expected outcomes of the seminar | i) Identification of research needs<br>ii) Formulation of future strategies/ road map<br>iii) Networking research options & opportunities<br>**(Attached, Page number 4)** |
| Coordinator | 1. Sh. R K Kalita, Head, Extension Division<br>2. Dr. Satyam Bordoloi, Head GTI Division<br>3. Ms. Tara Kumari, Nodal Officer (Monthly Seminars)<br>4. Supporting staff of Extension Division |
| Proceedings | **(Attached, Page number 2)** |

# Proceedings of the Monthly Seminar

**Date: 29th September 2025 & Time 10:00 AM onward**
**Venue: Brahmaputra Hall, ICFRE-RFRI, Jorhat**
**Theme:** Tree Improvement

ICFRE-Rain Forest Research Institute, Jorhat (Assam) conducted the monthly seminar on 29th September 2025 at Brahmaputra Hall of ICFRE-RFRI, Jorhat campus. The seminar was attended in physical and virtual mode by the scientists, officers, technical, subordinate staffs, researchers and students along with the members of its centers i.e. BRC, Mizoram and CFLE, Tripura. The Coordinator of the seminar Ms. Tara Kumari, Scientist, conducted the program. The program was chaired by Dr. Nitin Kulkarni, Director, ICFRE-RFRI.

**Dr. Prem Chand Gyani**, Scientist-B at GTI, ICFRE-Rain Forest Research Institute, Jorhat (Assam), delivered a comprehensive lecture on "**Cytogenetic Diversity and Genome Size Variation in North Eastern Indian Bamboos**." The session provided an in-depth understanding of how cytogenetic research can contribute to bamboo taxonomy, conservation, and sustainable utilization.

The lecture began with a discussion on the fundamentals of cytogenetics, including chromosomes, karyotyping, idiogram construction, polyploidy, and the C-value concept. Dr. Gyani explained how chromosome behavior during mitosis and meiosis influences species differentiation and genetic inheritance. He highlighted that genome size variation, often measured through flow cytometry, provides valuable insights into evolutionary processes, while the C-value paradox underscores the complexity of relating genome size to organismal complexity.

Using case studies from *Guadua, Ochlandra*, and *Bambusa* species, Dr. Gyani demonstrated the practical application of cytogenetic tools. Techniques such as chromosome banding, FISH (Fluorescent in situ Hybridization), and GISH (Genomic in situ Hybridization) were presented as crucial for identifying chromosomal variations, detecting rDNA sites, and studying hybrid genomes. These examples highlighted how cytogenetic markers can support conventional taxonomy, which is often limited in bamboo due to infrequent flowering and morphological similarities.

A major focus of the lecture was on the research needs in the North Eastern region of India, a biodiversity hotspot with high bamboo endemism. Dr. Gyani emphasized the importance of documenting chromosome numbers, karyotypes, and genome sizes of native bamboo species to establish a reliable reference database. Such data, he noted, would not only aid taxonomic clarification but also provide a foundation for breeding, propagation, and conservation programs. Looking ahead, he proposed a roadmap that integrates cytogenetic data with molecular phylogenetics using plastid markers and sequencing technologies. Rare, threatened, and economically important bamboo species should be prioritized for genome characterization. Furthermore, cytogenetic information should be linked with conservation genomics, thereby aligning laboratory research with field-based management strategies.

Dr. Gyani also stressed the need for networking and collaborative frameworks. He proposed establishing a North-East India Bamboo Research Consortium to connect universities, ICAR institutes, and forest departments. International collaborations with organizations such as INBAR, as well as partnerships with botanical gardens and germplasm banks, were suggested to expand access to living collections and reference materials. Finally, he underlined the importance of connecting cytogenetic research with local industries in handicrafts, construction, bioenergy, and medicine, ensuring that scientific outcomes are translated into regional economic benefits.
The lecture concluded with a call for interdisciplinary efforts to explore the genetic wealth of bamboos, highlighting the promise of cytogenetics in bridging fundamental research, conservation, and applied uses.

The presentation was followed by an insightful discussion in which valuable suggestions were shared by the participants. Dr. Satyam Bordoloi, Head of the GTI Division, commended Mr. Gyani for his excellent presentation. In his remarks, Dr. R. K. Borah, GCR, appreciated the quality and relevance of the talk, and encouraged to develop a research proposal on this important theme. The session concluded with a formal vote of thanks delivered by Ms. Tara Kumari, the coordinator of the program, marking its successful completion.

## Expected outcomes of the seminar

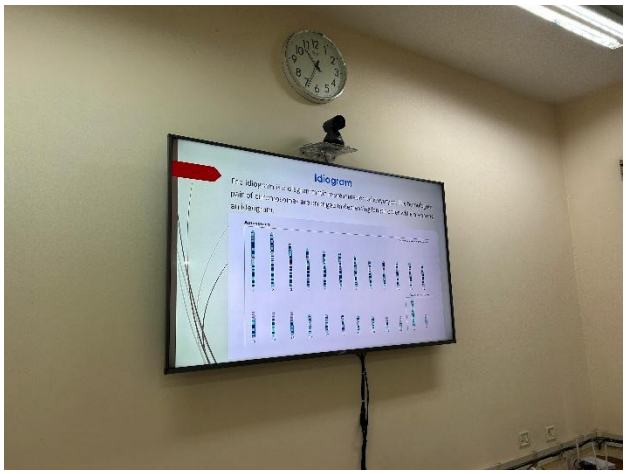
1. *Identification of Research Needs:*
   - ✓ Expand cytogenetic and genome size studies to underexplored bamboo taxa, especially Neotropical and North-Eastern Indian diversity.
   - ✓ Integrate cytotaxonomic data with morphological and molecular tools to improve bamboo taxonomy.
   - ✓ Investigate polyploidization and diploidization processes to better understand bamboo evolution.
   - ✓ Generate reference genome size databases across different bamboo genera for comparative evolutionary analysis.
   - ✓ Study chromosome structural variations and rDNA site patterns to refine phylogenetic relationships.

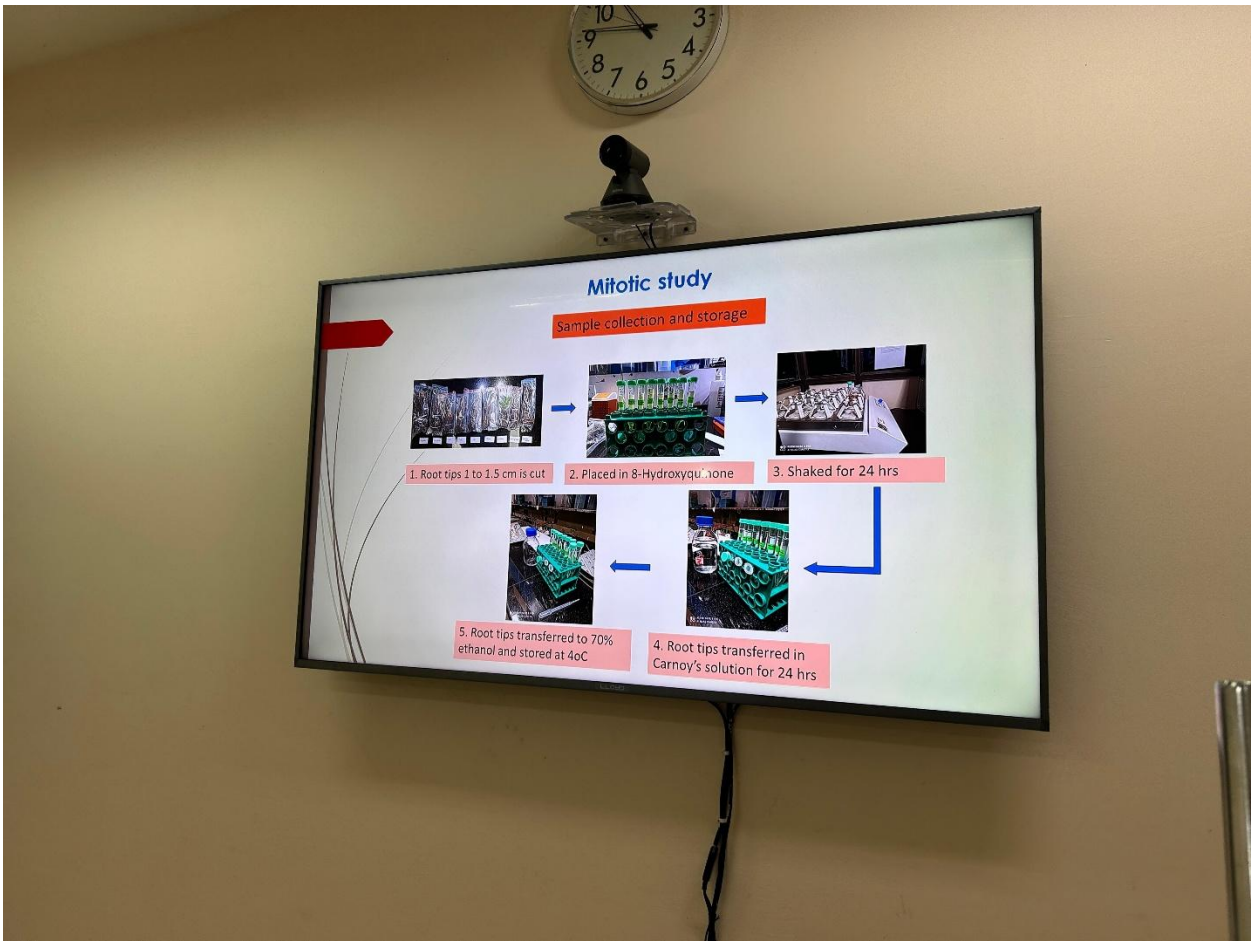
2. *Formulation of Future Strategies / Road Map*:
   - ✓ Establish coordinated cytogenetic and genomic mapping programs covering diverse bamboo species.
   - ✓ Combine classical cytogenetics (chromosome counts, banding) with advanced molecular tools (FISH, sequencing).
   - ✓ Use genome size and karyotype stability as parameters in breeding and conservation programs.
   - ✓ Develop long-term monitoring of diploidization/polyploidization trends within bamboo populations.
   - ✓ Promote data integration into global bamboo databases (like INBAR) for comparative studies.

3. *Networking Research Options & Opportunities*:
   - ✓ Foster collaboration between cytogenetic labs in bamboo-rich regions (Latin America, India, China, SE Asia).
   - ✓ Link bamboo genome research with forestry, conservation, and bioresource utilization networks.

- ✓ Encourage partnerships with botanical gardens and herbaria for germplasm exchange and chromosome studies.
- ✓ Integrate bamboo cytogenetics into global grass (Poaceae) research consortia for comparative genomics.
- ✓ Collaborate with applied sectors (construction, bioenergy, pharmaceuticals) to translate cytogenetic insights into practical value.


ICFRE-RAIN FOREST RESEARCH INSTITUTE
INDIAN COUNCIL OF FORESTRY RESEARCH & EDUCATION


Idiogram




**(Tara Kumari)**
**Scientist-B & Nodal Officer**
**Monthly Seminar**
**ICFRE-RFRI, Jorhat (Assam)**