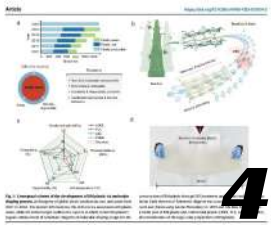
Volume 1, Issue 4, October 2025

Bamboo Info

A quarterly newsletter of Bamboo Technical Support Group (BTSG) - KFRI



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Gigantochloa atroviolaceae

Gigantochloa atroviolaceae Widjaja (G.atter sensu Kurz.), commonly known as Java Black Bamboo, is a beautiful ornamental bamboo from Java and Sumatra. It is an impressive, loosely tufted, clumped, sympodial, branched bamboo having purple, distally pubescent culms, nodes with a whitish ring; Culm-sheaths deciduous, 16-20 cm long, hispid with appressed dark brown hairs, auriculate; Leaves lanceolate, 20-28 cm long; Inflorescence spikelets up to 18 in a cluster, ovate-lanceolate; Fruit Caryopsis with adherent pericarp. The timber is used for building and construction, furniture, handicrafts, traditional musical instruments, and landscaping.

Editor's Desk

Dear readers,

Welcome to the fourth issue of Bamboo Info, your source for all things that are bamboo-related!

In this edition, we primarily focus on a revolutionary discovery from the scientific world. Today, plastics are one of the major threats to the ecosystem. To overcome this issue, from the bamboo scientific world, bamboo-based plastics have been introduced. Nowadays, bamboo, being an economically and ecologically significant plant, offers a sustainable alternative for a greener future.

This issue also features bamboo-related news and updates as part of the World Bamboo Day celebrations in India. September 18th, the day that celebrates the economic and ecological significance of bamboo. BTSG is grateful for the opportunity to engage in various bamboo-focused initiatives, connecting with farmers, artisans, and stakeholders across the country. As we reach the fourth issue of Bamboo Info this year, we take pride in sharing scientific knowledge and spreading awareness about bamboo's potential among the wider community through our initiatives.

At BTSG, we believe that through comprehensive training programs, community engagement and hands-on projects, we can transform landscapes and improve livelihoods by bringing farms to homes, creating sustainable solutions for a brighter tomorrow. By prompting local self-government institutions to cultivate bamboo, we aim to cultivate change, improve livelihoods, and foster sustainable development. We invite you to join us as we navigate the intersection of tradition and technology, seamlessly blending ancient wisdom with modern solutions.

As we launch Bamboo Info, we invite you to become an integral part of this interactive space. Use it to stay connected, share your stories, and be inspired by the groups' efforts that amplify the impact of bamboo and contribute to a more sustainable and resilient world.

Thank you for joining us on this exciting journey!

Editorial team,
Bamboo Info

Next generation bamboo: solution, innovation, and design

The theme for World Bamboo Day 2025, *"Next Generation Bamboo: Solution, Innovation, and Design"*, highlights how bamboo can be used in smarter ways through modern architecture, sustainable product design and other innovative applications that actually help to overcome climate and development challenges. Bamboo is a unique natural resource that can be extensively used in construction, handicrafts, and daily-use products. Through this, Bamboo supports rural livelihoods and sustainable industries. Additionally, bamboo plays a crucial role in reducing the impact of deforestation and contributing to the restoration of degraded land. In recent years, bamboo has been used in several revolutionary innovations, like bamboo-based plastics, bamboo-derived ethanol, and bamboo salt. However, these developments have also increased the demand for bamboo resources. To address such challenges and promote the sustainable growth of the bamboo sector, the National Bamboo Mission (NBM) provides financial assistance for bamboo plantations. These initiatives are particularly significant; they play a key role in the transformation and innovation of India's bamboo sector.

VB Sreekumar
Coordinator, BTSG-KFRI

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Species in Focus

Ochlandra travancorica (Bedd.) Benth. ex Gamble

Ochlandra travancorica, an endemic species of the Western Ghats and Sri Lanka. The genus *Ochlandra* is one of the ten members of the subtribe Melocanninae. The members of this subtribe are mostly distributed across northeast India, Thailand, Madagascar and the Philippines, except for the genus *Ochlandra*, are thin-walled and thickly clumped bamboo confined to the Western Ghats of India and Sri Lanka. Among different species under this genus, *O. travancorica* is the important group with a wide range of distribution throughout its geographical zones. The species is distributed to the tropical deciduous and evergreen forests of the Western Ghats as large 'reed brakes', prefer moist soil and are normally regenerated by seeds or through rhizomes. *Ochlandra* reed brakes are mainly impenetrable thickets, 3 m to 5 m high and are naturally distributed among evergreen forests, mainly restricted to the moist areas of forest with an annual rainfall of more than 1500 mm and found at an elevation of 200 m to 1000 m especially along the stream sides of the Western Ghats. Mass populations of reeds had a direct influence on reduction in global warming through CO_2 fixation in the ecosystem.

However, morphology of fruit is a dependable characteristic for taxonomic identification in the species. The species have a relatively large fruits with thick pericarp, possess large number of floral parts, especially stamens (around 120 in one floret). *Ochlandra* fruit, bacca, possess a thick fleshy pericarp usually seen separated from the seed coat. The species possesses prominent sympodial rhizome with a short, thick and curved branching pattern with longer internodes and solitary lateral buds. *O. travancorica* possess many adaptive strategies such as fibrous root system, vigorous growth, production of baccate caryopses, adaptability to riparian life, absence of fruit dormancy and mycorrhizal associations which help their successful existence in the wet terrains of the Western Ghats. The healthy clumps of reed bamboos form an umbrella-like canopy which resists uprooting in winds and assists in the formation of population climaxes.

Bamboos have characteristic flowering and fruiting cycles, ranging from a few years to 120 years. *O. travancorica* exhibits both gregarious and sporadic flowering behavior and are monocarpic in nature, regenerate naturally through seeds. Separate flowering phases of *O. travancorica* indirectly revealed self-incompatibility to ensure genetic diversity among populations.

The pollination mechanism in the species is not merely by wind, but *Apis* spp had a major role in pollen transfer and higher fruit set for long period of time. Abundant insect visits during male phase were an adaptive strategy to disperse higher pollen at nearby populations with female phases. This mechanism between *O. travancorica* flowers and honey bees make both as mutually benefitted species. Besides, root system of the species possesses extensive hyphal and vesicular stages of arbuscular mycorrhizal fungal colonization and fungal association varies from location to locations. The perfect growth and regeneration of species is due to certain microbes, especially mycorrhizal fungi.

Since the species are economically and ecologically important species, anthropogenic disturbances had led to the decline of populations. Clear felling of reed bamboo areas resulted in its poor regeneration and thus resulted in fragmentation of reed breaks. Forest fires during flowering phases cause the destruction of young seedlings along with parent plants. Man-made rock river embankments and river valley projects pose a serious threat to reed bamboo vegetation and thereby prevent growth of riparian populations. Expansion of man-made forests as well as monocropping plantations with species such as *Acacia auriculiformis, A. mangium, Eucalyptus* sp., etc. affects natural flora and fauna resulted in poor soil fertility and ground water availability leads to destruction of native *O. travancorica* population. The expansion of invasive species also poses a serious threat to the natural distribution of species.

Bamboo has multiple uses and plays a crucial role in culture, art, industry and construction, planted for hedges and used for landscaping. In Kerala, bamboo cottage industries mainly use *O. travancorica* because of its high lignin and fibre content. Reeds are considered one of the most important Non-Timber Forest Produce (NTFPs) because of the subsistence and livelihood support they provide for the economically weaker strata of society. In India, bamboo handicraft industries are widespread in the southern states, but deforestation of reed areas for agriculture, multi-purpose river valley projects and permanent settlements add to decline of reed resources and this affects the stability of cottage industries. Within the genus *Ochlandra, O. travancorica*, in particular plays a significant role for the livelihood of rural communities by providing source materials for construction, fencing, and handicraft industries, fodder for cattle and byproducts for medicinal purposes. The traditional tribal community, Kadar of the Western Ghats, utilizes reed bamboos extensively for their livelihood as part of their culture.

Proper conservation and management of naturally occurring undisturbed areas should ensure that their natural values are retained without any anthropogenic pressures. The unpredictable flowering behavior, along with unscientific management practices during extraction, has resulted in fragmentation of natural reed populations and decline of resources. Hence proper scientific culm extraction and ideal propagation methods need to be practiced in order to replenish the existing

fragmented reed bamboo resources. An inventory mapping of the resources and cataloguing *Ochlandra* species is equally important for formulating conservation strategies.

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22nd Edition
Kerala Bamboo Fest

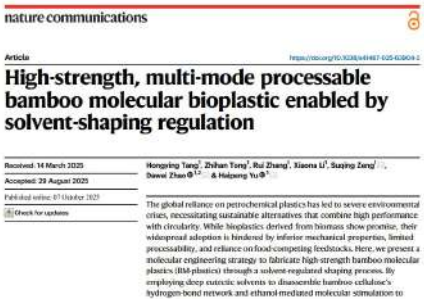
The 22nd edition of 'Kerala Bamboo Fest', a National Event for the promotion of Bamboo sector is scheduled to be held from **December 27, 2025 to January 01, 2026 at Jawaharlal Nehru International Stadium Ground at Kaloor in Kochi (Ernakulam), Kerala.** On behalf of Department of Industries & Commerce, Government of Kerala, the fest will be organised by Kerala State Bamboo Mission (KSBM) and Kerala Bureau of Industrial Promotion (KBIP) in association with National Bamboo Mission (KSBM), Government of India.

The Kerala Bamboo Fest will create an ideal platform for artisans/craftsmen to display the creative talents from different parts of the Country. The fest also provides to share and exchange the knowledge about product development, innovative designs, tools, machineries between Artisans, Craftsmen, SHGs, NGOs, Private Enterprises, Government Departments & Institutions, Machinery Suppliers and Research Organisations engaged in the Bamboo Sector.

The Bamboo Fest brings together the people working on bamboo from different parts of the country and serves as a powerful event that integrates commerce, culture, and conservation to revitalize the bamboo sector and promote a sustainable lifestyle.

For more details: https://keralabamboomission.org/index.php/events/bamboofest

Can plastic be made from bamboo?



nature communications

Article

High-strength, multi-mode processable bamboo molecular bioplastic enabled by solvent-shaping regulation

Received: 14 March 2025
Accepted: 29 August 2025
Published online: 07 October 2025
Check for updates

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The global reliance on petrochemical plastics has led to severe environmental crises, necessitating sustainable alternatives that combine high performance with circularity. While bioplastics derived from biomass show promise, their widespread adoption is hindered by inferior mechanical properties, limited processability, and reliance on food-competing feedstocks. Here, we present a molecular engineering strategy to fabricate high-strength bamboo molecular plastics (BM-plastics) through a solvent-regulated shaping process. By employing deep eutectic solvents to disassemble bamboo cellulose's hydrogen-bond network and ethanol-mediated molecular stimulation to

Article details:
Author: **Hongying Tang, Zhihan Tong, Rui Zhang, Xiaona Li, Suqing Zeng, Dawei Zhao & Haipeng Yu (2025)**
Nature Communications 16, 8729 (2025)
DOI: https://doi.org/10.1038/s41467-025 - 63904-2

Plastic is a revolutionary material and is referred to as "a material with thousands of uses". Plastic has a unique role throughout human life with its several properties, such as lightweight, high durability, flexibility, and low production cost. Despite all the benefits in today's world, plastics pose a huge problem to the environmental well-being of our planet, as well as adversely affecting all living beings. The petrochemical plastics are causing severe environmental crises. According to studies, plastics can degrade into micro to nano sizes, and those fine particles are more spreadable in air, water, and soil. It makes various negative impacts on both terrestrial and aquatic animals. To overcome these challenges, the scientific world has developed a sustainable alternative to traditional plastics, known as **bamboo molecular plastics (BM-plastics)**. In comparison to starch-based bioplastics derived from food crops, BM-plastics exhibit greater mechanical strength and thermal stability. Researchers from Northeast Forestry University in China have made this valuable discovery.

More than just a versatile plant, bamboo rises as a powerful social capital and also a sustainable resource. It weaves its magic through communities, offering livelihoods to farmers and artisans, its strength reflected in traditional crafts and towering buildings. The major limitations of bioplastics, such as inadequate mechanical strength, thermal stability, and processability are overcome by a molecular engineering strategy to fabricate high-strength bamboo molecular plastics (BM-plastics) through a solvent-regulated shaping process. The major challenges of this innovative strategy are breaking of bamboo cellulose hydrogen bonds. It is achieved through a solvent-mediated molecular engineering strategy to fabricate high-performance bamboo molecular plastics (BM-plastics) with tunable H-bond networks. Employing a hydrated $ZnCl_2$/formic acid deep eutectic solvent (DES) can disassemble the native H-bond matrix of bamboo cellulose into a homogeneous molecular system. Thereafter, subsequent

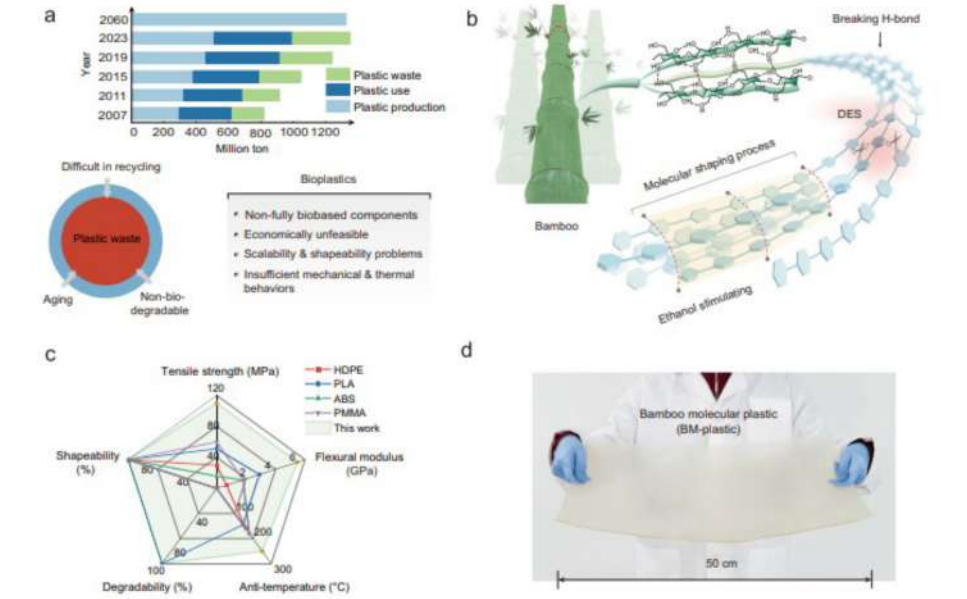

Fig. 1 | Conceptual scheme of the development of BM-plastic via molecular shaping process. a Histogram of global plastic production, use, and waste from 2007 to 2060. The bottom left illustrates the deficiencies associated with plastic waste, while the bottom right outlines the aspects in which current bioplastics require enhancement. **b** Schematic diagram of molecular shaping design for the construction of BM-plastic through DES treatment and ethanol molecular stimulation. Each element of Schematic diagram was conceived by the authors of this work and drawn using Adobe Photoshop CC 2019 and 3ds Max 2018 software. **c** Radar plot of BM-plastic and commercial plastic (HDPE, PLA, ABS and PMMA). **d** Demonstration of the large-scale preparation of BM-plastic.

ethanol stimulation triggers the rearrangement of cellulose chains, promoting dense, ordered H-bond interactions. Through this process can achevie a bioplastic with exceptional mechanical strength, thermal stability (>180 °C), and versatile processability via injection, moulding, and machining techniques. The BM plastics are reusable and also maintain full biodegradability in soil within 50 days, showing making them more valuable for mitigating plastic pollution. This discovery not only presents bamboo as a sustainable raw material for next-generation bioplastics but also provides a viable pathway to mitigate global plastic pollution.

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A view *Bambusa tulda* Roxb. by VB Sreekumar

“ Bamboo is not a weed, it’s a flowering plant. Bamboo is a magnificent plant.”

Steve Lacy

Bamboo Beats

Collection of news and activies from the bamboo sector.

Odisha Bamboo Development Agency awards nursery accreditation in Ganjam

Odisha, known for its abundant bamboo resources, continues to promote quality bamboo nurseries to boost livelihoods and industry. As part of this initiative, the State Level Bamboo Nursery Accreditation Committee (SLBNAC) has accredited the bamboo nursery of Sri Kedar Krushna Panda in Ganjam District. The accreditation certificate was presented on 8th September 2025 by Sri Karthick V., IFS, Project Director-cum-SMD, Odisha Bamboo Development Agency (OBDA) and Chairman, SLBNAC, at the OBDA office in Bhubaneswar with the presence of Dr. Prasad Kumar Dash (Odisha Biodiversity Board), Dr. Nirakara Bhol (OUAT), Miss Kashish Behera (ACF,State Silviculture, Bhubaneswar) and Sri Rajanikanta Rout (OBDA).

This recognition highlights Odisha's commitment to strengthening its bamboo sector, supporting rural entrepreneurs, and building benefits to both the environment and the economy.

World Bamboo Day 2025 celebrated in Nagaland

The World Bamboo Day 2025 was celebrated on 18th September 2025 at the Nagaland Bamboo Resource Centre under the theme "Next Generation Bamboo: Solution, Innovation & Design." Development Commissioner, Temsunaro Aier, IAS, honoured the event as special guest, and described bamboo as the "green gold" of Nagaland, highlighting its deep cultural, ecological, and economic significance. Aier commended the Nagaland Bamboo Development Agency (NBDA) for promoting bamboo enterprises, training artisans, and supporting livelihoods. As part of the celebration, Aier announced the upcoming state-of-the-art Cane and Bamboo Technology Park at the Nagaland Bamboo Resource Centre, which will serve as a Centre for research, training, and production. On the occasion, a special publication titled "Facilitating Ease of Doing Business in the Bamboo Sector in Northeast India: Removal of Compliance Burdens" was also released in collaboration with the Confederation of Indian Industry (CII).

Source: Govt. of Nagalamd, DIPR

India's first bamboo-based ethanol plant in Assam was inaugurated by the Prime Minister

The Honourable Prime Minister Narendra Modi inaugurated India's first bamboo-based ethanol plant, Assam Bio-Ethanol Private Limited (ABEL), Numaligarh Refinery Plant in Golaghat district, on September 14, 2025. This is making a significant step towards energy self-sufficiency and green energy promotion.

The bioethanol plant will source 5 lakh tonnes of bamboo annually from Assam and other north-eastern states. It will benefit to local farmers and tribal communities, providing a boost to Assam's rural economy. After the amendment to the Indian Forest Act, 1927, bamboo is no longer classified as a tree, removing the ban on its cutting. This change supports the livelihoods of forest communities and private growers in the bamboo value chain.

Submission guidelines

We at Bamboo Info are excited to invite you to contribute full-length articles, news snippets, reports, and announcements of bamboo-related events for our upcoming issues. We welcome submissions on a wide range of topics, including but not limited to:

Spotlight: share your knowledge and expertise on any aspect of bamboo you're passionate about. You may introduce readers to a topical issue in the bamboo sector that deserves more attention.

Out of the Box: Have you stumbled upon a design concept, product novelty, or innovation that uses bamboo in a unique and creative way? We want to hear about it! Please submit an illustrated note describing the species used, dimensions, and other relevant details. The design should be original.

Species in Focus: Do you have a particular species of bamboo that you find fascinating? Share your insights on its distribution, ecology, salient features, specific uses, cultivation, and economic potential.

Roots: Bamboo has a rich cultural history and is still used in many traditional ways today. We would love to showcase time-tested bamboo products, cultural uses of bamboo, and traditional technologies from far and wide.

Chronicles: We are interested in hearing stories from the field about bamboo resource development, technology adoption, training, and other related topics.

Bamboo Quill: This section will highlight relevant books or publications about an emergent aspect of bamboo.

To submit your notes and articles, please send them to btsg@kfri.res.in or btsgkfri@gmail.com.

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Vol. 1, Issue 4

October 2025

Cover Image

Gigantochloa atroviolaceae from Field Research Centre of KFRI,Velupadam

About Bamboo Info

Bamboo Info is a quarterly newsletter from the Bamboo Technical Support Group (BTSG)-KFRI. Contents do not necessarily reflect the views or policies of BTSG-KFRI. Articles may be reprinted without charge, provided BTSG-KFRI and the author are credited. All photos should be credited to BTSG-KFRI.

About BTSG-KFRI

The Bamboo Technical Support Group is hosted at KFRI and supported by the National Bamboo Mission of the Ministry of Agriculture and Farmers Welfare to serve as a unit providing support to the National Bamboo Cell in technical and research matters.

KFRI BTSG team has expertise in various areas relating to bamboo which includes taxonomy, propagation, germplasm conservation, plantation technology, preservative treatments, harvesting techniques, pest and disease management, Value addition and marketing of bamboo products, inventory of bamboo stocking using Remote Sensing and GIS, socio-economic and livelihood potential, training programmes, cluster development and livelihood improvement of artisans and farmers, etc.

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