

# Bamboo Info

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



## Whispers from the bamboo: Unveiling the diversity of bambusicolous lichens

Dive into the hidden world of Bambusicolous, where lichens weave their spell on bamboo's every inch. A vibrant kingdom of cryptogams, lichens galore to unveil!



## Foldable bamboo stool

Compact and eco-friendly: Unfold endless possibilities with our new foldable bamboo stool! Sturdy, stylish, and built for your space.



## *Ochlandra scriptoria*

The genus *Ochlandra* belongs to shrubby reed bamboos endemic to the Western Ghats & Sri Lanka biodiversity hotspot. They are widely used for making handicrafts, baskets, mats, and also in the paper and pulp industry. The patches of reed breaks have been considered a stable vegetation climax capable of improving the soil properties thereby stabilizing slopes and preventing soil erosion. The above click shows *Ochlandra scriptoria* grown along the banks of the Chalakkudy River near Athirappilly water falls, Thrissur, Kerala.

## Bamboo traditions: The artistry of Kannadippaya

Light-dancing reflections, a gentle roll to fit inside bamboo - Kannadippaya's beauty lies in its weave and wonder. Discover its secrets, where Munroe's bamboo reigns supreme.



# Editor's Desk

Dear readers,

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

In this milestone edition, we are thrilled to shine a spotlight on the catalytic role played by the Bamboo Technical Support Group (BTSG). At BTSG, we work with the conviction that bamboo, often hailed as the "green gold" of our forests, is not merely a grass; it's a transformative force with the potential to reshape our relationship with the environment. Its rapid growth, strength and versatility make it a cornerstone for sustainable living. Bamboo Info is here to unravel the myriad facets of this incredible resource.

This issue features the diverse range of initiatives in the bamboo sector that spans the entire bamboo value chain. From innovative cultivation practices to the development of eco-friendly products, BTSG is all geared up to function as a driving force in harnessing the full potential of bamboo. This issue brings you news bits on policies, programmes, partnerships, designs, technology sharing, events and their positive impact on communities and the environment.

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**

## Bamboo – a social capital

“More than just a versatile plant, bamboo rises as a powerful social capital. It weaves its magic through communities, offering livelihoods to farmers and artisans, its strength reflected in traditional crafts and towering buildings. Its very presence whispers stories of cultural heritage, carrying ancestral wisdom. But above all, bamboo embodies sustainability, promises of a greener future where harmony with nature reigns. In bamboo, communities find not just a resource, but a thread that binds towards resilient prosperity.

Bamboo, beyond its scientific marvels of rapid growth and flexible strength, stands tall as a powerful social capital. It weaves itself into the very fabric of communities, anchoring livelihoods for farmers and artisans. Yet, its greatest strength lies in its quiet promise of sustainability. From weaving mats to constructing eco-friendly buildings, bamboo champions harmony with nature, offering a greener future for generations to come. Thus, bamboo transcends its material abundance and in its humble grace, bamboo not only thrives, but nurtures, solidifying itself as a social capital of immeasurable worth.”

### **VB Sreekumar**

Coordinator, BTSG-KFRI

### **V Anitha**

Associate Coordinator, BTSG-KFRI



## Spotlight

# Whispers from the bamboo: Unveiling the diversity of bambusicolous lichens

Lichens, one of the excellent examples of symbiotic association, are a group of non-vascular cryptogams, having composite thallus comprising of two components, mycobiont (which is a heterotrophic fungus) and photobiont. Depending on the species, the photobiont is either green algae (chlorolichens), or cyanobacterium (cyanolichens) or both. Lichens play an important role in terrestrial ecosystems as pioneer species of primary successional stages, biological soil crusts, atmospheric nitrogen fixers, epiphytic rain buffers and water condensers in high-precipitation forest and ecosystems, and food and shelter for animals. Lichens are characterized by their drought resistance; generally grow slowly and may survive to an impressive age; up to several centuries for a single specimen. Lichens are affected by atmospheric conditions and different species display a range of sensitivities to pollution which has enabled them to be widely used as bioindicators of air quality, and in climate change studies. Lichens have been used as medicines, spices, dyes, and source of many bioactive compounds.

Bamboo, members of the grass family Poaceae and subfamily Bambusoideae, comprise more than 123 genera with approximately 1678 species. Bamboo species are found growing in diverse climates, from cold mountain areas to hot



Bamboo clumps showing the luxuriant growth of lichens on culms at KFRI Field Research Centre, Palappilly.

tropical regions and providing a suitable substratum for many epiphytes including lichens. India has the second largest reserve of bamboos.

Bambusicolous lichens which embodies lichens growing on any bamboo substrates, including leaves, culms, branches, sheathes, and exposed rhizomes. Bambusicolous fungi were well studied, so far 1300 species have been reported or recorded globally. However, bambusicolous lichens have been poorly documented.

Generally, the bambusicolous lichens were treated under foliicolous category. But these lichens have often been categorized as foliicolous when found on bamboo leaves, and as corticolous when growing on culms by many lichenologists world-wide, and in some cases the substratum was not specified. Therefore, accurately determining the precise number of bambusicolous lichens is a challenging task without examination of the specimens deposited in the various herbaria and a thorough review of published literature. The current understanding of bambusicolous lichens remains incomplete. Nevertheless, an initial assessment of relevant literature revealed the presence of three species of lichen found growing on bamboos in India, whereas, about 40 species of lichens have been reported to be bambusicolous globally. The present data might vary highly due to the inadequate information about the habitat of many reported lichen species in earlier centuries.

About 28 species of bamboo are known from different parts of Kerala including bambusetum and natural habitats. A large number of lichens are found to be inhabiting bamboo. The host specificity is unknown. Despite persuasive calls for its documentation, this has not yet been studied. Like many organisms, bambusicolous lichens face several threats, due to forest



*Cryptothecia* sp. growing on bamboo culm.



*Diorygma* sp. growing on bamboo culm.



*Strigula* sp. growing on bamboo leaf.

degradation and land-use change, pollution, and extensive harvesting of bamboos for art and craft material. Anything harmful to the survival of the bamboo will directly affect the existence of these lichens. To conserve these lichens, we need to protect their habitats.

Bambusicolous lichens are a fascinating group of organisms. While much is not known about their diversity, distribution and ecological importance, there is still scope to learn about their genetics, host specificity, physiology, relation to climate change studies, and finding new bioactive compounds.

### **Siljo Joseph\* and VB Sreekumar**

*Forest Botany Department, Forest Ecology and Biodiversity Conservation Programme Division, KSCSTE - Kerala Forest Research Institute, Peechi - 680 653, Thrissur, Kerala.*

\*E-mail: siljojoseph@kfri.res.in

## Activated carbon from bamboo biomass

In the scenario of climate change and global warming, it is essential for every human to take sincere efforts for mitigating disasters made by us. Creating a greener earth through planting more trees and protecting forests is one possible way. However developing more tree cover outside forest areas need equal attention in order to challenge the tough realities of climate change and global warming.

Bamboo is one of the fastest growing plant, which has got many advantages including high growth rate, short period of harvest, high yield and multiple uses. The high productivity and resourcefulness of bamboo has made it a potential candidate for driving a huge economic growth. The proper utilization of bamboo resources offers practical solutions for sustainable economic development of every section of the society. Bamboo has the potential to generate huge volume of biomass in a shorter period of time and this could be utilized for various purposes. One such product from bamboo biomass is biochar - a carbon-rich substance made by pyrolyzing bamboo biomass. Though biochar could be prepared from other biomasses, the huge volume from bamboo resources offers significant potential.

Biochar and charcoal are different forms of black carbon that are amorphous in nature and possesses many pores. Biochar have more pores compared to charcoal hence it has the advantage of more surface area. As we are well aware, the charcoal is widely



Activated carbon from bamboo biomass.

used in applications related to adsorption of contaminants from environment, biochar emerges as a potential replacement for charcoal in such uses. As such bamboo charcoal has advantages over wood charcoal in terms of high surface area and better adsorption properties. Both charcoal and biochar are produced by the pyrolysis of biomass, but through varied procedures. Different species produces different levels of charcoal on pyrolysis and the yield varies from 24.60% - 74.27%. However, the biochar yield varies from 32 to 80%. Highest biochar production was observed from the species *Dendrocalamus giganteus*, which yields 80% biochar at 300 °C.

Activation of carbon material thus produced is a way to enhance its efficacy in terms of adsorption capacity as well as other specialized applications. There are

different procedures adopted for the activation of carbon which include chemical activation. Phosphoric acid, hydrochloric acid and potassium hydroxide are some chemicals using in the activation among many others. Activated carbon is a key component of many of the adsorbent systems and is the filter material used to clean exhaust gases utilized in treating wastewater and drinking water. Activated carbon is a popular adsorbent with a huge surface area, a consistent microporous structure. The efficiency depends on carbonization of biomass and activation of the carbonized material. Activated carbon from bamboo biomass has got high adsorption efficiency compared to wood charcoal. It has got a wide range of applications, including as an absorbent material, anode for dye-sensitive solar panels, in water purifiers, electromagnetic wave insulator for communication systems, blood purifier, and many more, based on its effectiveness in adsorption properties. The effectiveness of bamboo charcoal for the removal of antibiotics, such as, ciprofloxacin, which is largely available in pharmaceutical industrial waste is well documented. The carbonization and activation processes determines the adsorption capacity, surface area and

porosity of the material. Dye removal from synthetic wastewater using raw-bamboo-biomass-based magnetic “BC/Fe” bamboo charcoal–iron oxide nanocomposite adsorbents were successfully attempted and have confirmed its potential application in industrial dye-bearing effluent treatment.

Our studies found that *Dendrocalamus giganteus* has highest carbon content among the ten other bamboo species (*Bambusa bambos*, *Dendrocalamus strictus*, *Dendrocalamus tulda*, *Dendrocalamus brandissi*, *Thyrostachys oliveri*, *Dendrocalamus stocksii*, *Dendrocalamus asper*, *Dendrocalamus longispathus* and *Dendrocalamus polymorpha*) when pyrolyzed at a temperature of 270<sup>o</sup> C. It is also noted that acid based activation of bamboo charcoal has high adsorption capacity for dyes and depend on the time of contact and quantity of adsorbent material. The evaluation of performance at different conditions, is being studied.

Being one of the most available biomass, bamboo has the potential as a resource material for many such applications and based on requirement, the potential need to be tapped.

### **K Vidya and R Jayaraj\***

Non-Timber Forest Produces Department,  
KSCSTE - Kerala Forest Research Institute, Peechi - 680 653, Thrissur, Kerala.

\*E-mail: jayaraj@kfri.res.in

## Species in Focus

### *Pseudoxytenanthera ritchiei* (Munro) H.B. Naithani

Our species in focus is *Pseudoxytenanthera ritchiei* (Munro) H.B. Naithani, a lesser-known yet remarkable bamboo species found exclusively in Peninsular India. Known by vernacular names 'Erankol', 'Korna', 'Udha', 'Udhe', 'Huda', 'Manga', 'Tandali', 'Chiwa', 'Chiwan', and 'Chawa', it has distinct features which singles it out from the other bamboos with its thornless, loosely spaced sturdy and robust culms that are fully solid, much like rattan poles in size and appearance. This medium-sized clump-forming species is primarily found in moist deciduous forests in the Western Ghats in Maharashtra, Goa, Andhra Pradesh, Karnataka, Kerala, and Tamil Nadu. Interestingly, it thrives in extreme locations, such as, hilltops, ridges, and slopes, with elevations ranging from 200 to 1100 meters above sea level.

Type specimen of this bamboo was collected by Dr. David Ritchie in 1852 from a river near the Kala Nuddi waterfall in Bombay. Colonel William Munro named it '*Bambusa ritchiei*' in 1868. Several botanists later revised the binomial based on distinct morphological features. In 1990, H.B Naithani transferred this species to '*Pseudoxytenanthera ritcheyi*', which has been accepted by the Royal Botanic Gardens, Kew's taxonomic resource database 'Plants of the World Online'



A mature clump of *Pseudoxytenanthera ritchiei*.

(POWO). However, the nomenclature continues to change, and in 2008, scientists Dr. Muktesh Kumar and Mr. Remesh proposed a new genus, '*Munrochloa*', and a new binomial name, '*Munrochloa ritchiei*', during revisionary studies of Indian bamboos, citing the unique characteristics that distinguish it from all other bamboo species in India.

Despite the 140 years since the species was first described, *Pseudoxytenanthera ritchiei*





fascinate botanists and researchers alike. Its distinct appearance and adaptability to extreme locations make it a valuable species to study.

*Pseudoxytenanthera ritchiei* is easily identifiable in field conditions. When young, the culms are covered with a dense, golden-yellow, velvety powder, which transitions to smooth, yellowish-green culms as they mature. These culms can grow up to 10 meters tall and have a diameter of 4 centimetres, resembling cane poles, with the exception of the nodes.



*P. ritchiei* growing in rocky habitat.

The presence of monadelphous filaments, white plumose stigma, viable seeds, and seedlings in flowering clumps further confirm the species' identity. Forest-dependent communities extensively utilize *P. ritchiei* for various purposes, including as a source of nutrition and a structural construction material. Fishing communities in Maharashtra and Goa also use it, and in these regions, it is commonly used to construct temporary pavilions for religious and social events.

In Kerala, *P. ritchiei* is commonly used in



Inflorescence of *P. ritchiei* in dense clusters.

crafting temporary sheds for storing firewood, fodder, or agricultural produce. It also finds use in crafting walking sticks, crop support poles, hangers for drying processed rubber sheets, and vegetable trellises. It is utilized in the construction of traditional houses, and there is a high demand for poles supporting betel plants in their commercial cultivation in Tamil Nadu. It is also supplied as a hiking prop along the pilgrim treks at Velliangiri temple near Coimbatore in Tamil Nadu. The tender shoots are consumed as a vegetable in the Uttara Kannada and south Konkan regions of Maharashtra. Overall, this versatile species plays a significant role in the daily lives of many communities and serves as an essential resource for their livelihoods.

One of the most remarkable features of the species is its ability to act as an effective carbon sink, storing a substantial amount

of carbon in biomass and soil. Moreover, studies have shown that the biomass of *P. ritchiei* is rich in nutrients, including carbon, nitrogen, calcium, phosphorous, potassium, and magnesium. The decomposition process takes around 77 days to release 50% of the litter nutrients, making it an excellent source for use as compost.

However, the natural population of *P. ritchiei* is rapidly decreasing due to various threats, both biotic and abiotic. Factors, such as, invasive species, deforestation, unsustainable harvesting, dependency on the species for food by wildlife, and diseases pose significant challenges to its survival. Furthermore, gregarious flowering events and climate change could exacerbate the situation.

Despite its many uses and benefits, *P. ritchiei* has not been cultivated or commercially

utilized in India due to a lack of awareness. The existing population is fragmented into isolated patches, and continuous harvesting and overexploitation from natural populations could lead to its decline in natural forests. Therefore, promoting alternative methods, such as, commercial plantations outside forests, is essential.

To reduce the pressure on the natural population of *P. ritchiei*, cultivating it outside forest areas is a plausible solution. This can be done by planting it as a border crop in home gardens, incorporating it into agroforestry systems, farmlands, along riverbanks, and on community-owned lands, and including it in afforestation and restoration programmes. However, it is crucial to conserve its natural habitat to prevent the loss of genotypes while promoting large-scale propagation.



Extracted mature culms.



Transportation of extracted culms to Tamil Nadu.

**Muhsina Moosa\*, Syam Viswanath, M Amruth, VB Sreekumar and CP Antony**

KSCSTE - Kerala Forest Research Institute, Peechi - 680 653, Thrissur, Kerala.

\*E-mail: muhsinamoosa10@gmail.com

# Out of the Box



## Foldable bamboo stool

### Product Description

**F**oldable bamboo stool made of solid bamboo is naturally durable and sturdy with a high density of wood fibres. It can be used indoors, is very easy to fold and store, thereby taking up less space. The product is recyclable, which has been tested for public use and it meeting the requirements for safety, durability, and stability.



Sample prototype of Foldable stool.

### Process

The 3-4 year of old matured culms of solid bamboo species, *Dendrocalamus stocksii* is used. Properly treated solid bamboo poles of *D. stocksii* are usually available in various sizes and diameters. This needs to be segregated to help standardize the poles for making furniture. Generally, different dimensions of the standard solid rods of 40 mm, 35 mm, 30 mm, 25 mm, 20 mm, and

15 mm can be used in making different types of furniture.

Later this can be cut to various lengths and if any straightening is required it can be done by heating and pressing on the stand. Bending is practiced by applying the heat from a hot air gun or blow torch, which helps to change the physical composition to change the form. It needs to be cooled with water after keeping the bamboo straight on the bending stand. This process can be mechanized with technical intervention, which can make the process faster.

Once the bamboo poles are straight they need to be converted to standardized round rods with good quality surface in different dimensions through mechanical lathe or CNC lathe. The rods also need to be smoothened through a roller sanding process.



*D. stocksii* in different dimensions and smoothened standard round rods.

Looking at the standard round solid bamboo poles, various types of joints can be used. However, the simplest and most effective types of joints are round tenon and mortise joints. There could be various types of round tenon and mortise according to the shape of the shoulder.

We can use two different methods, such as, manually preparing the round tenon in the lathe which has limitations and it can be also made with a round tenon cutter, that can be fabricated according to the diameter of the required tenon. The tools (tenon making tool and fostener bit) for tenon making and the drilling are shown below which can be operated with a drill machine.



Rendered image of round tenon and mortise joint.



Tenon making tool and fostener bit.

These tools can make the process faster and more accurate to create the joints with standardized solid bamboo poles for making furniture. Once the components are ready with the joints, this can be fixed with adhesive for partial assembly. For further strengthening a cross dovel can be inserted at the places of joints.

This can be further smoothed by sanding and surface coating with any of the waterproof coating methods used on wood. Coating ling melamine, lacquer, water-based polyurethane, etc can be used. As a natural coating wax finish or double-boiled linseed oil is also appropriate for use on bamboo.



Component assembly using round tenon and mortise joint.



Bamboo component after coating with melamine.

Fixing of hardware and upholstery can be performed after the surface coating. If the

product is a knockdown furniture the assembly systems need to be planned in such a manner that a user should be able to do it by themselves.

### **CS Susanth**

*National Institute of Design, 12 HMT Link Road, Off Tumkur Road, Bengaluru - 560 022, Karnataka.*

E-mail: [cssusanth@nid.edu](mailto:cssusanth@nid.edu)

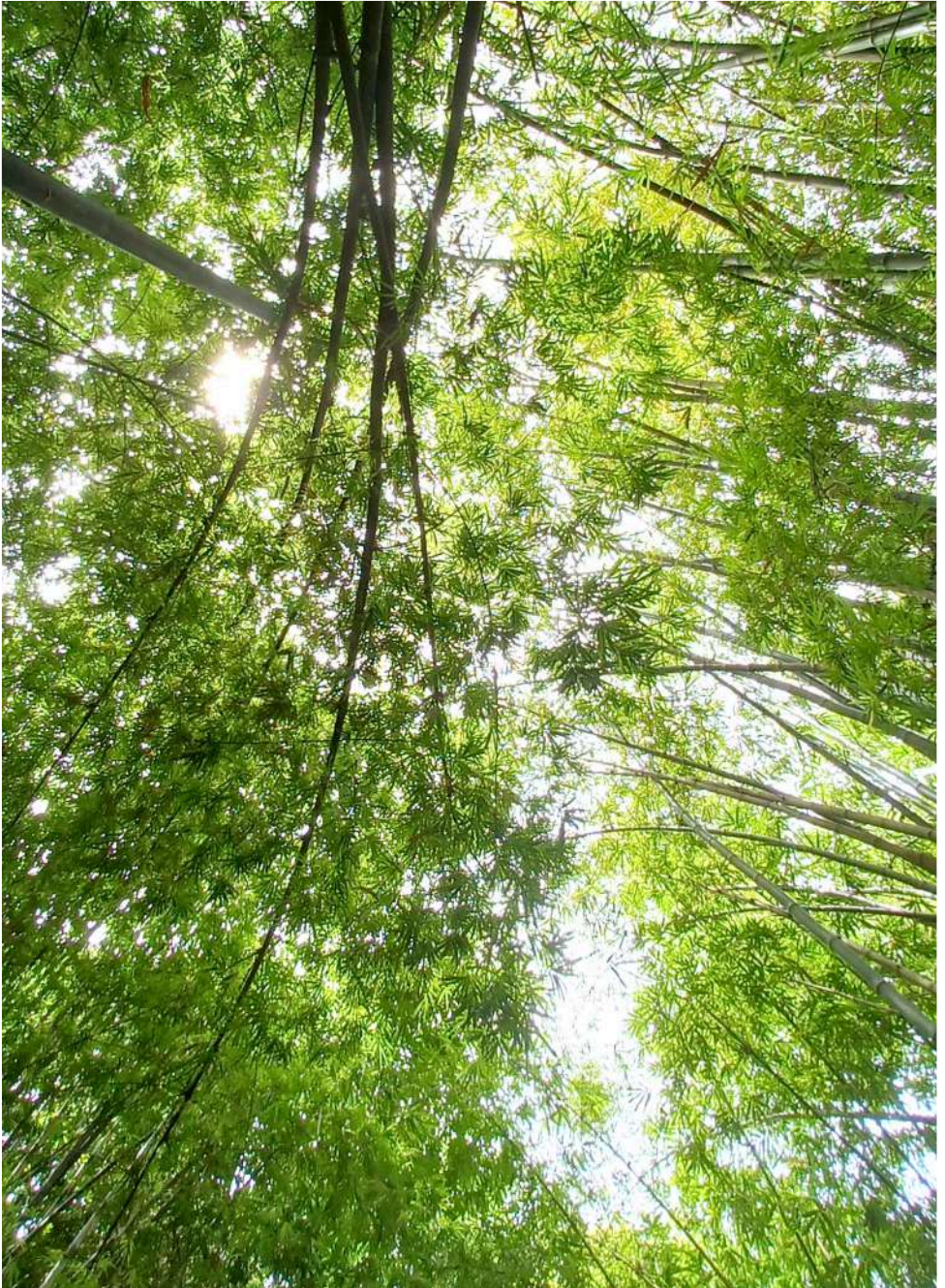
### **Specifications**

Height of frame: 18 inches, Seat Height: 16 inches, Seat Width: 15 inches, Seat Length: 16 inch.



Bamboo, with its natural hollow structure and acoustic properties, has been utilized for centuries to craft a diverse array of musical instruments across various cultures. From the elegant flutes of Asia, such as the dizi and shakuhachi, to the vibrant panpipes of South America, bamboo's versatility shines through in the creation of instruments that produce captivating sounds. The flute for Carnatic music and Hindustani music is made from different bamboo species. The reed bamboos *Ochlandra travancorica*, *Ochlandra scriptoria* and *Tienostachyum wightii* are the two species used for making flutes for Carnatic music in Kerala.

For more details on bamboo flutes please contact Mr. Sivadas – 9847855913



A view from Noor Lake bamboo collection, Tirur by VB Sreekumar

**“ Be like bamboo. The higher you grow, the deeper you bow. ”**

*Chinese proverb*

## Bamboo traditions: The artistry of Kannadippaya



Kannadippaya and noonjileeta used for weaving.

Indigenous communities possess profound knowledge of the forest and its resources, utilizing the available materials to craft captivating products for their daily lives. One such remarkable creation is Kannadippaya, intricately woven by skilled artisans belonging to the Urali, Mannan, Muthuvan, Malayar, and Kadar communities in the settlements across the Idukki, Ernakulam, Thrissur, and Palakkad districts in Kerala. The finesse of a well-finished Kannadippaya is exemplified by its ability to reflect light and its flexible nature, allowing it to be conveniently rolled and stored inside a bamboo culm. The choice of weaving material is a crucial aspect, and all communities unanimously favor *Teinostachyum wightii* Bedd. as the ideal

species for weaving *Kannadippaya*.

Bamboo mats play a crucial role in tribal life, used for sleeping, resting, and drying forest produce. Unlike conventional reed bamboo mats, crafting *Kannadippaya* requires a significant amount of skill and patience. Finely woven *Kannadippaya* holds significant value as a cherished gift among community members. The meticulous process involves the collection of the species from deep forests considering the lunar cycle, the selection and polishing of slivers, drying slivers, and the intricate art of weaving itself. The mat is fully natural and the quality depends on the species selection and choice of the slivers. The weaving is carried out with the fourth and fifth sliver

starting from the inner hollow. The slivers are polished and smoothened by pulling them beneath a sharp knife. Mastering the skills required for this craft proves challenging and is exclusively passed down through a hands-on or 'learning-by-doing' approach within the tribal communities. There are no written documents involved in the preservation and transmission of this intricate knowledge.

*Teinostachyum wightii* is an evergreen straggling species widely distributed on the slopes of the Western Ghats growing up to a height of 15 meters. The internodes may be about 2 meters reducing the need for joining the slivers. The species can be used to produce thin slivers having a particular sheen and is more durable and flexible according to the weavers. The species grows to its full potential by straggling on large trees. Weavers cut the culm on the bottom

and top and pull it out of the clump. The recent events of flowering and the difficulty in accessing the raw materials have forced the weavers to search for alternatives. Now most of the community members are using *Ochlandra travancorica* (Bedd.) Gamble, the most commonly available reed bamboo for weaving. But the *Kannadippaya* woven using *O. travancorica* lacks the same flexibility and luster as those crafted with *T. wightii*.



Ms. Rathiyammal, youngest weaver from Adichilthotti hamlet with kannadippaya.



Clumps of *T. wightii* reaching heights in the interior forests of Idukki



Culm sheath of *T. wightii*

**N Anjana\*, K Pranav, AV Raghu, Syam Viswanath and VB Sreekumar**

KSCSTE - Kerala Forest Research Institute, Peechi - 680 653, Thrissur, Kerala.

\*E-mail: anjana.nkp@gmail.com



## The story of bamboo collection at Pulpally, Wayanad



My fascination with bamboo originated from an admiration for artworks that showcased its beauty. Since my youth, creating art with a bamboo theme has held a special place in my heart. In 2010, my passion took a new direction as I began planting and collecting various bamboo species. Through extensive research on bamboo varieties in India and worldwide, I gained valuable insights. Initially, I planted a few bamboo varieties on my land, and over the years, my interest matured into a profound passion. What started as a budding curiosity has transformed into a deep and meaningful connection with bamboo.



John with his bamboo collection

Currently, my bamboo plantation covers fifteen acres in Wayanad, featuring approximately hundred and thirty seven species with two hundred ecotypes, more than ten thousand clumps ranging from the smallest, like *Shibataea kumasasa*, to the largest, such as *Dendrocalamus sinicus*. The majority of these species hail from different regions in India, mainly from the North-eastern states. I am eager to expand my bamboo collection and share my knowledge about these versatile, robust, and eco-friendly plants, intending to foster a profound appreciation for their remarkable qualities.

In my extensive bamboo collection, for having the highest species diversity in India, several varieties of rare and ornamental bamboo types coexist with commercially valuable species. The commercially important bamboos in my collection are *Dendrocalamus strictus*, *D. giganteus*, *D. asper*, *D. brandisii*, *D. latiflorus*, *D. sinicus*, *Bambusa balcooa*, *B. tulda*, *B. polymorpha*, *Thyrsostachys oliveri*, etc. The ornamental species include *Schizostachyum brachycladum* (Bali gold) and its green variant, *Schizostachyum aciculare*, *Gigantochloa* sp. with white-colored stems, *Gigantochloa atroviolacea* (Java black), *Bambusa lako* (Timor black), three varieties

of *Bambusa vulgaris*, including a rare black variety, *Fargesia jiuzaigou* with red-coloured stems, *Fargesia denudata*, *Hibanobambusa tranquillans shiroshima* (dragon white), and others.

Moreover, the collection also represents running bamboos like *Melocanna baccifera*, *Phyllostachys edulis*, *Phyllostachys bambusoides*, and others. There are seven varieties of *Bambusa multiplex* and climbing bamboo named *Dinochloa andamanica*.



*Guadua angustifolia*



*Hibanobambusa tranquillans*

I have extensively travelled throughout India, particularly in the north-eastern states, known for their rich bamboo collections and culture.

I am closely associated with bamboo researchers from institutions like KFRI Peechi, JNTBGRI Trivandrum, NECBDC Assam, RFRI Jorhat, FRC-BR Aizawl, Bamboo Research Centre Itanagar, IWST Bangalore, and several other social media groups on bamboo.



*Dendrocalamus brandisii*



*Schizostachyum brachycladum*

## Johnson Varghese

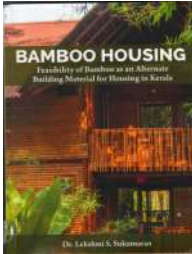
John's bamboo collections, Pulpally - 673579, Wayanad, Kerala.

E-mail: thottees@gmail.com

# Bamboo Quill



## Bamboo housing – feasibility of bamboo as an alternative building material for housing in Kerala



Book details:

Author: **Ar. Lekshmi S Sukumaran PhD (2022)**  
Laurie Baker Centre & COSTFORD, 2022 Kerala,  
ISBN: 9788194165149

**B**amboo is one of the oldest traditional building materials used by mankind since time immemorial. As technology improves, Bamboo has gained momentum as an attractive and sustainable building material for many reasons. It is a renewable resource, a naturally strong and durable material that can withstand heavy loads and extreme weather conditions and can reduce the carbon footprint. The book 'Bamboo Housing – feasibility of Bamboo as an Alternative Building Material for Housing in Kerala' by Architect Lekshmi S. Sukumaran is an excellent treatise on bamboo as a building material for contemporary living conditions. This publication considers bamboo-based housing by four critical feasibility conditions such as technological, economic, social, and

**VB Sreekumar**

*Forest Botany Department, Forest Ecology and Biodiversity Conservation Division, KSCSTE - Kerala Forest Research Institute, Peechi - 680 653, Thrissur, Kerala.*

E-mail: [sreekumar@kfri.res.in](mailto:sreekumar@kfri.res.in)

environmental aspects. The key issues like variations of physical and mechanical properties of different bamboo species, susceptibility to damage from the attack of biological agents, such as, insects and borers, and the need for scientific cultivation, harvesting, preservation, and treatment techniques and bamboo grading are highlighted. The systematic framework for designing a bamboo house suitable for semi-urban and rural areas is proposed by the author and validation of environmental sustainability of the proposed design is also conducted. The importance of regional factors, contextual appropriateness, user-centric designs, economic and environmental factors, and the choice of available technology are well discussed in the framework. It is established that the bamboo house would have 77% lower embodied energy and 66% lower CO<sub>2</sub> emissions than a typical contemporary house of equal size. Moreover, it is found that the bamboo house design is 30-40% more cost-efficient than comparable contemporary housing. This book is a valuable contribution to researchers and architects as bamboo is gaining global importance as a versatile, eco-friendly material for modern housing construction.

# Bamboo Beats

Collection of news and activities from the bamboo sector.



## 21<sup>st</sup> Edition of Kerala Bamboo Fest

Kerala Bamboo Fest is an annual event organized by the Kerala State Bamboo Mission (KSBM) to promote bamboo use and showcase its diverse products. It is one of the major interventions for the marketing of the Bamboo sector and provides a platform for the beneficiaries to widen their market, acquire knowledge about product development, and share information. The 21<sup>st</sup> Kerala Bamboo Fest 2024 was held at Marine Drive Kochi on December 7<sup>th</sup> to 12<sup>th</sup>, 2024. The fest was inaugurated by Shri. P. Rajeev Hon'ble Minister (Law, Industries & Coir), Govt. of Kerala. Shri. Hibi Eden Hon'ble Member of Parliament, Shri. Mir Mohammed Ali IAS, Shri. A.P.M. Mohammed Hanish IAS, Shri. N.S.K.

Umesh IAS, Dr. Kannan CS Warriar, Mr. Sreekanth P M, Shri. T.K. Mohanan, Shri. Rajeev G., Dr. K.S. Kripa Kumar, Shri. Manu Jacob, Shri. Najeeb P.A, and Shri. Suraj S participated in the inaugural programme.



Several artisans, designers, and farmers representing different states of India and international participation from Bhutan were also represented in the fest.

By promoting the use of bamboo, this fest contributes not only to environmental sustainability but also to the empowerment of communities through economic development and cultural preservation. The bamboo fest also serves as a platform to raise awareness about the ecological and economic benefits of bamboo, emphasizing its role in environmental conservation, carbon sequestration, and as a renewable resource.

## **World Bamboo Day 2024**

BTSG - KFRI & Extension Department of KFRI organized a one-day workshop on Bamboo in connection with World Bamboo Day 2024 on 18<sup>th</sup> September at KFRI Peechi. The programme was inaugurated by PP. Ravindran, President, Pananchery Grama panchayath. Dr. Kannan CS Warriar, Director, KFRI and Dr. VB Sreekumar, Principal Scientist,

Department of Forest Botany, KFRI; Dr. R Jayaraj, Principal Scientist, Department of Non-Timber Forest Produces, KFRI; Dr. Siljo Joseph, Junior Scientist, Department of Forest Botany, KFRI have participated in the programme. The key issues on raw material availability, skill development, market trends, challenges, government support, and policies for bamboo-based Industries, and regulatory framework for bamboo-based businesses were discussed. Members of BTSG-KFRI, researchers, artisans, and farmers were participated. In the afternoon session, a visit to the Field Research Centre, Palappilly, was carried out in which researchers, artisans, and farmers visited the Bamboo Primary Processing Centre, Bamboo Waste Management Unit, Bamboo Treatment Plant, Bamboosetum, Agro-forestry plot and Bamboo Germplasm collections.



## » **India's first bamboo-based biorefinery**

India's Numaligarh Refinery Ltd (NRL), a wholly-owned subsidiary of Oil India, is planning to commence ethanol production from bamboo as feedstock at its biorefinery in the northeastern state of Assam. The company is expected to annually produce 50,000 tonnes of ethanol, 16,000 tonnes of furfural, and 11,000 tonnes of acetic acid..

## » **Incubation centres for bamboo**

A significant step towards fostering bamboo entrepreneurship in the Northeast is the establishment of Incubation Centres for bamboo-based start-ups. This collaborative effort between a Sikkim-based university (Medhavi Skills University) specializing in industry-immersive education and the North East Cane and Bamboo Development Council (NECBDC) aims to provide a nurturing environment for budding entrepreneurs. These centers will offer crucial support, including mentorship, access to resources, and market linkages, empowering aspiring entrepreneurs to translate innovative bamboo-based ideas into successful ventures. This initiative holds immense potential to unlock the economic potential of bamboo in the northeast region, creating sustainable livelihoods and contributing to regional development.

## » **Revision of NBM guidelines**

The meeting of the Consultation Committee for the revision of NBM guidelines was held under the Chairmanship of Dr. Prabhat Kumar, Horticulture Commissioner & Mission Director, NBM. Officials and scientists from BTSG-ICFRE, NID, BTSG-KFRI, BCDCI, State Bamboo Mission (Maharashtra), KONBAC, URAVU participated in the meeting.

## » **Facilitation of quality planting material of bamboo**

A meeting on Facilitation of Quality Planting Material of Bamboo was held on under the Chairmanship of Dr. Prabhatkumar, Horticulture Commissioner, Ministry of Agriculture and Farmers Welfare. Detailed discussion was held on the Public Private Partnership



for mass production of bamboo quality plants from the Germplasm created by ICFRE and similar Govt. Agencies. Shri. Pasha Patel, Chairman, Maharashtra Agriculture Price Commission, Dr. Ratnakar Jauhri, DDG ICFRE, Dr. Ajai Takur, FRI, Shri. Sanjeev Karpe, Dr. Sreekumar, Dr. Suma Arundev from BTSG-KFRI, Dr. Nitin Kulkarni, Dr. Satyam Bordoloi, and Dr. Abhinav Kant delivered valuable contributions on the subject during the meeting.

*Source: National Bamboo Mission*

## » **India International Trade Fair (IITF)**

The 43rd India International Trade Fair (IITF) was held in November 2024 in New Delhi showcasing products like bamboo crafts, textiles, handlooms, handicrafts, embroidery, toys, cane crafts, gems, jewellery, ceramics, etc., This dedicated space provided the platform for MSMEs from across the country to exhibit their diverse range of products and services, connect with potential buyers, explore new markets, and foster business collaborations especially on bamboo.

### **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](mailto:btsg@kfri.res.in) or [btsgkfri@gmail.com](mailto:btsgkfri@gmail.com).

# Bamboo Info

## Vol. 1, Issue 1

January 2025

### Editorial Team

Dr. Kannan CS Warriar  
Dr. VB Sreekumar  
Dr. V Anitha  
Dr. Suma Arun Dev  
Dr. R Jayaraj  
Dr. AV Raghu  
Dr. Sandeep S  
Dr. M Amruth  
Dr. Siljo Joseph  
Dr. Donald James  
Dr. Shweta B Kukreti  
Dr. Sreejith KA  
Dr. Shambhu Kumar  
Dr. Wable Pawan Shyamrao  
Mr. Arun VR

### Layout & Design

Mr. Saneesh Raj. KS

### Cover Image

*Ochlandra scriptoria* patches along the banks of the Chalakkudy River.

### 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.

### Contact us

#### Bamboo Technical Support Group - KFRI

KSCSTE-Kerala Forest Research Institute  
Peechi - 680 653, Thrissur, Kerala, India.

☎ 0487-2690100

☎ 9446505286

✉ [btsg@kfri.res.in](mailto:btsg@kfri.res.in); [btsgkfri@gmail.com](mailto:btsgkfri@gmail.com)

🌐 [www.bambooinfo.in](http://www.bambooinfo.in)



**Bamboo Technical Support Group - KFRI**  
**[www.bambooinfo.in](http://www.bambooinfo.in) @BTSG-KFRI**