EVER GREEN

KFRI

NEWSLETTER

February | 2023

Interview with
Prof. M K Prasad

Newsletter of the
KSCSTE-Kerala Forest Research Institute, Peechi
Issue- 84-86
ISSN: 0254-6426
February 2023

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Published by:
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Cover photo:
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Printed at:
Printisign, Kozhikkode

From the Director's Desk

At KFRI, 2022 has been a year full of excitement as we moved out of the shadows of the pandemic to win the Best Performing Research Institute award declared as part of the Golden Jubilee Celebrations of Science & Technology in Kerala. I would like to dedicate this award to all those who contributed actively to the growth of this institute, especially the first-generation researchers and staff who laid a strong foundation for the excellent work culture that is prevailing in the Institute and to the agencies who collaborated with KFRI and continue to contribute to the research at KFRI.

Over these four and half decades, while advancing towards its fiftieth anniversary year, KFRI has come to assume a remarkable presence in tropical forestry research. As the priorities of tropical forestry and forest research have undergone paradigm shifts, we have responded quickly by addressing the emergent concerns and by reformulating the mandate. While originally conceived as an institution to cater for the forestry research needs of Kerala state, now services of KFRI are sought by numerous other states, national and international agencies, networks and coordinated research programmes in wide topical areas such as silviculture, timber forensics, species recovery, ecosystem restoration, forest hy-

drology, climate change studies, ecophysiology and forest dynamics. This issue of Evergreen carries reports of events and field sessions connected to these topics and more. As a significant move to pursue research in these areas, 14 new scientists were appointed during this period and we hope to soon fill in more vacancies so that the institute is fully equipped to address the challenges in forest management and biodiversity conservation.

KFRI has been steadily adding to its facilities, collections and data archives. The Central Instrumentation unit of KFRI has been elevated to the Centre for Analytical Instrumentation- Kerala (CAI-K) and is engaged in providing analytical services to the scientific community within and outside KFRI. The Centre had recently added a series of highly sophisticated and automated analytical instruments and is fully equipped to carry out a nearly exhaustive spectrum of all analytical services. In a major effort meant to enrich the geocoded real-time database at the Institute, a citizen science programme is initiated this year which we hope would expand its scope to diverse aspects of biodiversity conservation and human-wildlife interactions. Responding to the demands of the forest department, KFRI is setting up a Centre for Timber Forensics and you find an article on the topic in this issue of the newsletter. A note on the newly acquired facility of large-scale in vitro propagation of commercially important plant species at the Kuzhur appears in the pages that follow. KFRI is hosting the Regional Cum Facilitation Centre (RCFC), Southern Region of the National Medicinal Plants Board at its Peechi campus and a Medicinal Plants on-call helpline started functioning at the campus for the benefit of medicinal plants farmers with the generous funding of State Medicinal Plants Board. Aimed at empowering the communities subsisting on the bio-resources, the Extension and Training Division of the KFRI has been facilitating communities in filing applications for obtaining Geographical Indication Tag for the exquisite and unique products such as Kannadippaya (the mirror mat). The cover story of this issue of the newsletter provides interesting information on this exquisite hand-crafted product.

Wish you a wonderful year filled with the joy of learning and insights!

Syam Viswanath
Director, KSCSTE-KFRI

Prof. M K Prasad

Interview

Prof. M.K. Prasad (1932-2022) is known for his multiple roles as a science educator, environmental activist, and policy influencer. He had made lasting contributions in these areas while being part of popular environmental and science movements in Kerala. These are excerpts from the transcripts of an unpublished interview with Prof. M. K. Prasad by the KFRI team on 04 January 2014 at his residence in Kochi, Kerala.

"While it is important to carry out scientific studies on popular topical issues and people's science initiatives, publish such study reports and popularize the findings, it is equally important to engage in proactive policy dialogues with the governments to effect critical policy changes rather than waiting for the social pressure to build up its own and trigger a policy change."

"It is important to equip vernacular languages for science education, and that need not necessarily require creation of new technical terminologies in that language; in most cases, the original terminology that

is being used globally may be directly adopted into the vernacular, this could make the learning process easier and meaningful, especially for those who pursue higher studies at the centers of learning abroad.“

“Our forest management during the British period was a project of selectively growing economically merchantable species. Only prominent tree species of utility figured widely in the forest codes and rules, not the herbs and shrubs. Until recently, most of our ‘conservancy’ was actually about timber conservancy.”

“Nowadays, ‘ecology’ and ‘environment’ are terms in common parlance, but there is no deep understanding of the consequences of human actions on ecology and environment. Use of these terms has become mere social habits and rituals, which is insufficient, only actions based on a deep understanding of the meaning of ecology and environment can produce sustainable results on the long run”

Kannadippaya
(Bamboo Mirror Mat)

Cover story

Somewhere on the slopes of the high ranges of the Idukki district on the veranda of her thatched hut in a remote hamlet, 89 years old Ponmala, who hails from the Oorali Tribal Community, is deeply engrossed in perfecting the warps and wefts of a special soft, paper-thin bamboo mat she has just finished weaving. It is a gift to her newborn granddaughter. The know-how and skill possessed by Ponmala in preparing the raw material and weaving this mat is remarkable and is perfected over the centuries by innumerable generations. This exquisite piece of artwork with charming patterns and special optical qualities is called Kannadippaya. As per the customs of the Thankamma's community, reed and bamboo are intimately associated with every ritual and play a crucial role in their day-to-day life. Kannadippaya is an exquisitely crafted traditional bamboo mat, woven by some so the tribal communities of South Kerala with unique design elements called 'kannadi'. It is a product of pride for the members of these communities. The weaving of Kannadippaya is mainly a skill possessed by five ethnic groups viz. Oorali, Mannnan, Muthuva, Malayan and Kadar tribes mainly from the Idukki, Thrissur, Pathanamthitta, Ernakulum and Palakkad districts of Kerala. Other indigenous communities including Ulladan, Malayarayan, and Hill Pulaya are also engaged in its weaving to a lesser extent.

This traditional mat is woven using slivers made out of reed bamboo (thin-walled bamboo), collected from the forests in the Western Ghats. Njoonjileetta / njoojoora/ ponneetta/ meieeta/ neytheetta are some of the colloquial names of the reed bamboo [*Teinostachyum wightii* (Munro) Bedd.] used in weaving the

mats. Ochlandra sp., known as kareetta, pereetta, velleeta, chitoora, kanjoora, are also used in weaving kannadippaya, basket wares and handicraft items with kannadi designs. Normally 10 to 15 days are needed to weave a normal-sized mat fits of this natural sleeping mat are unparalleled. The mat is famous for its unique design elements, softness, appealing craftsmanship and light refractive properties. The square designs woven uniquely on this mat in different patterns are called “kannadi”. Each kannadi (square) and its surrounding warps and wefts on the mat impart it a unique appearance and beauty. A wellfinished Kannadippaya reflects light differently and creates different designs when viewed from different angles. Designs and mirrors become more clear and more visible with a slight change in the plane of view. For most luxury mats along with kannadi designs, designs of trees, animals and birds are also made along the corners. Border designs of the mat are also unique, very attractive and reflect light differently according to the slivers used. The mat is said to have health benefits as it has heat insulation properties, thus regular use of this natural bamboo mat is said to help one to keep away ailments such as rheumatism and back pain. Oorali community in their ceremonies of newborns has Kannadippaya as an object of ritual importance.

The skill of weaving Kannadippaya is learned by doing it under the supervision of experienced elders. It is said that the skill is very difficult to acquire and the know-how is preserved through ‘learning-by-doing’ mode with a lot of pain and sacrifice of comfort. KSCTE-Kerala Forest Research Institute, Peechi, has initiated programmes involving studies of physical properties of raw materials, community propagation and augmentation of raw materials, empowering the weavers by imparting training in making and marketing the product and introduction

of mechanisation in preparation of raw materials for reducing the drudgery of the mat weavers. The modernisation of making Kannadippaya-based products is a major objective of a DST-funded action-research programme. KFRI has also facilitated registration for Geographical Indication (GI) of Kannadippaya for its better visibility and brand positioning in the global markets.

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Stitching the success story of biodiversity conservation in human-modified landscapes:

A case study from Gavi, KFDC plantation division

Gavi, the graceful high altitude panoramic landscape mixed with tropical wet evergreen forests, montane grasslands and shaded cardamom and coffee plantations is one of the most popular ecotourism destinations in India. Every year thousands of tourists visit here because of its natural serenity, hospitality and attractive packages offered by the Kerala Forest Development Corporation (KFDC). Started in the late 1970s for improving the productivity of cash crops such as Cardamom and Coffee, KFDC not only built a plantation culture here, but also shaped the lives of many people rehabilitated from Sri Lanka as plantation workers and excellent tourist guides.

But this place is not just filled with history and culture. By sharing continuous landscapes with the protected areas like Periyar Tiger Reserve (PTR) and Ranni Reserve Forest, Gavi acts as an adobe for many endangered and endemic flora and fauna. Habitat types including grasslands, tropical evergreen and semi-evergreen forests, riparian vegetations, reed patches, rocky terrains and human modified landscapes, salubrious climatic conditions, and availability of resources are providing rich conditions for the wildlife to perish here. Since the land of KFDC is connected to the PTR, this land serves as an excellent corridor and foraging space for wildlife. A study conducted as a part of certification for wildlife-friendly and organic certifications for cash crop plantations of KFDC, Gavi by the Department of Wildlife Biology, KFRI, recorded 22 mammals, 110 birds, 20 reptiles, 31 amphibians, 58 butterflies, 51 moths and 29 odonates. These numbers are almost equivalent with the fauna of nearby natural vegetation of PTR and show the importance of wildlife-friendly farming practices near protected landscapes. Organic farming practices, left out unproductive plantation areas from management activities and restricted weeding activities allow wildlife in this area to make these plantations as their transportation corridors or shelter or foraging or even breeding grounds. The presence

of endangered and Western Ghats endemic mammals like Lion-tailed macaque, Nilgiri marten and Nilgiri langur; breeding populations of Great Indian hornbills, Malabar grey hornbill, Grey-headed bulbul and other nine species of WG endemic birds; endangered and endemic amphibian species like Malabar tree toad, Gadgil's dancing frog, Travancore bush frog which was once considered as extinct and rediscovered in 2004, species which are described from Gavi like Uthaman's reed frog, Gavi night frog, Sabarimala night frog; WG endemic reptiles like Large-scaled forest lizard , Elliot's forest lizard , Travancore ground skink, Günther's vine snake, Beddome's keelback and Bibron's coral snake were some of the interesting observations from this rapid survey.

The social surveys with the local communities and management revealed that the human animal interaction in this area is very limited and the residing communities are possessing a positive attitude towards the wildlife in this area. But the survey also showed the adequate knowledge of communities towards the lesser-known or non-charismatic group of animals and their lives around. This led to a lesser understanding of the microhabitat for lesser taxa like amphibians, snakes and insects. It is this lack of knowledge that paves way to threats like firewood collection. Another major threat is the limitless roadkills from this area. Pathanamthitta-Kumily road (~90km) is the main road connecting this mountain region to the townships. This is also the route tourists coming to Gavi other than the Vandiperiyar route (~30km). Amphibians and reptiles are the most affected groups found during the survey. Many WG endemic species like Günther's vine snake, Beddome's keelback, Shieldtail species, and many frogs were observed during the study period. Other than this, loud music, sounds produced by the vehicles are also negatively affecting the wildlife here.

Altogether, KFDC is building a success story for the wildlife in their human-modified landscape. But as mentioned earlier there are still gaps in building awareness among the local communities and thousands of tourists visiting the region. Also, long-term biodiversity research can surely contribute more towards the conservation of wildlife in this human-modified landscape with proper policy implementation and stakeholder participation.

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Photo Story

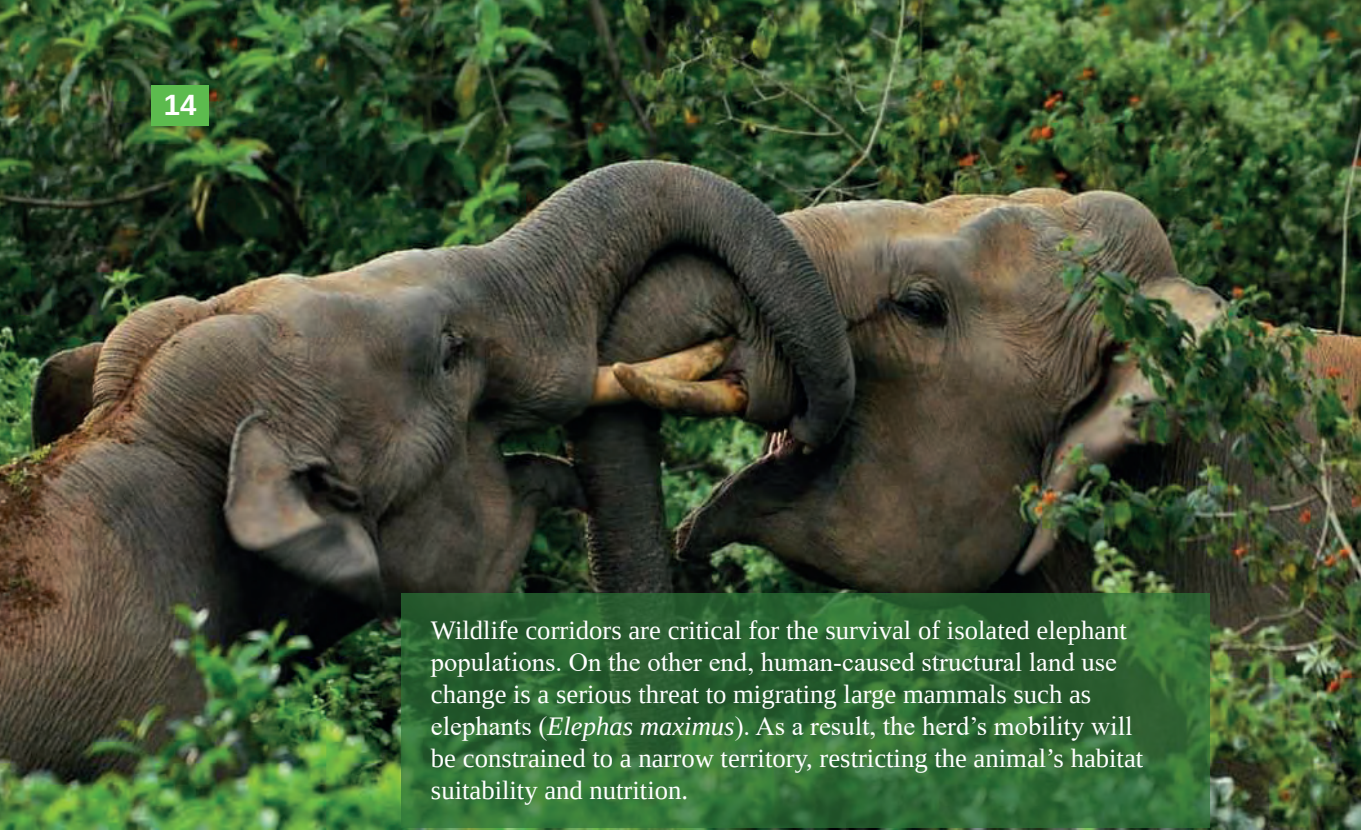
Wildlife in the tea plantations of Malakkappara

Nowadays, fragmentation, habitat conversion and changes in the land use pattern in natural ecosystems are serious threats to the wildlife community. Over the past few decades, spatial change of natural forests by the intervention of humans has become evident. They converted the land into plantations, farmlands, roads, cities, etc. Some of the animal communities have adapted to these changes, but some have not. Tea plantations make a huge gap between natural forests, which results in connectivity loss and affects the movement of animals. With the reduction in habitat heterogeneity, these animals are forced to restrict their habitat and foraging preferences in this limited area. Recently a severe forest cover loss has been observed in the Western ghats, which indicates the importance of understanding the relationship between habitat conversion, fragmentation and wildlife population viability for better conservation management efforts.

Tea plantations in a natural, undisturbed habitat result in the elimination of woody trees, creating a large open area for larger mammals such as Indian Gaur (*Bos gaurus*). The perks of this large, accessible area include restricted predation pressure due to clear visibility to the surrounding area. Furthermore, the grasslands/vayals that exist between these crops serve as a foraging area for these herbivores.

Lion tailed macaques (*Macaca silenus*) are typically shy animals that live exclusively in the core forest area. These animal troops forage for fruits, leaves, and flowers amid high canopy trees. However, these endangered primates occasionally visit the edges of forests and altered landscapes to feed on human-made food supplies.

Animal movements can often resolve a variety of ecological concerns. Dholes (*Cuon alpinus*) are indeed gregarious, pack-living wildlife that wanders across habitats for hunting and breeding. The bushes in the tea plantation favour them as a perfect place to hide and build an den for their secure breeding season.



Wildlife corridors are critical for the survival of isolated elephant populations. On the other end, human-caused structural land use change is a serious threat to migrating large mammals such as elephants (*Elephas maximus*). As a result, the herd's mobility will be constrained to a narrow territory, restricting the animal's habitat suitability and nutrition.

In human-modified landscapes like tea plantations, small mammal groups are essential for habitat structuring. They provide an essential source of food for several other taxa by increasing their biomass. The rapid increasing population rate of these small mammals favours small carnivores like the small Indian civet (*Viverricula indica*).

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Conserving the Indian doum palm

Hyphaene dichotoma (White) Furt. (Indian doum palm), locally known as 'oka mundel' is a threatened palm growing along the seasonal water - courses, coastal sand dunes and flat areas of Gujarat, Goa and Maharashtra, along with the union territories of Daman, Diu and Dadra. This palm is seen mostly in habitations of former Portuguese colonies possibly introduced in India by Portuguese sailors from Africa, as they employed the oil-rich seeds of this palm to light up their ships during night-time. However, the fossil petioles resembling closely those of this palm and fruits assignable to the species of genus Hyphaene have also been described from Deccan intertrappean exposures confirming its distribution in the past. KFRI conducted a preliminary survey on H. dichotoma in Goa and Gujarat in 2011 and found that the rapid industrialization process affected the populations and urgent conservation planning programmes are needed for this species. The existing population is highly fragmented. The genus Hypahene Gaertn. with about eight species, is distributed in the drier parts of Africa southwards to Natal, Madagascar, the Red Sea and the coast of the Gulf of Eliot, Arabia and Western India. Most of the species within this genus are important non-cultivated fruit plants with many domestic and commercial uses. The species contribute significantly to the livelihood and welfare of local communities and is used in several ways with products ranging from thatch, ropes, baskets, nuts, dye and medicine. H. dichotoma is also reported from Sri Lanka and might be introduced either from India or Africa. IUCN (2014) enlisted this species as Lower Risk/near threatened ver 2.3 and increasing settlement and development are the major identified threats for the survival of this species. As this palm is mainly found in human settlements or near to beaches, the population is rapidly declining due to habitat modification, and other developmental activities. The regeneration is very low and as this palm is slow-growing, it will take several years to produce flowering. As the male and female plants are seen as separate plants, sufficient male and female plants are also needed for producing seeds. As a part of the conservation of this species, seeds were collected from Gujarat and Goa, germinated in KFRI nursery and it will be restored to their original distribution sites.

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Restocking the IUCN listed Indian Redwood tree

-the decades long monitoring

Gluta travancorica Bedd. (Anacardiaceae) (Malayalam: Shenthuruni/ Chenkurinji), the Indian red wood tree, is an IUCN Red listed species, endemic to southern Western Ghats, India. The species is found in dense moist forests of Travancore in Kerala and the adjacent areas of Tamil Nadu (Tirunelveli), between 400 and 1,200m above msl. The evergreen tree reaches 35 - 40m in height and has a girth up to 5m. The wood is hard and durable with pleasant reddish heartwood and therefore very much in demand for furniture, tumery, carving and for ship building as the wood is resistant to salt water. The Shendurney WLS situated in Kollam District of Kerala is named after the species. The genus Gluta has major distribution in Malayan Peninsula with distribution of one species each at North Australia (New Guinea), India (G. travancorica, Western Ghats) and South Africa (Madagascar). The natural populations of the species were found dwindling as ecological, biological, genetic factors along with climate change affect the phenology, breeding behaviour and natural regeneration of the species.

The conservation through restocking of species was found to be an effective tool for enhancing the genetic base of the dwindling populations in situ. In this context, seedlings were planted during late 90's in the homelands, at moist evergreen forests of Shendurney (N-08°, 51.866' E- 077°, 06.986' ; 688 m asl) and sholas of Ponmudi hills (Thiruvananthapuram Dist.), N 08°, 45'33" E 77° 06 ' 58" ; 891m asl). The growth of the seedlings to saplings and to adult trees was monitored and recorded within two decades of planting. The reintroduced plants attained 5-7 m height and 35-40 cm girth and 10-12 m height and 50-60 cm girth at Shendurney and Ponmudi sites respectively. During growth stages, plants were found largely browsed by Sambar deer (Rusa unicolor) which impacted consistent growth of the plants (Figs.1-3).

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KFRI takes urgent steps to arrest the spread on

Red-eared slider turtle in Kerala

The Red eared slider turtle (RES)- Trachemys scripta elegans- was first spotted in the wild at Kalathode, Thrissur when 11 year old Adithyan caught it, strangled in his fishing gear. The picture of the turtle which was posted in the facebook helped to quickly identify by Sandeep Das, researcher at KFRI. He advised not to release the turtle back to the stream and alerted the Nodal Centre for Biological Invasions (NCBI) which specializes on managing invasive alien species.

The RES is a native of Mexico and has reached many parts of the globe through pet trade. A lovely pet which is sold at a size which can be fitted in a matchbox has taken the fascination of kids especially after the release the Ninja Turtle animation film series. It has become an invasive species in many countries and the trade of which has been banned in the US, European Union, Australia, Philippines, and Bermuda. It harbours the human pathogens- Salmonella and Shigella and being an omnivore, devours and impacts the fresh water native floral and faunal diversity. Australia had spent $ 1 million to eradicate the RES from its water bodies during 2014-17.

Suspecting more RES release in Kerala, NCBI started off a mass campaign using social media and prominent Television channels highlighting that the pet turtles should not be released to the wild at any cost. Large number of calls were received at NCBI from all across Kerala and there had to be a solution for people who wanted to part with their turtles. It was in response to this that KFRI started rehabilitation centres at three of its campuses- Peechi, Palapilly and Nilambur. These centres now hold 250 turtles of which 35 were tortuously collected from the wild. Studies on behaviour, feeding, reproduction and interactions with native species are now ongoing at all the three rehabilitation centres. There had also been reports of RES sighting from natural ponds, lakes and dams. NCBI has now designed a floating turtle trap which has crossed the stage of field testing which was successful. We are in the process of developing e-DNA tool to detect the presence of RES in water bodies.

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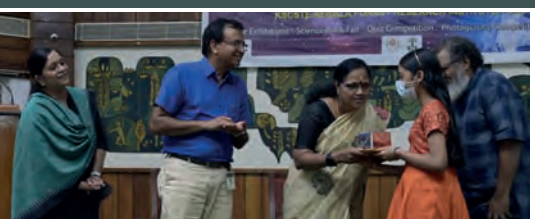
Vigyan Sarvatra Pujyate

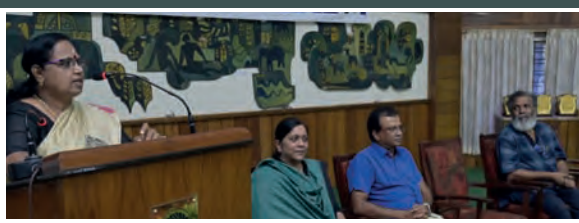
Commemorating 75 years of independence (Azadi ka Amrit Mahotsav), the Govt. of India organized "Vigyan Sarvatra Pujyate : Festival of SCoPE for all" glorious science week celebrations at 75 locations across the country from 22nd – 28th February 2022 with an objective of "SCoPE: Science & Technology Communication, Popularization & its Extension" in association with Vigyan Prasar and Ministry of Culture.

Kerala Forest Research Institute (KFRI) has been identified as the one of the 75 locations in India as a regional centre in Kerala under the coordination Kerala State Council for Science, Technology and Environment (KSCSTE). The event was organized as a 7 day program including Day 1: Grand Inaugural, Day 2: Annals of History of Science, Day 3: Milestones of modern S& T, Day 4: Swadeshi Paramparik Inventions & Innovations, Day 5: Science Lit Festival, Day 6: Next 25 Years and day 7: Grand Finale in 75 locations across India. Prof.C Raveendranath, Former Minister of Education, Government of Kerala inaugurated the event on 22nd Feb 2022.

Various activities organized as part of the Science Week Festival in KFRI was as follows:

- Science Expo by DRDO, Oushadhi, Jubilee Mission Medical College, KFRI, IRTC Palakkad, Banana Research center, State Medicinal Plant Board
- Science Talks by Dr. V Vijayakumar, Associate Professor in Physics(Rtd), Victoria College, Palakkad, Dr. George Varghese, Former Professor in Physics (Rtd), Victoria College, Palakkad and Dr. Rajmohan V Associate Professor and State Coordinator (State Ayurveda Covid -19 Response Cell), Govt. Ayurveda Medical College,Thiruvananthapuram
- Science Book Fair by KILA, Sasthra Sahithya Parishath,DC books and KFRI
- Exhibition by ISRO-Space on Wheels (ISRO)
- Poster Exhibition of milestones in S& T and renowned Scientists
- Competitions for School Students(Photography competition& Quiz Competition)
- Science Film Festival





Foundation Day

February 19, 2022

Reading Week Celebration 2022

KFRI Library and Information Division hosted a programme as part of Reading Week Celebrations that featured readings from a diverse range of languages. The program was scheduled on 24-06-2022 at KFRI Auditorium. The event's Chief Guest was the renowned novelist Shri. T. D. Ramakrishnan. He pointed out that, unlike in the past; today's readers face several obstacles on the pathway to reading. In order to have a feel for the languages, literary works authored in English (Dr. Syam Viswanath, Director ,KFRI) Malayalam (Dr. T.V. Sajeev, Dr. A. V. Raghu, Dr. K. A. Sreejith, Dr. P. Balakrishnan Mrs. Raji M. K.), Hindi (Dr. Shweta B. Kukrety), Marathi (Dr. Badole Srikanth,Dr. Ayate Deepika), Kannada (Dr. Mahadevakumar S), Telugu (Dr. Bhimalingappa), Tamil (Dr. Muthukumar) each were read. Library and Information Division Head Dr. KF George gave the welcome speech and KFRI Registrar Dr. TV Sajeev presided over the event. The winners of the Reading Day Slogan Competition also received prizes for their creative and catchy slogans. Retired scientist Dr. Damodaran, Mrs. Kirti K, Mr. Vimal Raj extended their greetings as well. Mr. Arun V.R. delivered the expression of gratitude for the event.

Snake Sense - an awareness programme

During the Science week-2022, the Department of Wildlife Biology, KFRI conducted an awareness programme named “Snake sense” for understanding the knowledge and perceptions of the public and creating awareness on snakes. Kerala is home to over 100 species of snakes and among these only few are venomous species. However, due to fear and resentment due to large numbers of deaths and injuries due to snake bites, the majority of the snakes get killed at first sight. Such anthropogenic kills have serious impacts on the population of snakes and thereby their ecosystem services. The programme involved three sessions: identification of snakes from photos, a questionnaire about the knowledge and perceptions and a visit to the reptile section of the Wildlife Museum with an explanatory lecture. 196 people participated in the snake identification and 166 people participated in the questionnaire to assess the knowledge and perceptions. About 53% of participants correctly identified the venomicity of snakes. However, there were high mis-identifications for species like Wolf snake and Sand boa, which are mimics of venomous species. At species level, only 37% were correctly identified and with the least number of correctly identified for Wolf snake and sand boa. The knowledge and perceptions about the snakes by the participants were poor and largely negative. We hope that the awareness programme after the surveys improved the knowledge and perceptions towards snakes and urges the need to conduct micro-level awareness programmes for the conservation of snakes.

Sports Day

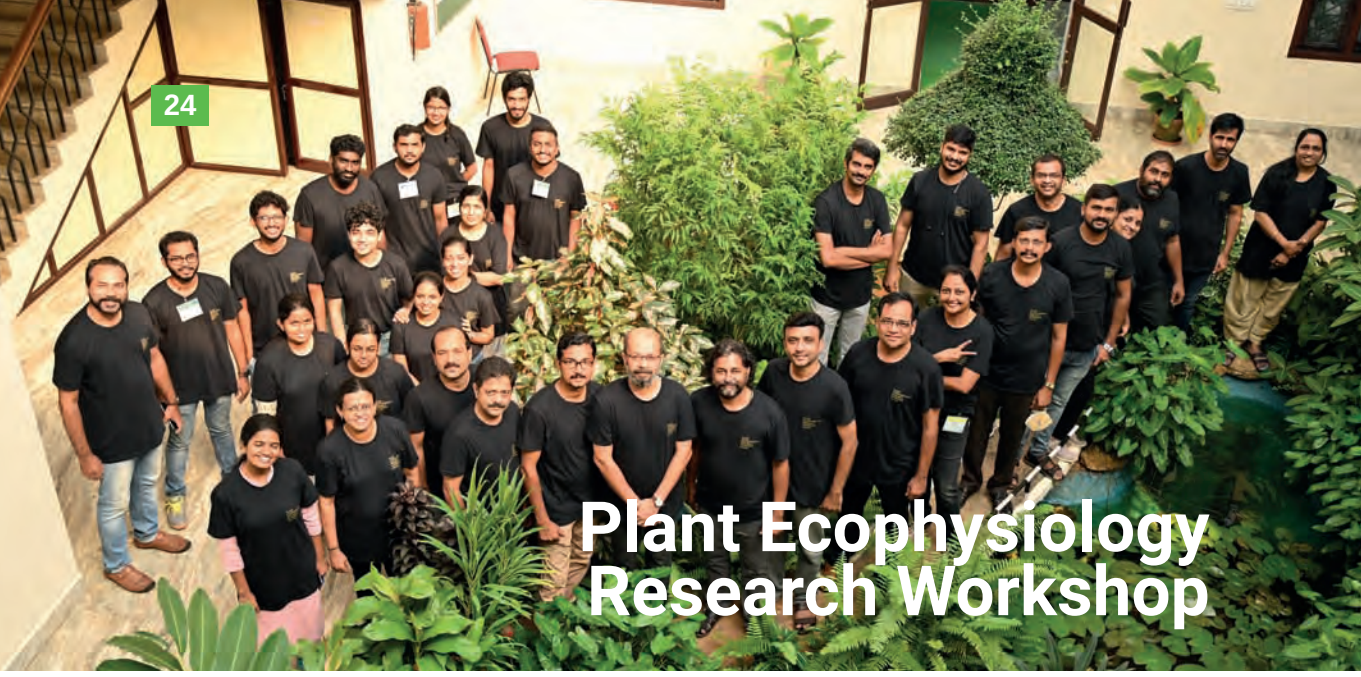
December 21, 2022

Consultative Meeting on Kannadippaya GI

Consultative meeting on the GI application of Kannadippaya was conducted on May 17, 2022, at the extension and training division of Kerala Forest Research Institute. KFRI Director Dr. Syam Viswanath presided over the function. Idukki District Panchayath president Mr. Jiji K Philip inaugurated the function. KSCSTE Executive Vice President Prof. K. P. Sudheer was the chief guest. GI Consultant, Dr. C. R. Elsy presented the proposed application of GI. Various designs of Kannadippaya were displayed by the applicants; Unarvu Pattikavarga Vividhodhesha Sahakarana Sangham and Vanasree Bamboo Craft and Vanavibhava Sheskarana Unit. A short teaser video of Kannadippaya produced by the extension training division was also screened. The meeting was attended by Mr. T. K. Mohanan (Chairman, Kerala State Bamboo Corporation Ltd.), Dr. S. Bindu (Director, KIRTADS), Dr. R. V. Varma (Member, Research Council, KFRI), Mr. K. G. Manoj (Asst. Tribal Development Officer, Adimali), and Mr. S. Jayashankar IFS (DCF Research (N) Thrissur).

Training on Plus-tree Selection for Technical Staff of ICFRE

Three days' certificate course on "Plus Tree Selection for Technical Staff of ICFRE, Dehradun" Sponsored by Indian Council for Forestry Research & Education of Ministry of Environment, Forests and Climate Change (MoEF& CC), Government of India was organized through Virtual mode at KSCSTE -Kerala Forest Research Institute during 28-30 September 2021 at Tectona Hall KFRI, Peechi. This training programme was attended by 38 Participants from RFRI Jorhat, RFRI Jodhpur, IWST Bengaluru, HFRI Shimla, IFP Ranchi, TFRI Jabalpur, and IFB Hyderabad. Different topics includes improvement methods in tree crops, Science behind the plus tree selection in Forestry and new methods of plus tree selection were handled by both internal and external resource persons who are experts in various disciplines of the subject offered in this training programme.



Plant Ecophysiology Research Workshop

Plant Ecophysiology Research Workshop (PEPR 2021) was held in KFRI, Peechi during December 5-8, 2021. This was organized by the Department of Forest Ecology with the support of SERB, Dept. of Science and Technology, Govt. of India. More than 20 college teachers from different parts of the country have participated in the event. This workshop was intended to update the knowledge on the impact of climate change and to give hands-on sessions on various tools and protocols available to measure the response of plants to changing climate. There were invited talks on various aspects of climate change and ecophysiological tools to understand the effect of climate change. Globally renowned ecophysiologists Prof.Kathy Steppe (Ghent University, Belgium) and Prof. Emanuel Gloor, Leeds University gave highly useful sessions on Plant hydraulics and Response of Amazon forests in the context of climate change. In addition, Dr.Jose Kallarackal (one of the doyens in ecophysiology), Dr. Deepak Barua, Dr.T.V.Sajeev, Dr.K.A.Sreejith, and Dr.Ron Sunny gave sessions on various aspects related to climate change. Hands-on training on ecophysiological instruments/tools/techniques were also provided by a team of experts including Dr.Deepak Barua, Dr.K.A.Sreejith, Dr.Ron Sunny, and Abdulla Naseef. The programe was inaugurated by Dr.Syam Viswanath, Director, KFRI in the presence of Dr.T.V.Sajeev, Registrar-In Charge, KFRI, and Dr.V.Anitha, Research coordinator, KFRI.

GSDP-Certificate Course on Propagation & Management of Bamboo

Green Skill Development Programme (GSDP), Kerala Forest Research Institute (KFRI) organized a certificate course on Propagation and management of bamboo through ENVIS Hub Kerala State Council for Science Technology and Environment (KSCSTE), held from 16/03/2022 to 27/04/2022. The duration of the course was 240 hours. The main objective of the course on Propagation and management of bamboo was to develop technical skill on various aspects of bamboo such as Botany & taxonomy, Seed technology and treatment, nursery techniques and propagation, plantation management and harvesting methods, conservation, value addition, preservation etc. Interview and selection procedures were conducted following the guidelines from MoEF& CC and seven candidates were selected for the course of which five candidates were attended the course. The class room sessions were handled by both internal and external key resource persons who are experts in various aspects of Bamboos. Filed visits were arranged in various institutes/organizations (Bamboo Plantation at KSBC Campus Angamali, Uravu, Wayanad, Grow More Biotech, Hosur, Tamil Nadu and KSBC Factory, Nallalam, Calicut etc.) where the participants got opportunity to get enough exposure and understand the applications of what they have been taught in classrooms.

GSDP-Certificate Course on Value addition & Marketing of NTFPs -Bamboo Craft

Two-month certificate course on "Value Addition & Marketing of NTFP (Plant Origin)- Bamboo Craft" sponsored by Ministry of Environment, Forests and Climate Change (MoEF & CC), Government of India under Green Skill Development Programme (GSDP) was organized through ENVIS and Kerala State Council for Science, Technology and Environment -Kerala Forest Research Institute during 16 March 2022 – 25 May 2022 at the Extension and Training Division of Kerala Forest Research Institute (KFRI), Peechi. This GSDP training programme was attended by 9 candidates. The key objectives of the training programme includes training in bamboo craft, skill training, design development workshops in collaboration with different master trainers, establishment of micro enterprises for bamboo craft and improving social groups through, sustainable entrepreneurship. It would be helpful for new entrepreneurs to develop a self-employment opportunity in the field of Bamboo handicrafts. The course on Bamboo Crafts broadly covers aspects such as species and products range of bamboo, operation of processing machines, conversion of bamboo, product making & product design, Bamboo boards preparation, Bamboo hut construction and Furniture making. Practical classes on Processing and Product making were taken by resource persons from KFRI and master trainers from reputed institutes/ organizations and bamboo clusters. products made by the trainees are Agarbathi Stand, Pen Cup, Table Organiser and Bamboo Speaker etc.

Training course for the officers of Indian Forest Service

One-week Compulsory training course for the officers of Indian Forest Service on "Conservation and Development of Medicinal Plants and Benefit Sharing with Local Communities during 17 - 21 October 2022 at KFRI. 40 officers were intimated, among them 24 officers from different states of India were participated the training program. This year the programme was offered in direct mode with physical participation as a departure from past two years when under prevailing conditions of pandemic, the training was offered online. Practical orientation was provided during the interactive session in the lecture hall of the Extension & Training Division, KFRI and while on tour to different organizations/plantations/forest areas includes drug formulation and manufacturing facility of Oushadhi, Vazhachal MPCA and Athirapally Water Falls and CIMH, AVP, Kanjikode, Palakkad etc. There was a proper blend of internal and external faculty who had very good exposure in the topic of the training programme. The course was designed based on inputs from MoEF& CC. Overall, the participants benefitted from the course and they found the course informative and useful.

Training Programme on Mangrove Conservation and Propagation

Training on Mangrove Conservation and Propagation is organized for the staff of the Social Forestry wing of the Kerala Forest Department by the Kerala Forest Research Institute (KFRI) at Peechi on Thursday 23 September 2022. Sri Raveendran, President Pananchery Panchyat, inaugurated the program, and Dr. TV Sajeev, Registrar KFRI presided over the function. Dr. K V Muhammed Kunhi and Dr. A V Raghu addressed the participants. Dr. S Sandeep, Dr. K A Sreejith, and Dr. V B Sreekumar elaborated on the various aspects of conservation and Propagation of the endangered mangrove flora and familiarised the technical aspects of restoration and management of mangrove forests. A total of 19 ACF/DFO level staff of the Kerala Forest Department participated in the program.

One-day A
wareness training program on conservation and management of mangrove at Payyannur Municipality on 21th June 2022. 57 participants from staffs and counsellors from Payyannur Municipality were attended the training.

One-day Awareness training program on conservation and management of mangrove at Kasaragod Municipality 22th June 2022.

Invited talks

The seminar committee of KFRI in association with various departments organized eight invited talks and three training programmes during 2022. Details as follows:

■ Invited talk in association with the Department of Wildlife Biology: "The Himalayan langur project: Research, Conservation and Education" by Dr. Himani Nautiyal, Post-Doctoral Associate, Howard University, Washington DC, USA & National Institute of Advanced Studies. 29th December, 2022

■ Invited Talk in association with the Department of Wildlife Biology: "Human-Animal Interactions in India", by Dr. A.J.T. Johnsingh, former Dean, Wildlife Institute of India 12 December 2022

■ Invited Talk in association with the Department of Wildlife Biology: "Wildlife Conservation in India", by Dr. A.J.T. Johnsingh, former Dean, Wildlife Institute of India. 12 December 2022.

■ Invited Talk as part of World Soil Day in association with the Department of Soil Science "Agroforestry perspectives of soil conservation and productivity in the climate change scenario" by Dr. Kunhamu T K, KAU. 5 December 2022.

■ Training programme: *Pararaksha* - First Aid training for KFRI daily wage/contract staff on Emergency Situations by Sri. Basheer, Daya Hospital, Thrissur – Part III. 03 December 2022.

■ Training programme: *Pararaksha* - First Aid training for KFRI office staff on Emergency Situations by Sri. Basheer, Daya Hospital, Thrissur– Part II. 29 November 2022.

■ Kadarivu – Knowledge and Experience on the Forests of Kerala. Invited Talk by Sri. A.O. Sunny (Rtd ACF) Kerala Forest and Wildlife Dept. 08 November 2022.

■ Training programme: *Pararaksha* - First Aid training for KFRI project staff on Emergency

Situations by Sri. Basheer, Daya Hospital, Thrissur – Part I. 24 November 2022.

• Invited Talk on World Mereological Day "Early Warming and Early Action for Disaster Risk Reduction"by Dr. Manoj M. G., CUSAT. 23 March 2022 (Online Mode).

• Invited Talk on International Day of Forests 2022 on "Forestry Challenges and Sustainable Development" by Dr N. Krishnakumar IFS (Retd.), Chairman, RC-KFRI. 21 March 2022 (Online Mode).

• Invited Talk on International Day of Forests 2022 on "Participatory Forest management & Community Development - Sharing Experience from Odisha" by Dr Krishnakumar K, Navaladi. 21 March 2022 (Online Mode).

Newly added facilities at the Forest Seed Centre

Kerala Forest Seed Centre (KFSC), is a collaborative venture of KFRI and Kerala Forest Department. It is located in the KFRI main campus at Peechi. The existing general facilities on seed testing and processing at KFSC has been upgraded with cold storage facilities with varying storage temperature, especially for the recalcitrant seeds.

Centre for Analytical Instrumentation-Kerala (CAI-K)

The sophisticated analytical instrumentation facility; Centre for Analytical Instrumentation – Kerala (CAI-K) houses sophisticated analytical instruments required for chemical, environmental and life sciences research. The facility caters to a wide range of researchers, students, government and non-governmental institutions and Research & Development labs in sophisticated analyses and instrumentation training. It was established as a state-of-art facility in a phase wise manner as a collaborative programme of Kerala State Council for Science Technology and Environment (KSCSTE) and Kerala Forest Research Institute (KFRI). It is included in the "Special Programmes of KSCSTE "and is a part of "impactful programmes Hon'ble Chief Minister of Kerala". The Facility was inaugurated by Hon'ble Chief Minister of Kerala, Shri. Pinarayi Vijayan on 08 November 2018.

The overall performance of the Centre since 2021-22, can be categorized into two aspects, i) routine sample analysis and ii) training programmes. A total of 2055 samples were analyzed during the period from 01 March 2021 to 31 April 2022. The data clearly indicated an increase in the use of the facilities available in the Centre. The lockdowns and restrictions due to Covid-19 pandemic affected negatively on the routine functioning of the Centre in the initial months of 2021. Since the Centre conducts hands on training programmes, the lockdowns and restrictions made it impossible to conduct such programmes. A total of Rs. 9.06 Lakhs was generated during the period. The income generation was in the order, analytical charges – 73.93%, Training programmes – 13.24 % and water quality analysis – 12.81 %. Among the users, 68.56 % were of internal users and 31.43 % were external users. The income generation is in the pattern that 61.26 % of income was generated from external sample analysis and 38.73 % was generated from internal users. The major service of the Centre are for sample analysis using different sophisticated analytical instruments. In some cases, preprocessing of the samples are also carried out by the Centre, where ever required. Three internship programmes were conducted during this period and the candidates were trained in operation, handling, sample analysis, data evaluation, record keeping and maintenance all the analytical instruments available at the Centre.

New instruments

Recently three major instruments were added to the facility including High performance liquid chromatography (HPLC), M/s. Shimadzu Corporation, Japan; High performance thin layer liquid chromatography (HPTLC), M/s. Camag, Switzerland and X- Ray Diffractometer (XRD), M/s. Rigaku Corporation, Japan. The financial expenditure was for HPLC –Rs.38.5 lakhs ; HPTLC-Rs.57.5 lakhs and XRD-Rs.41.475 lakhs respectively. Among this, HPLC was purchased from the KFRI Plan grants and HPTLC & XRD were purchased by the grants received through the special programme of KSCSTE. The instruments were installed at the Centre and training programmes and routine sample analysis were initiated.

The procurement of the GC-MS initiated in the year 2021-22 is under processing and the Purchase Order for the same was placed vide No.KFRI/PO 318/2096/CAIK/21-22 dated 25/03/2022 for Gas Chromatograph, GCMS-QP2020EI NX with Electron impact ionization and with Advanced Flow Technology with Fast GC-MS capability, Auto injector AOC-20i plus and FID of M/s. Shimadzu Corporation, Japan.

visit: https://www.caik.res.in

Centre for Citizen Science & Biodiversity Informatics

Citizen Science also known as participatory science, volunteer-based monitoring, or crowd science is scientific work undertaken by members of the general public, often in collaboration with or under the direction of professional scientists and scientific institutions. Citizen science is recognized as an excellent tool for democratizing science and promoting equitable access to scientific data. Digital tools, especially the camera and GPS applications on smartphones revolutionized participatory science and have the potential to generate big data required for developing policies to address global problems such as biodiversity loss, climate change, etc.

The Centre for Citizen Science & Biodiversity Informatics is established to support evidence-based policy making in biodiversity conservation by democratizing science. The specific objectives are to:

- Coordinate and co-develop citizen science programmes,
- Generate and collate biodiversity data for science and conservation,
- Organize capacity building workshops for researchers and citizen scientists, and
- Develop public outreach programmes to improve environmental awareness and capacity of citizens to contribute quality data.

Kuzhur Sub-Centre

The Sub Centre at Kuzhur, is taken over by KSCSTE – Kerala Forest Research Institute, Peechi as on 01.01.2022, from KSCSTE- Jawaharlal Nehru Tropical Botanic Garden and Research Institute. The Centre is established in 2019 with the financial support of Kerala State Industrial Development Corporation (KSIDC). The Sub Centre, is situated in an area of around 1.27 acres. Presently, the Sub Centre is equipped with a full-fledged 10000 sq. feet Plant Tissue Culture laboratory. The laboratory consists of media preparation, inoculation, incubation and sterilization rooms. The facility has a total production capacity of 5,00,000 plants per annum. The Sub Centre mainly aims at expanding the cultivation of *Pandanus* (screw pines) by providing plantlets of different species of Pandanus, suited for different purposes including restoration programs, thereby helping the livelihood improvement of the dependent communities and revival of traditional industries based in Kodungallur and its surrounding Panchayats. The Sub Centre is currently focused in the production of tissue culture raised plantlets of different species of screw pines (*Pandanus odorifer, P. furcatus, P. leram, P. tectorius, P. pygmaeus*), forestry species (bamboo, teak), agriculture crops (banana, ginger), ornamental plants (*Aglaonema, Calathea, Philodendron, Spathiphyllum, Orchids, Anthurium, spider lilly, Cordyline,* etc.) and medicinal plants.

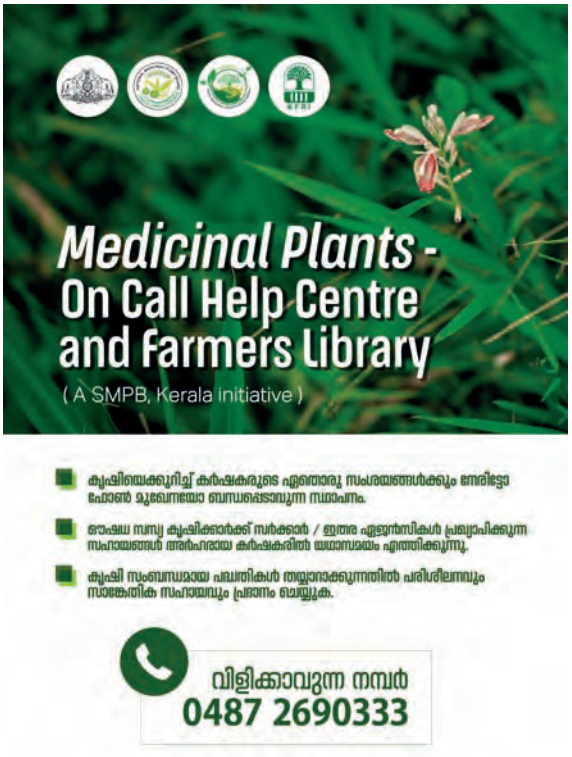
The Sub Centre is envisioned to evolve as a Research and Development (R&D) Outreach and Bio-incubation Centre of the Institute. The envisaged activities in a phased out approach include (1) upscaling the facility so as to cater to the extension activities of the research projects and outreach activities of the Institute (2) mass propagation of plant species of commercial importance in line with demand from various stakeholders, local farmers, government and public sector enterprises, NGOs, academicians and individual entrepreneurs (3) genetic fidelity testing of tissue culture raised plantlets (4) production of QPMs of tree species and other miscellaneous multipurpose native tree species and medicinal plants in high demand, through nursery established and managed at the Centre (5) training of manpower in plant tissue culture (Training for academicians, internship students and Masters attachment programs) to generate a regular income (6) as a Bio-incubation Centre for start-up entrepreneurs in tissue culture.

Medicinal Plants On Call Help Center and Farmers Library

(An SMPB, Kerala Initiative)

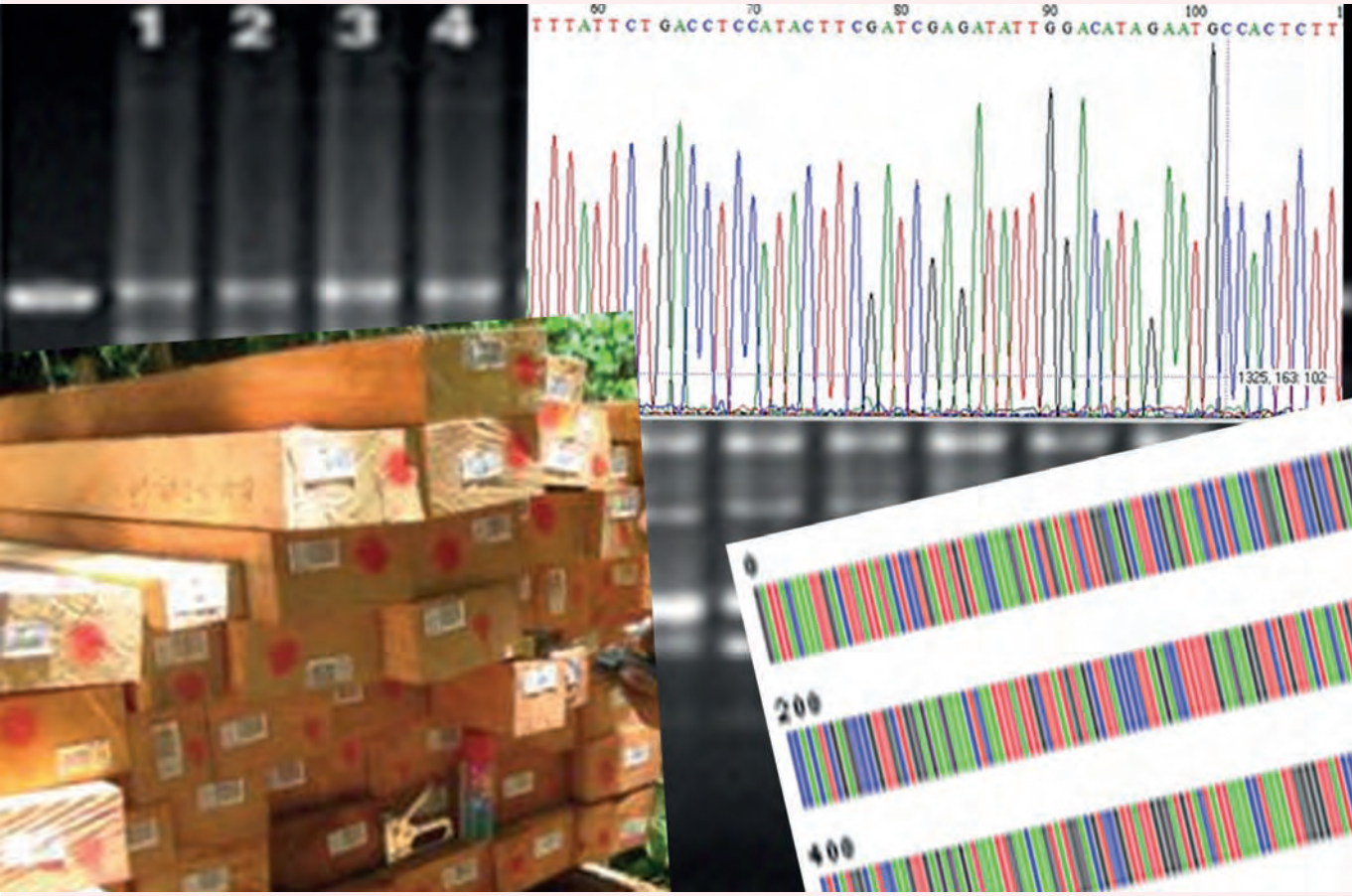
This is a KFRI facility which enable farmers to seek expert options and solutions to any issue they may facing with respect to cultivation of medicinal plants. The facility also offers timely delivery of financial and technical assistance announced by the Government as well as other agencies to medicinal plant growers. The help center would also provide assistance in preparing project proposals/ agreements related to medicinal plant cultivation and make it available to the needy.

The help center activities commenced from the month of February 2021 and we started receiving the calls. 360 calls were received which were recorded and the clarifications sought on various aspects of medicinal plant cultivations were provided. As of now, the database of farmers built based on these queries has information on 190 farmers. All the calls were answered with necessary information and the queries were closed. In connection with these queries, we have carried out field visits and taken up a couple of documentation works. Information on the farmer's experiences with medicinal plants cultivation, agro-techinques and cultivation protocols they are following etc. are being recorded. The office of the call center was set up with dedicated room and phone lines with signage of the programme funding agency and services being offered. We are visiting the visiting the farmers to medicinal plants cultivation sites, and a record of the agricultural practices being followed is being maintained. A compendium of information pertaining to the frequently asked questions are being compiled from experts to speed up the services of the call center. As a part of these facility, we provided training/workshop program to medicinal plant growers, Ayurveda doctors, traditional healers, and traders for made an awareness, promote the agro-technologies of medicinal plants along with aspects of various provided by NMPB, SMPB and local administrative level. We visited the cultivation plots of *Plumbago indica, Phyllanthus emblica, Sida alba, Coleus aromaticus, Justicia adathoda, Curcuma angustifolia, Curcuma aromatica, Curcuma aeruginosa, Alpinia galanga, Aloe vera, Santalum album, Vetiveria zizanoides, Asparagus racemose, Kaempferia galanga* at different districts of Kerala. Documented their agro-techniques followed and the experiences of the people with cultivation and marketing of the products.



DNA Testing: A Breakthrough in Timber Forensics

Suma Arun Dev, Swathi Balakrishnan, Remya Unnikrishnan, Donald James
(Forest Genetics and Biotechnology Division)



Application of biotechnology for conservation and sustainable management of forest genetic resources have advanced tremendously in recent years driven by rapid scientific and technological innovations in genomics. An array of biotechnological tools ranging from anonymous molecular markers to genome wide functional markers, through whole genome/transcriptome approach have been developed for various applications in forestry. In this regard, KFRI's interventions commenced with the use of first-generation markers (allozymes) to support the conservation efforts in Santalum album (Suma and Balasundaran, 2003). The early generation DNA markers, such as, restriction fragment length polymorphism (RFLP) and random amplified polymorphism DNA (RAPD) were additionally utilized in sandalwood for the purpose (Suma and Balasundaran, 2004). DNA diversity evaluation of eucalyptus, acacia and teak clones (Balasundaran and Florence, 2005), taxonomic revision of the genus Calamus (Sreekumar et al., 2006),

molecular characterization of pink disease pathogen, Corticium salmonicolor (Anuapama et al., 2009), genetic diversity of captive elephants (Balasundaran and Jayson, 2010), were some of the major contributions of the Institute in the area. More robust DNA markers, such as, Inter Simple Sequence Repeats (ISSRs), Amplified Fragment Length Polymorphisms (AFLP) and microsatellites (simple sequence repeats-SSRs) were eventually employed for genetic diversity assessment (Priya et al., 2016) and for genetic diversity and gene flow estimation in teak populations (Balasundaran et al., 2010, Indira et al., 2010; Sreekanth et al., 2012). Recent genomic research in KFRI has opened up new avenues to understand the genetic basis of adaptation, and together with IFGTB, Coimbatore, the Institute was instrumental in developing the first draft genome of teak (Yasodha et al., 2018) and sandalwood (Dasgupta et al., 2019) to explore the composition of genome wide SSRs and their utilization in population genetic structure analysis (Balakrishnan et al., 2021). Current research on functional genomics focuses on the concept of landscape genomics using SNP tagging to identify locally adaptive populations in teak and sandalwood and translate the information to Forest Departments for effective planning in planting and reforestation programs.

Over the past four decades of genetic and biotechnological researches, the Institute has developed a strong genetic database of important forest tree species for conservation and resource utilization as well as to provide DNA evidence for tracking the origin of timbers and chain of custody validation of traded commercial trees. KFRI offers technical expertise to trace the origin of illegally felled timber by comparing DNA fingerprints of the seized wood with that of the original stump and has provided tamper-proof evidence to the judiciary to deal with illegal felling cases. This is the first of its kind used in the court proceedings in the state of Kerala to tackle the scourge of illegal felling, more quickly and effectively.

The ability to track and authenticate forest resources of economic value is crucial for effective management of natural resources and appropriate regulation of trade. DNA barcoding is another promising molecular tool for authentication of wood and non-wood forest produce and thereby to curb adulteration activities. Through development of institutional capability for DNA barcoding of life forms, KFRI has demonstrated the potentialities of DNA barcodes to authenticate original East Indian sandalwood (Santalum album) and red sanders (Pterocarpus santalinus) (Dev et al., 2014) to solve taxonomic complexities in the genus Salacia (Dev et al., 2015), Ochlandra (Sijimol et al., 2020) and Calamus (Kurian et al., 2017), certification of planting materials in bamboo species (Dev et al., 2020) and authentication of Ayurvedic raw drugs (Unnikrishnan et al., 2019; 2021; Dev et al., 2021). KFRI has developed a DNA barcode database for commercial timber tree species which can be used as a tamper proof and credible tool to distinguish adulterant wood species for voluntary wood certification agencies (Dev et al., 2022, under review). Currently, DNA barcoding facility caters to the requirements of various researchers in the field and undertakes consultancy services from various State Forest Departments and other agencies. The technological advancements over time have dramatically reduced the cost and expertise needed, so that DNA barcoding can complement an integrated approach for the enforcement officers.

The institute has the scientific expertise to offer hands-on training programme that helps the trainees to develop know-how on the various molecular marker techniques/DNA testing/ barcoding/ sequence data analysis and will be useful for the researchers to understand its applications in the conservation and sustainable management of forest genetic resources.

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National Medicinal Plants Board

Regional cum Facilitation Centre-Southern Region

The Regional cum Facilitation Centre-Southern Region (RCFC-SR), one of the seven RCFCs of the National Medicinal Plants Board (NMPB) was established in KFRI in October 2017 to serve as a one stop shop for all matters related to the medicinal plants in the southern region of India. The RCFC-SR provides technical inputs to stakeholders for enhancing their managerial and technical skills, developing agro-technology of medicinal plants, facilitating production and distribution of quality planting materials (QPMs) apart from providing technical assistance to various organizations in formulating project proposals in the priority areas identified by NMPB, and attending to field assessment/evaluation of NMPB projects and other works assigned by NMPB from time to time. The overall objective is to streamline and strengthen the activities of NMPB in five states (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana) and three Union Territories (Puducherry, Lakshadweep, and Andaman & Nicobar Islands). The activities of the RCFC (SR) are monitored periodically by NMPB. RCFC-SR maintains strong linkages with several government and non-government organizations, and farmers' groups for effective implementation of its activities. Close interactions with Departments of Forest, Agriculture and PWD help in implementation of several programmes. For effective implementation of various pragrammes, RCFC-SR associates with financial agencies such as NABARD and other commercial banks; agencies such as Kerala Forest Development Corporation (KFDC), Kerala State Tribal Welfare Department, Kerala Institute of Local Administration (KILA), Ayurvedic Medicine Manufacturers Organization of India (AMMOI); various Universities and research institutions like Tamil Nadu Agricultural University (TNAU), Centre for Medicinal Plants Research (CMPR) of Arya Vaidya Sala Kottakkal (AVS), CSIR-Central Institute of Medicinal and Aromatic Plants (CSIR-CIMAP) etc.

During the financial year 2021-22, a total of thirteen trainings were organized in different states and UTs of southern region, and 552 farmers were given training in medicinal plants farming and exposure to the activities of NMPB and

RCFC (SR). With respect to QPM Network, one of the successful initiatives to facilitate sustainable cultivation, eight new QPM projects were implemented for production of 4,59,000 QPMs of 27 species of the Medicinal plants in the five southern States. Apart from trainings, four seminar/workshops were organized. The RCFC-SR team members also participated as resource persons in fifteen seminars/workshops organized by other institutions/ agencies. As part of monitoring and evaluation, sixteen NMPB projects were monitored in Andhra Pradesh, Karnataka, Kerala, Tamil Nadu and Telangana and the monitoring and evaluation reports were submitted to NMPB. Also expedited submission of nine Utilization Certificates by various project implementing agencies to NMPB. Collection of market price from the southern region and its trend analysis for the period April 2021 to March 2022 was done. Also assisted five stakeholders to establish linkages. A documentary entitled ` Saraca asoca (Ashoka): A tree for sorrow-free life' was prepared. Seven scientific papers, one information bulletin and one IEC brochure were of credit to the Centre. During the reporting period, the Centre organized seven meetings and the team members participated in twenty-eight meetings. In all, sixty-six extension works and expert services were taken up apart from providing inputs to NMPB on Parliament Questions.

Scicomi

Sudheer P Y

Achievements/awards

Kerala Forest Research Institute (KSCSTE - KFRI) won the Best Performing Institute Awards during the ***"50 Years Golden Jubilee Celebration of Science & Technology in Kerala"*** held on 29-05-2022. In order to commemorate the 50th Anniversary of the formation of the State Committee on Science and Technology, KSCSTE is organising a series of events and activities across the State to bring out Science and technology promotion activities carried out by STEC, KSCSTE and R&D Institutions under its ambit. Chief Minister Shri. Pinarayi Vijayan presented the Award to a Team of Scientists from KFRI

Achievements/awards:

Dr. Syam Viswanath, Director KFRI received Dr. KG Tejwani endowment award for excellence in Agroforestry research for 2021, instituted by the ISAF (Indian Society for Agroforestry), ICAR-CAFRI, Jhansi.

Dr. V.B. Sreekumar - Membership in Linnean Society

Dr. T.V. Sajeev - nominated by the Ministry of Environment, Forest and Climate Change (MoEFCC) as the national focal point for the Asia-Pacific Forest Invasive Species Network (APFISN).

Chief Minister's Award for the best Research Institute of Kerala under Kerala State Council for Science Technology & Environment, dated 29.05.2022.

Dr. K.G. Tejwani award for Excellence in Agroforestry Research and Development- 2021 to Dr. Syam Viswanath, Director, KSCSTE-Kerala Forest Research Institute.

Publications

Research articles

1. Krishnasree PS, Jose PA, Subin K. and TV Sarath. 2022. Reproductive biology of two threatened and highly traded medicinal plants, Salacia gambleana and Salacia oblonga, from the Western Ghats of India. Journal of Threatened Taxa 14(4): 20859–20865.
2. Chandrashekara UM, Sujanapal P and Chacko KC. 2022. Tree girth increment pattern in three medicinally important Pterocarpus species in Kerala, India. International Journal of Phytomedicines and Related Industries. Medicinal Plants. Vol. 14 (1): 149-152.
3. Subin K, Jose PA and Vivek AS. 2022. Rarity analysis of an endangered tropical tree species of the Western Ghats, India. Current Science 123 (1): 67-72.
4. Sanil MS, Swathi Balakrishnan, Sreekumar VB and Suma Arun Dev. 2022. Dipterocarps used India as a raft from Gondwana to Eurasia. Taxon https://doi.org/10.1002/tax.12794.
5. Eswaran M, Thangaraj K, Aliyar B, Suma Arun Dev, Swathi Balakrishnan, Dasgupta M (2022) Development of a sensitive and single step PCR based assay for the detection of sandal spike phytoplasma. Current Science 122 (12): 1454-1459 Biswas S, Daimari R, Islary P, Nayaka S, Siljo Joseph, Upreti DK and Sarma P. 2022. New additions to the lichen biota of Assam from Dhubri district, northeastern India. Journal of Threatened Taxa 14(5): 21084-21090.
6. Singh G, Yadav S, Singh R and Shambu Kumar (2022). Passalora golaghati comb. nov. from India. Mycotaxon, 137 (1): 89–94, https://doi.org/10.5248/137.89.
7. Islary P, Daimari R, Biswas S, Nayaka S, Siljo Joseph and Dwimary M. 2022. An enumeration of lichen diversity from Ultapani Forest Range of Kokrajhar District, Assam with Ocellularia calvescens and Rhabdodiscus subcavatus, two new records in India. Studies in Fungi 7 (5): 1-5.
8. Schaepdryver KHD, Goossens W, Naseef A, Kalpuzha Ashtamoorthy S, Steppe K. 2022. Foliar water uptake capacity in six mangrove species. Forests 13(6):951. https://doi.org/10.3390/f13060951.
9. Crous PW, Boers J, Holdom D, Osieck ER, Steinrucken TV, Tan YP, Vitelli JS, et al. Mahadevakumar S, et al. 2022. Fungal Planet description sheets. Persoonia 48: 1383– 1434.
10. Patel B, Sivaraman S and Balakrishnan P. 2022. Nesting ecology of Malabar grey hornbill, Ocyceros griseus in a mosaic landscape in the Southern Western Ghats, India. Proceedings of the Zoological Society (Springer-Nature) 75: 337-348. https://link.springer.com/article/10.1007/s12595-022-00446-1.
11. Balakrishnan P, Das KSA, Patel B and Sivaraman S. 2022. Predation of Indian giant flying squirrel and Travancore flying squirrel in the Western Ghats, India. Mammalia. https://doi.org/10.1515/mammalia-2021-0097.
12. Wani MR and Patel B. 2022. Photosynthetic performance of Terminalia arjuna Roxb towards different doses of 60Co γ-irradiation. Biocatalysis and Agricultural Biotechnology, 43: 102442. https://doi.org/10.1016/j.bcab.2022.102442.
13. Narayanan N, Das S, Balan A, Tom R, Divakar N, Rajkumar KP, Hopeland P and Deepak V. 2022. A new species of Cyrtodactylus (Reptilia: Gekkonidae) from the southern Western Ghats of India. Vertebrate Zoology 72: 729–743. https://doi.org/10.3897/vz.72.e89660
14. Bindu TN, Balakrishnan P, Sajeev TV and Sudheendrakumar VV. 2022. Role of soil and larval excreta in the horizontal transmission of the baculovirus HpNPV and its implications in the management of teak defoliator Hyblaea puera. Current Science, 122(11): 1321-1326.
15. Bindu TN, Balakrishnan P, Sajeev TV and Sudheendrakumar VV. 2022. Seeding baculovirus HpNPV in the epicentre populations of teak defoliator, Hyblaea puera to prevent large-scale outbreaks. Current Science, 122(7): 812-818.
16. Vijayan K, Suganthasakthivel R, Naggs F, Fontanilla IKC, Sooraj PS, Sajeev TV, Wade CM.

2022. Fine-scale geographic sampling and molecular characterization of the giant african land snail in its invasive ranges of Asia shows low genetic diversity, new haplotypes and the emergence of another haplotype from the Indian Ocean Islands. Biological Journal of the Linnean Society. DOI:10.1093/biolinnean/blac106.

17. Das S, Pal S, Siddharth S, Palot MJ, Deepak V, Narayanan S. 2022. A new species of large-bodied Hemidactylus Goldfuss, 1820 (Squamata: Gekkonidae) from the Western Ghats of India. Vertebrate Zoology 72: 81-94. (Scopus – 1.73)
18. Narayanan S, Bhat HNP, Paran D, Das S, Aravind NA. 2022. Truly absent or sampling gaps? Insights on the potential distribution of Duttaphrynus hololius (Günther, 1876) from Peninsular India. Current Herpetology 41(2): 215-229. (SCI – 0.368)
19. C.K. Rasmi, P.A. Jose, Shambhu Kumar (2022). First report of Lasiodiplodia theobromae causing leaf spot on Flacourtia montana, a wild edible fruit tree of western Ghats, India. Journal of Horticultural Sciences, (communicated).
20. Chandrashekara U.M, Sujanapal P. 2022. 17(2): 555-559. Visitors' satisfaction in service quality of herbal garden, Nilambur, Kerala. Medicinal Plants-International Journal of Phytomedicines and Related industries, Year: 2021, Volume: 113, Issue:4.
21. Chandrashekara UM, Sujanapal P, and Chacko KC. 2022. Tree girth increment pattern in three medicinally important Pterocarpus species in Kerala, India. Medicinal Plants Journal. (Accepted for publication in March 2022, vide letter M- RA-126/2021)
22. Rini Vijayan KP and A V Raghu (2021) Embelin: an HPTLC method for quantitative estimation in five species of genus Embelia Burm f. Future Journal of Pharmaceutical Sciences 7:55. https://doi.org/10.1186/s43094-021-00210-w. (Springer Open)
23. Krishnasree PS, Jose PA, Subin K. and TV Sarath 2021. Reproductive biology of Salacia gambleana whiting &Kauland Salacia oblonga Wall. ex wight &Arn. – two threatened and high valued medicinal plants of the Western Ghats, India, To Journal of Threatened Taxa. NAAS: 5.10 Impact Factor: 0.50
24. Patel, B., Sivaraman, S. and P. Balakrishnan. 2021. Use of tree cavities by Indian vertebrates: status of research, knowledge gaps and future conservation perspectives. Current Science 121(4): 490-501.
25. Patel, B., Sivaraman, S. and P. Balakrishnan. 2022. Nesting ecology of Plum– headed Parakeet (*Psittacula cyanocephala*) in the southern Western Ghats, India. Journal of Bombay Natural History Society (in Press).
26. Raghu, A.V., & Viswanath, S. 2021. "Kannadipaaya"- role of geographical indication in brand making and conservation, Current Science, 121(1): 19-20
27. Remya Unnikrishnan, M. Sumod, Jayaraj Ravindran, P. Sujanapal and Suma Arun Dev. 2021. The efficacy of machine learning algorithm for raw drug authentication in Coscinium fenestratum (Gaertn.) Colebr. employing a DNA barcode database. Physiology and Molecular Biology of Plants 27: 605–617.
28. Samitha K. A., Rajathy Sivalingam., Sandeep S. and Syamkumar R. 2021. Monitoring Heavy Metal Contamination in the Pineapple (Ananas comosus) Cultivated tracts of Kerala, India. International Journal of Current Science Research and Review, 4 (5), 415 – 421.
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30. Shukla, S.R., & Viswanath, S. 2021. Comparative financial analysis of plantation teak (*Tectona grandis L.f.*) under different management practices in farmlands. Indian Journal of Agroforestry, 23(2), 107-117
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32. Vishnu P.S and Sandeep S. 2021. Variations in taxonomy and soil pedon characters of two contrasting forest systems in the Southern Western Ghats, India. Green Farming, 11(6), 7 – 12.
33. Vishnu P.S and Sandeep S. 2021. Variations in weathering of natural and man- made forest systems in the Southern Western Ghats, India. International Research Journal of Environmental Sciences, 10 (4), 1 – 7.
34. Sreejith K.A, Sanil M. S , Prasad T. S , Prejith M. P , Sreekumar V. B, Akhil Murali. 2021. Importance of small diameter woody plants and treelet species in Tropical Wet Evergreen Forest Of Southern Western Ghats, India. doi: https://doi.org/10.1101/2021.12.31.474647 bioRxiv
35. Geethakumary, M.P., Deepu, S., Kissling, J. and Pandurangan, A. G. 2022. Revisiting the taxonomy of Exacum courtallense (Gentianaceae) and recognizing E. courtallense var. laxiflorum at the species rank. Phytotaxa559(2):185-192. https://doi.org/10.11646/phytotaxa.559.2.7
36. Sivadas, D. 2022. Pathways for Sustainable Economic Benefits and Green Economies in Light of the State of World Forests 2022. Anthropocene Science.2022. https://doi.org/10.1007/s44177-%20022-00041-1
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38. Sanil, M. S., Sreekumar, V. B., Sreejith, K. A., Dev, S. A., Sasi, R. and Balakrishnan, S. (2022). Population status and habitat suitability of Vatica chinensis L., an endangered Dipterocarp from the Western Ghats, India. Biodiversity Research and Conservation, 67(1), 21-32, https://doi.org/10.2478/biorc-2022-0009 , Nov 29, 2022
39. Sarath P, Dev SA, Sreekumar VB & Dasgupta M. 2022 Anthropogenic threats and habitat degradation challenge the conservation of palm genetic resources – an appraisal of current status, threats and look-ahead strategies. Biodiversity and Conservation https://doi.org/10.1007/s10531-022-02512-8
40. Dasguptha M, Dev SA, Parveen AM, Sarath P and Sreekumar VB 2021 Draft genome of Korthalsia laciniosa (Griff.) Mart., a climbing rattan elucidated its phylogenetic position. Genomics 113, 2010-2022.

Popular Articles

1. Balakrishnan P. 2021. Challenges of Wildlife Conservation (in Malayalam).Deshabhimani-Kilivathil. 10th October. P. 4.
2. Balakrishnan P. 2022. Evolution of locomotion in dinosaurs (in Malayalam).Deshabhimani-Kilivathil. 6th February. P. 4.
3. Sandhwana K. S., Sujanapal P., Dantas K. J., 2021. Keezhatangatha Adhinivesa Patarppukal (Unbeatable Invasive Species). Aranyam. May - June. 12-15.
4. Anjana N, Sreekumar VB, Raghu AV and Syam Viswanath. 2022. Bamboos and reeds. Arnanyakam. 42(11)14-15.
5. Anjana N, Sreekumar VB, Raghu AV and Syam Viswanath. 2022. Endemic Bamboo and Rattan. 42 (11):14- 15.
6. Bindu TN and Balakrishanan P. 2022. World of Viruses (in Malayalam). Deshabhimani Kilivathil, Dtd, 23 May 2022.
7. Divakar N. 2022. Bats unsung heroes. Newsletter of the Nilgiri Natural History Society. Pp. 8-11.

Books

1. Deepak V, Narayanan S, Das S, Rajkumar KP, Pal S, Gerard JD, Gower DJ. 2022. Snakes and lizards of the sky Islands of the Western Ghats. ATREE, Bangalore, India 114p.
2. Viswanath S., V.B. Sreekumar and S. Sruthi. 2021. Bambusa balcooa Roxb.: A multi-utility bamboo for domestication. KSCSTE-Kerala Forest Research Institute, Peechi (ISBN:81-85041-98-9)

3. 2022. Chandruvinte Yathra (Environment based Malayalam Novel for Children) ISBN 978-93-91112-50-9, Published by Kerala State Institute of Children's Literature
4. Raghu AV, Sudhir K P et.al. 2022. 34th Kerala Science Congress – Proceedings (Abstracts) – ISBN 978-81-953863-1-4

Chapter in Books

1. Syam Viswanath and Sandeep Chakraborty 2022. Indian sandalwood Cultivation Prospects in India. Indian Sandalwood Springer. ISBN 978-981-16-6564-6. Raghu AV. 2022. Bamboo Conservation – Propagation – Utilisation. In: Certification of Bamboo Planting Material and Accreditation of Bamboo Nurseries (ISBN:978-81-953863-9-0)
2. Sajeev T V and Syam Viswanath. (2022). Pangalitha Vana Paripalanam. In Paristhithi Samithi-Saphalam Sargathmakam (in Malayalam). Pg.162.Kerala Legislative Assembly.
3. Sreejith KA and Prabhakar K. 2022. Role of bamboos in climate change mitigation and adaptation. Bamboo: Conservation, propagation and Utilization, GSDP Programme, Kerala Forest Research Institute
4. Sony SR and Arun VR. 2022. Role of National Digital Library of India (NDLI) for Paradigm Shift in Education and Research in India-A Study Based on Central University of Kerala. In: Innovative Librarianship: Accelerating Open Access, Today & Tomorrow's Printers and Publishers. pp. 215-225.
5. Seethapathy GS, Remya Unnikrishnan, Urumarudappa SJ, Chen X, Peng J. 2022. Value chains and DNA barcoding for the identification of anti-infective medicinal plants. In: Chassagne F (Ed.) Medicinal plants as anti-invectives -Current knowledge and new perspectives, Elsevier Publications.
6. Sreejith, K.A., Balakrishnan, P. and M. Amruth. 2022. Forest and Wildlife: Conservation and Challenges (in Malayalam). Book Chapter. In: Manorama Year Book. pp. 346-363.
7. Sandeep Sasidharan and Yasodha Ramasamy. 2021. Teak: The King of Timbers. In: Yasodha Ramasamy., Esteban Galeano., Thwe Thwe Win (eds) The Teak Genome. Springer - Nature, Singapore.
8. Sandeep Sasidharan. 2021. Teak Plantations and Wood Production. In: Yasodha Ramasamy., Esteban Galeano., Thwe Thwe Win (eds) The Teak Genome. Springer - Nature, Singapore.
9. Hrideek TK, Suby, Aswaja P, Amruth M and Sabu A. Implications of plant invasion on the soil microbial diversity and ecosystem sustainability: Evidence from a tropical biodiversity hot spot. Book title: Microbial Biodiversity, Biotechnology and Ecosystem Sustainability. Editors: Cristobal Noé Aitorsuilar, Sabu Abdulhameed, Raúl Rodríguez-Herrera & Shiburaj Sugathan. Publisher: Apple Academic Press, CRC Press, Taylor & Francis Group, 2022.
10. Viswanath S., and Chakraborty S. 2022 .Indian Sandalwood Cultivation Prospects in India. Indian Sandalwood. Materials Horizons: From Nature to Nanomaterials, Springer, Singapore. (In: Arunkumar A.N., Joshi G., Warrier R.R., Karaba N.N. (eds)). Pp 281-292 https://doi.org/10.1007/978-981-16-6565-3_19
11. Sruthi S. and Viswanath S. Above-ground biomass and carbon content in select bamboo species across humid and semiarid zones of Karnataka, India, Forest Resources Resilience and Conflicts,Elsevier Editor(s): Pravat Kumar Shit, Hamid Reza Pourghasemi, Partha Pratim Adhikary, Gouri Sankar Bhunia, Vishwambhar Prasad Sati, Pp 153-163 doi.org/10.1016/B978-0-12-822931-6.00011-3
12. Madan Prasad Singh, Manohara Tattekere Nanjappa, Sukumar Raman, Suresh Hebbalalu Satyanatayana, Ayyappan Narayanan, Ganesan Renagaian and Sreejith Kalpuzha Ashtamoorthy. 2021. Forest Vegetation and Dynamics Studies in India DOI: http://dx.doi.org/10.5772/intechopen.97724. Vegetation Index and Dynamics. ISBN: 978-1-83969-385-4, Intech Open Publishers

13. Sanil M. S., Sreekumar V. B., Suma Arun Dev, Sreejith K. A. and Swathi Balakrishnan 2021 Status of Dipterocarps in the Western Ghats, India in Plant Genetic Resource Utilization: An Appraisal (Swapna et.al. eds), Dept. of Botany Kerala University ISBN:978-81-951912-4-6
14. Jayaraj R and Sandeep S. 2022. Training Manual for Training Programme in Analytical Instrumentation – Edition-II, Centre for Analytical Instrumentation – Kerala (CAI-K), KSCSTE - Kerala Forest Research Institute.
15. Sreekumar VB. 2022. 'Bamboo Cultivation' English and Malayalam Version. Bamboo Technical Support Group. KFRI, Peechi.

Papers in Seminars/Workshops/Conferences/Symposiums/others

1. Syam Viswanath. 2022. Comparative study on growth, biomass and wood quality of 25- year-old teak managed under three agroforestry practices. In: 4th World Teak Conference held in Accra, Ghana during 05-08 September.
2. Anitha V. 2022. Need for economic valuation of ecosystem services. In: National Seminar on Ecorestoration 'Forests for water', Jointly organized by Kerala ForestDepartment, MOEF&CC, GoI, USAID India's Forest-PLUS 2.0, KFRI, CWRDM. Thiruvananthapuram, 19-20 May - Panel discussion on Ecorestoration approaches
3. Sujanapal P, Sumod M, Chandrashekara UM and Pillai CPK. 2022. Seed properties and germination studies in Berberis tinctoria Lesch. an endangered medicinal plant: Implications for conservation and cultivation. In: International Conference on Modernization of Traditional Indian medicine: Industrial perspective at Patanjali Research Institute, Haridwar, P:158.
4. Sreekumar VB. 2022. Rattan. Global Priority species. Paper presented in Africa Bamboo and Rattan congress (ABARC2022) 20 -22 April, Yaounde Cameroon.
5. Patel B and Balakrishnan P. 2022. The utility of functional ecology in the management of forested landscapes (वनाच्छादति परदृिश्य के प्रबंधन में कार्ात्मक पारस्थितिकी की उपर्ोदति in Hindi). In Proc. of the National Hindi Webinar (ANSH-2022), CSIR-NAL, Bengaluru. pp. 166- 174.
6. Sreeja S. 2022. Effect of elicitors and precursors on the production of secondary metabolites in in vitro cultures of Oroxylum indicum. In a National Seminar on - "Biotechnology, Environment and Conservation", 25-26 August, St. Dominic College, Kanjirappally.
7. Rahul Jose, Anilkumar C., Jothish PS and Jose PA. 2022. Conservation through vegetative propagation of Diospyros crumenata Thw. – an endangered tree of Western Ghats. In: Proceedings of National Seminar on Fundamental and Applied dimensions in Plant Sciences, March 24 – 25, JNTBGRI, Palode.
8. Jose PA. 2022. Conservation of rare Endangered and threatened plants of Western Ghats. In: Proceedings of the National seminar on Biotechnology, Environment and Conservation on 26 August, St. Dominic's College, Kanjirappally. pp 53-56.
9. Remya Unnikrishnan, Suma Arun Dev, Jayaraj R, Swathi Balakrishnan. Integrated approach to combat illicit trade and conservation of medicinal plants. 20th IUFRO Tree Biotech and the 2nd FTMB Conference. 07–09 July.
10. Swathi Balakrishnan, Suma Arun Dev, Yasodha Ramasamy, Remya Unnikrishnan. 2022. Teak Genomics for Conservation and Timber Verification. In: Tree improvement, genetics, silviculture and stand management. 4th World Teak Conference held in Accra, Ghana during 05-08 September.
11. Bheemalingappa M. 2022. Endemism an overview in the Western Ghats of Kerala State India. In: National Seminar on 'Integrated Approaches to Environmental Sustainability & Biodiversity Conservation'. Department of Botany, Dr. BRR Government Degree College, Jadcherla Mahabubnagar Dist, Telangana.
12. Arun VR. 2022. Reading Culture for Spread of Science. In: National Conference on 'Library: Space for Scientific Research' organized by Academic Library Association & St. Thomas College, Thrissur in Collaboration with National Academy of Science (NASI), Govt of India.

13. Karthika M Nair, Sajeev, T V and Vimod K. 2022. Ecotourism and alien plant invasions: Negative linkages from Shendurney Wildlife Sanctuary, Kerala. In: Book of Abstracts of National Seminar on Biotechnology, Environment and Conservation.25-26 August. Department of Botany, St. Dominic's College, Kanjirappilly.
14. Sreeja CS, Raghu AV. 2022. Characterization of phenolic compounds in different parts of the species Oroxylum indicum by liquid chromatography coupled with mass spectrometry analysis. In: Rameshkumar KB and Dan VM (Eds). Proceedings of National Seminar on Fundamentals and Applied Dimensions in Plant Sciences, KSCSTE- JNTBGRI, Thiruvananthapuram, Kerala, India, 66p. ISBN No: 978-81-955043-0-5.
15. Mufeeda KT and Shambhu Kumar. 2022. Morpho-Molecular Identification and Pathological Investigations of Coniella wangiensis Associated with Leaf Spot Disease of Cleistanthus collinus (Roxb.) Benth. ex Hook.f. – First report from Kerala, India, in Association of Microbiologists of India - 62nd International Conference on "Microbes and Society: Current Trends and Future Prospects at university of Mysore during September 21-23, 2022. (accepted)
16. Jain Mary Jose and Shambhu Kumar. 2022. Assessment of antifungal potential of Simarauba glauca leaf extracts against Lasiodiplodia theobromae causing leaf blight disease in Coscinium fenestratum (Gaertn.) Colebr. – A critically endangered high demanding medicinal plant, in Association of Microbiologists of India - 62nd International Conference on "Microbes and Society: Current Trends and Future Prospects at university of Mysore during September 21-23, 2022. (accepted)
17. Kripa TS, Mufeeda KT and Shambhu Kumar. 2022. Appraisal of plant growth promotion potential of rhizosphere fungus Talaromyces muroii isolated from Hopea erosa (Bedd.) Slooten – a critically endangered plant, to be presented in Association of Microbiologists of India - 62nd International Conference on "Microbes and Society: Current Trends and Future Prospects at university of Mysore during September 21-23, 2022. (accepted)
18. Shambhu Kumar. 2022. Fungal diversity, conservation and prospecting in current perspectives, to be presented in Association of Microbiologists of India - 62nd International Conference on "Microbes and Society: Current Trends and Future Prospects at University of Mysore during September 21-23, 2022. (accepted)

Retirements -2022

S Padmavathy
Nursery Man Gr III

A M Lalitha
Office Attendant Gr V

Grace Andrews
P A to Director Gr. II

Prakash T S
Helper Gr II

Rajendran P K
Driver Gr II

Chamy A V
Helper Gr II

Scientists Appointed

Dr. Badole Srikanth Purushottam
Scientist B, Soil Science

Dr. Donald James
Scientist B, Forest Biotechnology

Dr. Murali R
Scientist B, Forest Pathology

Mr. Arun V R
Scientist B, Library
and Information Division

Dr. Wable Pawan Shyamrao
Scientist, Soil Science

Dr. Siljo Joseph
Scientist B, Forest Botany

Dr. Deepu Sivadas
Scientist B, Forest Ecology

Dr. Adarsh C K
Scientist B,
Silviculture

Dr. Ayate Dipika
Purushottam, Scientist B,
Forest Genetics and Tree
Breeding

Dr. R Suganthasakthivel
Scientist B,
Wildlife Biology

Ms. Soorya S
Scientist B, Soil Science

Dr. Jithu U Krishnan,
Scientist B,
Forest Entomology

Dr. Madiga
Bheemalingappa,
Scientist B,
Forest Botany

Dr. Shweta B Kukreti,
Scientist B, Wood Science and
Technology Dept.

Research Projects Initiated 2022-23

Sl. No.	Project Title	Funding Agency
1	Developing organo-lime nanocomposites on graphene micro-structures extracted from humic acid	Department of Biotechnology -Govt. of India
2	Triparty action plan for the reintroduction of Red plants of Kerala	Kerala Forest & Wildlife Department, Govt. of Kerala
3	Micro Plastics and Phthalate Esters in urban water bodies occurrence, Distribution and seasonal variation in selected urban areas of Kerala	KFRI Plan Grants
4	Synthesis, characterization and analysis of activated spherical carbon derived from lignocellulosic biomass	KFRI Plan Grants
5	Diversity and Distribution of Myxomycetes in a tropical wet evergreen forest ecosystem and their response to climate change	KFRI Plan Grants
6	Development of eDNA technology for detecting faunal invasion and modelling of biological invasion in aquatic ecosystem of Kerala.	KFRI Plan Grants
7	Long Term Ecological Observatories (LTEO)- Monitoring forest structure and dynamics in relation to climate change across different biogeographic Zones in India (Kerala part)	Ministry of Environment Forestry and Climate Change, Govt. of India
8	Biogeography, phylogenetic studies and development of e-mon-ograph for the Arthoniales (lichenized fungi) in India	Department of Science and Tech-nology, INSPIRE fellowship, Govt. of India
9	Monitoring Eco-Restored sites at Chembikunnu in Wadakkanchery Range.	Kerala Forest & Wildlife Department, Govt. of Kerala
10	Kannadipaya Special bamboo weaved mat product-Scientific, Technical and Marketing interventions for tribal empowerment.	SEED, Department of Science and Technology, Govt. of India.
11	Development of management protocols for restoring degraded forests in Vazhachal – Parambikulam CFR area using native plant species and NTFPs.	World Wide fund for Nature India
12	Land Tenurial assessment of mangrove forests in Malappuram and Ernakulam districts, Kerala	Directorate of Environment & Climate Change, Govt. of Kerala
13	Tourist-Lion- tailed macaque interface in Nelliampathy hills and its implication on conservation and Management (Phase 1)	KFRI Plan Grants
14	Standardization of preservative treatment process for selected economically important bamboo species of Kerala	KFRI Plan Grants
15	Carbon Stocks and soil organic carbon saturation deficit under different forest types of Kerala.	KFRI Plan Grants
16	Otters outside Protected Areas: population assessment & Con-flict mitigation through stake holder participation	Kerala Forest & Wildlife Department, Govt. of Kerala
17	Transcriptome, methylome and small RNA analysis to identify chronological age of flowering in bamboos	KFRI Plan Grants

Priced Publications of KFRI–2023

Bamboo		Rs.	US$
1	Bamboos of India	2250.00	100.00
2	Edible Bamboo Shoots: Collection and Processing (Malayalam)	10.00	10.00
3	Introduction to Some Bamboos of Kerala	100.00	10.00
4	Bambusa Balcooa Roxb. : A Multiutility Bamboo for Domestication	250.00	25.00
Rattan (Cane), Palms			
5	A Field Guide to the Palms of India	500.00	50.00
6	A Manual on the Rattans of Andaman and Nicobar Islands	175.00	20.00
7	Annotated Bibliography on Rattans of the World	350.00	35.00
8	Commercial Rattans of Kerala	50.00	10.00
9	Field Identification Key for Rattans of Kerala	125.00	15.00
10	Nursery and Silvicultural Techniques for Rattans	50.00	10.00
11	Oil Curing Technology for Value-added Rattan (Cane) Products	50.00	10.00
12	Palms of Kerala	200.00	20.00
13	Protection of Rattan against Fungal Staining and Biodeterioration	50.00	10.00
14	Rattans of India	1500.00	150.00
15	Rattan Management and Utilisation	300.00	30.00
16	Rattans of the Western Ghats: A Taxonomic Manual	100.00	10.00
17	Structure and Properties of South Indian Rattans	75.00	10.00
Teak			
18	Processing and marketing of teakwood products of planted forests: Proceedings	700.00	50.00
19	Teak Bibliography (Print)	700.00	70.00
Plantation Management			
20	Litter Dynamics, Microbial Associations and Soil Studies in Acacia auriculiformis Plantations in Kerala	75.00	10.00
21	Plantation technology: Colophyllum polyanthum (Kattu punna) (IB.18)	50.00	10.00
22	Plantation technology: Dysoxylum malabaricum (Vella akil) (IB.19)	50.00	10.00
23	Plantation technology: Garcinia gummi-gutta (Kodampuli) (IB.20)	50.00	10.00
24	Plantation technology: Gmelina arborea (Kumbil) (IB.21)	50.00	10.00
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Agroforestry Man

Cartoon: Sajjive Balakrishnan

Dr. Syam Viswanath, Director KFRI recieved Dr KG Tejwani endowment award for excellence in Agroforestry research.

Tree Health Helpline

Established in 2009, the Tree health helpline is the single window of KFRI for all issues regarding trees. The services offered include site selection, soil testing, fertilizer recommendations, pest, disease and weed management, multi-species planting matrices, landscape afforestation, preparation of health cards for avenue trees, tree/wood sample identification, preservative treatments for wood and economic evaluation. Site visits and recommendations are free within Kerala.

First Question

On the occasion of the National Science Day 2019, KFRI has launched First Question- a dedicated Helpline for answering questions children ask about nature. First Question was launched by Dr. Haridasan, former Director FRLHT. Dr. Syam Viswanath, Director, KFRI presided over the function.

The Helpline is in response to the fact that children ask a large number of unique questions which are rarely answered to their satisfaction. Till date, we have received over a thousand calls from 14 different states of India. The questions raised by the callers covered basic sciences, astronomy, philosophy and theology. Various age groups of different backgrounds have been utilizing this platform to get answers to their previously unanswered queries.

Telephone: **0487 2690 222;** *Email:* **helpline.kfri@gmail.com**

EVER GREEN NEWSLETTER

February | 2023
Issue no. 84-86

Changeable hawk-eagle
(*Nisaetus cirrhatus*)
Nesting near Peechi, Thrissur

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