KALPA

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ICAR-CENTRAL PLANTATION CROPS RESEARCH INSTITUTE
Kasaragod, Kerala - 671 124
An ISO 9001:2015 Certified Institute

From the Director's Desk

Future Research Thrust of ICAR-Central Plantation Crops Research Institute

The cultivation of plantation crops is expanding to non-traditional areas where the crops are vulnerable to the climate. Hence, developing climate-resilient technologies is one of the priority areas. Developing abiotic stress-tolerant genotypes or developing agronomic management strategies to alleviate the stressful environment are needed. Developing a mass multiplication protocol for quick multiplication with special traits is the focus.

Thrust will be given to find any relationship between climate and emerging pests. This will help to develop a decision-support system to manage and mitigate pest havoc. Input-use efficiency is another area to bring down the production cost and make the crop more competitive internationally. Plantation crops have a high potential for carbon sequestration and could contribute to the national initiative of mitigating climate change. Refined quantification techniques might help to claim carbon credits for the farming community.

Mechanization: Crop management in palms is difficult because of climbing issue. With the advent of several value-added products where climbing is required on a daily basis, active collaboration with engineering institutes for the development of automated climbing or robotic equipment is essential. Similarly drones, which are easily accessible, there is insufficient data to create algorithms, without which their use for surveillance is ineffective.

Value addition: There is considerable scope to increase the income of the farmers through coconut inflorescence sap-based products. There is a need for shelf-life extension and automated production to make it more production efficient. Coconut and arecanut are rich in alkaloids, polyphenols and antioxidants, their isolation, characterization and use in nutraceutical products is beneficial. A multi-institutional project has been proposed to provide scientific evidence on arecanut and health and develop alternate products for diversification and sustainable farming.

Value chain management: With the help of technologists, marketing experts, and farmer groups, there is a need to create a viable FPO/CPC model and expand it to other regions of the nation.

Dr. K. Balachandra Hebbar
Director

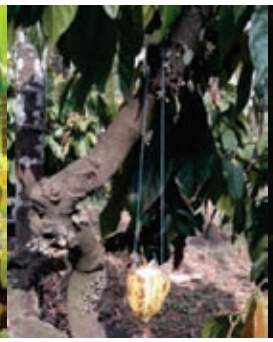
CONTENTS

SPECTRUM

Pollinator studies in Cocoa

To enhance the pollination in cocoa and to attract pollinators, fresh cocoa juice which contains more of sugar and sweating of second day of fermentation which contains more alcohol were collected in cocoa pod husk itself and hanged in cocoa trees which just started flowering both under areca + cocoa and coconut + cocoa cropping systems at Vittal. Cocoa juice attracted both black and red ants on the first day and fruit flies on the second day, since the sweating dried up on third day no insect visitors seen. When the cocoa juice was diluted with water, solution stood upto 3 days with only ants as visitors. Since cocoa husk take more time for decomposing, specifically during main flowering season starting from December to February, it can be used as bio-cups to hold other alcoholic solutions to attract more pollinators.

Cocoa bio- cups

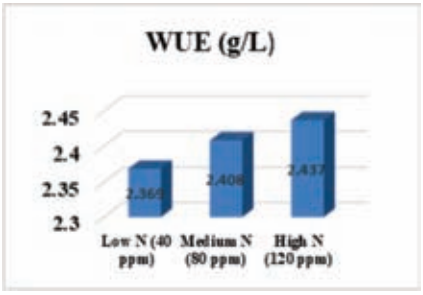


Cocoa juice in cocoa husk as attractant to pollinators

S. Elain Apshara

Nitrogen influences water use efficiency in cocoa

A hydroponic experiment was conducted with eight released cocoa varieties and three different nitrogen levels (low, medium and high). Increasing nitrogen concentration in the nutrient solution led to a significant increase in water use efficiency (WUE) in cocoa. Nitrogen uptake also positively influenced the WUE (r=0.55*). The dry weight of fine roots produced by the cocoa plants was positively correlated with nitrogen uptake (r=0.64*) and WUE (r=0.49*). Significant difference was observed for WUE among eight released varieties /hybrids. Maximum mean WUE was recorded in VTLCS-1 (2.56 g/L) which was on par with VTLCC-1 (2.51 g/L) and VTLCH-1 (2.49 g/L). The result indicates that, nitrogen influences water use efficiency in cocoa.



Bhavishya, H. Nayana, S. Elain Apshara and Ravi Bhat

Bio-efficacy evaluation of '*Chogaru*' against major plant pathogens in arecanut

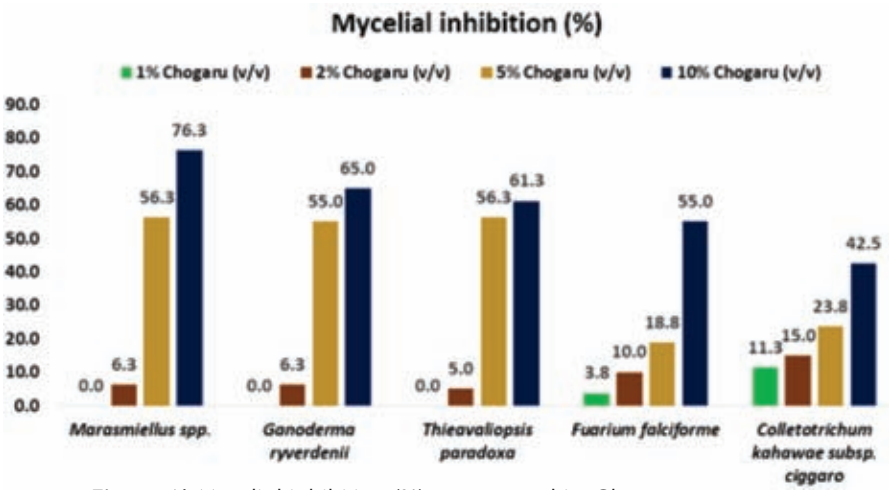
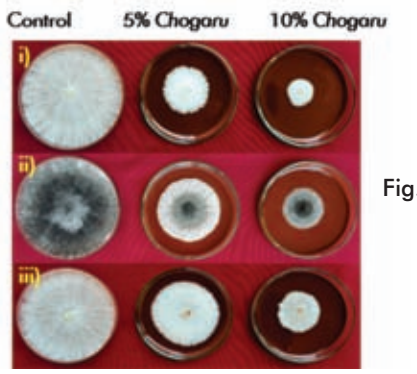


Fig. 1. A) Mycelial inhibition (%) over control in '*Chogaru*' treatments

Tannin (Chogaru), a by-product of arecanut obtained during the processing of tendernut, was evaluated for their antimicrobial properties against the major arecanut plant pathogens *viz.,Ganoderma ryverdinii, Thieavaliopsis paradoxa, Fusarium falciforme, Marasmiellus* spp. and *Colletotrichum kahawae* subsp. *ciggaro* with various concentrations (v/v) viz., 1%, 2%, 5%, and 10% using poisoned food technique under in-vitro conditions. The results revealed that none of the



pathogens were restricted at 1%, and 2% concentration. Whereas, 5% exhibited slight mycelial restriction and 10% showed higher reduction of mycelial growth as compared to control (Fig. 1).

Fig. 1. B) Mycelial growth of i) *Marasmiellus* spp. ii) *Thieavaliopsisparadoxa* iii) *Ganoderma ryverdiniiin* 5% & 10% 'Chogaru' treatments

R. Thava Prakasa Pandian, Bhavishya, Chaithra M., Vinayaka Hegde, and Madhu T. N.

Identification of disease free arecanut palms in YLD hotspot area

Field survey was conducted in Sampaje and Koppa which are the hotspot areas for yellow leaf disease of arecanut to identify arecanut palms having no yellow leaf disease (YLD) symptom. A total of 89 arecanut palms were identified in arecanut gardens with >90% disease incidence. Among them, 15 YLD symptom free palms were identified in gardens with >99% disease incidence. They were serologically tested for the presence of the disease and 9 palms in Sampaje and 1 palm in Koppa were found to be disease free. Hence, a total 10 YLD free arecanut palms were identified in YLD hot spot areas in Karnataka.

Fig.1. YLD free palm in disease hot spot area

Bhavishya, Thavaprakasa Pandian, Muralikrishna. K., Merin Babu, Vinayaka Hegde and Rajesh M.K.

Area wide field demonstration of *Trichoderma* for sustainable management of *M. incognita* in black pepper intercropped with coconut/arecanut system

Application of *Trichoderma harzianum* (CPTD-28) enriched neem cake @ 1.0 kg/vine during pre-monsoon and post monsoon season significantly suppresses the build up of root-knot nematode, *Meloidogyne incognita* population to the tune of 56.2% and reduced yellowing of vines to 6.1% from 20% in treated coconut/arecanut garden at Ajekar village of Karkala Taluk of Karnataka. Regular application of *T. harzianum* enriched neem cake was observed consistent improvement in overall health of vines and yield by reducing the damage caused by *M. incognita* (Fig.1-2). Further, build-up of *Trichoderma* population in soil had an inhibitory effect on incidence of nematode diseases.

Fig. 1. View of black pepper roots showing knots/galls and yellowing of vines caused by *M. incognita*

Fig. 2. View of improvement in vine growth under arecanut after the application of *Trichoderma* enriched neem cake.

Rajkumar, Pratibha V. H., Surekha and Vinayaka Hegde

New field occurrence of Bondar's nesting whitefly, *Paraleyrodes bondari* Peracchi on Portia tree, *Thespesia populnea* from Kavaratti, Lakshadweep Island

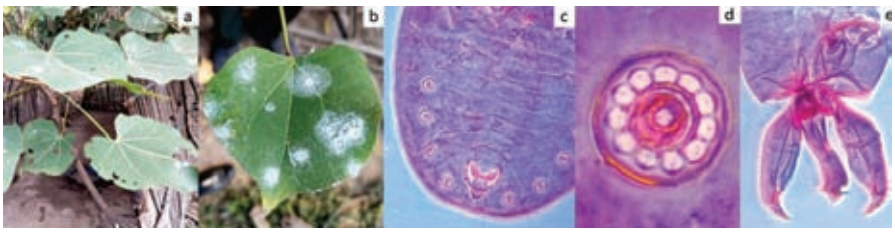


Fig.1. *Paraleyrodes bondari* on Portia tree from Kavaratti **a)** Field incidence of *P. bondari*, **b)** Close up view, **c)** Puparium features, **d)** Flower petal like compound pore, **e)** Male genitalia

Portia tree, *Thespesia populnea* is an important tree in coastal ecosystem especially in Laksha-dweep Island. It is an excellent green leaf manure for coconut and serves as ecosystem service provider for Islands due to its unique root pattern suited for calcium enriched saline coastal soil.

Field occurrence of the exotic Bondar's nesting whitefly, *Paraleyrodes bondari* Peracchi (Hemiptera: Aleyrodidae) was observed on the adaxial (upper) leaf surface for the first time on Portia tree, T. *populnea* in Kavaratti Island during February, 2023. Though the damage intensity is very limited, this forms the new host plant record for the pest and could serve as an alternate host for P. *bondari* which is both reported as a minor pest on coconut in the mainland and Island system. Puparium with flower petal-like compound pores on the abdominal and cephalic region and male aedeagus with dorsal and ventral horn form the diagnostic features of the pest. Thus, P. *bondari* is recorded from the new host plant, T. *populnea* on the adaxial leaf surface collected from Kavaratti, Lakshadweep Island system.

Josephrajkumar A., Jilu V. Sajan, Ananth P.N., Mathew A.C. and Thamban C.

Efficacy of entomopathogenic nematodes against termites in coconut system

Bio-efficacy of entomopathogenic nematodes (EPN) against termites in coconut system was evaluated under laboratory condition at Kayamkulam. Among the eight EPN isolates evaluated, *Steinernema carpocapsae, Heterorhabditis indica* CPCRIH0703 and *Metarhabditis rainai* CPCRIM2021 are observed to be promising, that induced 100% mortality of termite soldiers and workers within 48 hours of treatment application. Emergence of infective juveniles was also observed from all the cadavers infested by these entomopathogenic nematodes.

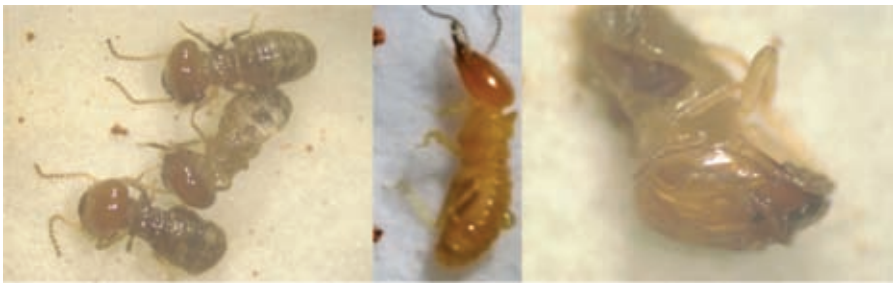


Fig.1.a) Termite workers, **b)** Soldiers killed by *Steinernema carpocapsae*, and **c)** Emergence of infective juveniles.

Anes K.M., A. Josephrajkumar, Jilu V. Sajan and Merin Babu

SUCCESS STORY

Skill training for livelihood improvement

In palms, there is shortage of skilled persons to carry out harvesting and plant protection operations. To impart the skill involved in spraying and harvesting of arecanut and coconut gardens, a 4-day field experience training under SCSP programme was organised at ICAR-CPCRI, Regional Station, Vittal on 16th to 19th March, 2023 for rural youths of Scheduled Caste community. Skill and knowledge on using CFT poles for spraying fungicides and insecticides, harvesting arecanut and coconut bunches and removing dried inflorescences was given to 12 rural youths from Scheduled Caste community. Among them, five trainees are actively engaged in spraying and harvesting of arecanut and coconut. Presently, they are earning two to six-fold more income per day than as a daily-wage farm laborers. There is lot of scope for the rural SC youths to take it as a profession, as there is huge scarcity for skilled labourers in plantation farming. This can be a win-win situation for both farmers and SC youths, as it will improve the economic status of the Scheduled Caste community and reduce the shortage of skilled laborers in palm ecosystem.

Management of inflorescence die back in arecanut

Inflorescence die-back (IDB) and button shedding caused by *Colletotrichum gloeosporioides* is increasingly noticed in many farmer's gardens. One among them, Mr. Ashok Bhat of Mittur village, Bantwal taluk experienced severe incidence of IDB in his arecanut garden. After following the CPCRI recommendations i.e. spraying Propiconazole 25% EC (0.3%) and balanced nutrition, he could get 53.9 % (2021 & 2022) higher dry kernel yield per palm than the previous years (2020). A training programme was conducted on "Management of fungal diseases and effective nutrient management techniques in arecanut" at Swarga Village, Kasaragod. Mr. Mullankochi Murali from Nettanige village, Kasaragod shared his experience that "As per the suggestions of CPCRI scientists, I followed spraying Propiconazole 25 EC and removal of diseased inflorescences using carbon fibre pole which reduced the disease incidence and improved the yield".

Root grub management using entomopathogenic nematodes (Kalpa-EPN)

Mr. Ajith Prasad Rai from Chikckamudnur village, Puttur Taluk shared his experience of using Kalpa EPN for the successful management of arecanut root grub in a training programme on 'Plant health management in arecanut' conducted at Balnadu village, Puttur Taluk, Karnataka. The palms between 4 - 15 years (2000 palms) were infested by root grubs with an average of 10% mortality. He was using Carbofuran/Phorate insecticides for its management but had little success. Due to the interventions of ICAR-CPCRI Kasaragod, he used Kalpa EPN for continuous three years (2019-22). It resulted in >65% reduction in root grub population and decline in mortality of palms. By following all suggested scientific practices of integrated root grub management and regular Kalpa EPN application found overall improvement in palm health and yield.

Arecanut fruit rot disease management using Mandipropamid 23.3% SC fungicide

Fruit rot disease also called as koleroga or Mahali caused by Phytophthora meadii is the most dreaded disease of arecanut. Among the twelve fungicides tested against fruit rot disease, Mandipropamid 23.3% SC fungicide was found very effective in the management of the disease. Under the project on 'Demonstration of arecanut fruit rot disease management using Mandipropamid 23.3%SC" with the financial support of Directorate of Arecanut and Spices Development, Calicut, confirmed its efficacy against fruit rot disease in large scale demonstration of fruit rot disease management. Recommended dose of integrated nutrients were also applied to experimental gardens. Prophylactic treatment of 0.5% Mandipropamid 23.3%SC fungicide and standard check 1% Bordeaux mixture with pH7 were imposed in all the plots from last week of May to first week of June. Second round of treatments with 0.5% Mandipropamid 23.3% SC and 1% Bordeaux mixture were induced during second week of July (45 days interval). Observations on fruit rot incidence and severity was recorded from June to December 2022 at an alternate day's interval in all the demo gardens. 5 to 10% fruit rot disease incidence and severity of 20-25% in 1% Bordeaux mixture sprayed areca palms could be observed. While, fruit rot disease was not recorded in 0.5% Mandipropamid 23.3%SC fungicide sprayed in all the demonstration plots. Very good chali yield (1450 to 1500 kg/acre) was recorded.

Very good yield in Mandipropamid 23.3% SC fungicide sprayed palms

Farmer Field School (FFS) brings in enthusiasm among women farmers

Sodic soil, salt water inundation and lack of knowledge on scientific crop management were the main impediments stood in between the women farmers in Thrikkunnapuzha and their desire to grow safe to eat vegetables of their own. They could overcome these obstacles when KVK-Alappuzha, Krishi Bhavan and the panchayath converged their efforts through organizing a Farmers' Field School with 20 participants. The FFS on 'Integrated crop management in homestead vegetables' started in August, 2022 and had twelve different sessions on alternate Mondays at each farmer's plot on rotation, facilitated by KVK subject matter specialists. Women members who were not even able to differentiate between insect pests and disease, were empowered to manage majority of these maladies by timely adoption of pest management practices and nutrient application methods by the skill and knowledge acquired through experiential learning offered by FFS. They could save their crop from pests like mites in chilly, stem borer and fruit fly attack in snakegourd and diseases like wilt, which in turn enhanced their income. FFS partners shared their experience and excitement during the field day organised on 11th January 2023.

IMPORTANT EVENTS

107th Foundation Day of the ICAR-CPCRI

The 107th Foundation Day of the ICAR-Central Plantation Crops Research Institute was celebrated on 5th January, 2023.

Dr. A. K. Singh, Deputy Director General (Hort. Science), ICAR, New Delhi, delivered the Foundation Day address virtually. He called upon the scientists to adapt to the changes happening in the sector in order to succeed. He emphasised the need for increased planting material production. Regarding the exports, the growth rates are promising, and we need to further strengthen our efforts to have better global market access.

Dr. V. B. Patel, ADG (Fruits and Plantation Crops), highlighted the rising global demand for coconut water, which is growing at double digit annual growth rates. The Dr. K. V. Ahmed Bavappa memorial lecture was delivered by Dr. Nirmal Babu, former Director, ICAR-IISR, Kozhikode. Dr. Dinesh, Director, ICAR-IISR, Kozhikode and Dr. M. N. Sheela, Director (Acting), ICAR-CTCRI, Thiruvananthapuram and Dr. M. V. Prasad, Director (Acting) ICAR-IIOPR, Pedavegi, offered felicitations online.

Institute awards for the employees were given away by Dr. Dinakara Adiga, Director, ICAR-DCR, Puttur: The Interdisciplinary Award was given to the team comprising Dr. Vinayaka Hegde, Dr. C. Thamban, Dr. Rajesh M. K., Dr. M. Sujithra, Dr. Rajkumar, Dr. Daliyamol and Dr. Prathibha V. H. The best technical staff award was given to Dr. T. Sivakumar, SMS, KVK, Kayamkulam.

Dr. K. Muralidharan, Director (Acting), presided over the function. The foundation day programme was followed by a business entrepreneurial "Kalpa - Green Chat" programme.

Dr. A.K. Singh, Deputy Director General (Hort. Science), ICAR, New Delhi, delivering the Foundation Day address virtually.

Scientific team comprising Dr. Vinayaka Hegde, Dr. V. H. Prathibha, Dr. Rajkumar, Dr. M. Sujithra, Dr. Daliyamol, and Dr. M. K. Rajesh with the best research team award certificates along with dignitaries.

Dr. T. Sivakumar, SMS, KVK receiving the best Technical Staff award

Mushroom spawn production unit at ICAR-KVK, Alappuzha

A mushroom spawn production unit with funding support from the State Horticulture Mission (Kerala), was inaugurated at ICAR-KVK-Alappuzha by Sri. P. Prasad, Hon. Minister for Agriculture, Govt. of Kerala, on 3rd March, 2023. On the occasion, the Diploma in Agri-cultural Extension Services for Input Dealers (DAESI) programme (2022-23) was also inaugurated by the Minister. Dr. V. Venkatasubramanian, Director, ICAR-ATARI, Bengaluru presided over the meeting. A small exhibition highlighting different aspects of mushroom production and value addition was also arranged. On this occasion a spicy health drink, "Mirchy's magic", from the KVK was also launched.

Sri P. Prasad, Hon'ble Minister, Govt. of Kerala, addressing the gathering

38th Annual Workshop of AICRP on PHET

ICAR-CPCRI, organized 38th Annual Workshop of the All India Coordinated Research Project on PostHarvest Engineering and Technology (AICRP on PHET) during 20th to 22nd February, 2023 at Kasaragod. Prof. Prasad Krishna, Director, NIT-Calicut was the chief guest of the inaugural session. The session was chaired by Dr. S. N. Jha, DDG (Agrl. Engg.) and other dignitaries in the dais were Dr. K. Narsaiah, ADG (Process Engg), Dr. K. B. Hebbar, Director, ICAR-CPCRI, Dr. Nachiket Kotwaliwale, Director, ICAR-CIPHET, and Dr. Vishwakarma R. K., Project Coordinator of AICRP on PHET.

About 100 delegates from 31 different centres of AICRP on PHET, ICAR-CIPHET and ICAR Head-

quarters have participated in the workshop. Two new technical bulletins in Tamil on 'Virgin coconut oil' and 'Coconut chips' by ICAR-CPCRI, Kasaragod centre were released by the chief guest and DDG (Agrl. Engg.). Four memorandums of agreement for transfer of AICRP on PHET, ICAR-CPCRI developed technologies 'Virgin coconut oil', 'coconut chips', 'foam mat dried coconut milk powder' and 'Kalparasa tapping and value addition' were exchanged with three entrepreneurs.

A Business and Plenary session was held at the end of the technical sessions on 22th February, 2023 which was co-chaired by Dr. K.B. Hebbar, Director, ICAR-CPCRI.

Dr. S. N. Jha, DDG (Agrl. Engg.) addressing during the function

National Workshop on Science History of India

Release of publication by the dignitaries during the function

National Science Day-2023 was celebrated at ICAR-CPCRI, Regional Station, Kayamkulam by organizing National Workshop on 'Science History of India' on 28th February, 2023 with the financial support from Kerala State Council for Science, Technology and Environment.

In his presidential address, Dr. K. B. Hebbar, Director, ICAR-CPCRI, Kasaragod highlighted on how history leads deeper insights in to science by citing the professional contribution of Prof. J. C. Bose retrieved from history. Prof. Rajan Gurukkal, Former Vice Chancellor, M.G. University & Vice-Chairman, Kerala State Higher Education Council inaugurated the workshop online. Key note address on 'History of Plantation Crops in India' was delivered by Prof. P. K. Michael Tharakan, Former Vice Chancellor, Kannur University & Chairperson, Kerala Council for Historical Research (KCHR).

Publications from this Institute on 'Proceedings of Mentoring Workshop for Strengthening FPO's and 'Compilation on Soil Health Management for Sustained Productivity' were released on this occasion. A Science Day Exhibition was arranged as part of the workshop.

More than 120 registered faculties, research scholars and students from South India participated and made the workshop a memorable event of understanding science laced with history.

Seminar on 'Smart Farming in 5G Era'

A seminar on 'Smart Farming in 5G Era' was organised by the TRAI, Bengaluru at CPCRI Kasaragod in collaboration with the institute on 1st March, 2023. Dr. K. Muralidharan, Director in charge, ICAR-CPCRI inaugurated the seminar. While inaugurating he expressed his feelings that the availability of multitude of network options available in the country makes it easy for 5G based smart farming. The other dignitaries present during the inaugural session were Sri. Chandrachud, AGM, TRAI and Sri. Manish Raghav, Sr. Officer, TRAI and Dr. K. P. Chandran, Pr. Scientist (Statistics).

More than 150 delegates, including agricultural scientists, data networking technicians, students and technocrats participated in the seminar.

Inuaguration of the function

Kalpa Quiz — Coconut Technology Dissemination Awareness Competition

Distribution of awards

Kalpa quiz competition was organized as a part of the Kalpa Vajra Celebrations by ICAR-CPCRI, RS, Kayamkulam on 16th March, 2023 at the auditorium of Puthuppally Service Cooperative Bank Ltd. Dr. Sreevalsan J. Menon, Professor, KAU was the Chief Guest of the valedictory program. The winners of the 1st, 2nd and 3rd positions were awarded with cash prizes of Rs. 25,000/-, Rs. 15,000/-, and Rs. 10,000/-, respectively, sponsored by CDB. A total of 163 participants, including 65 students, farmers, people's representatives, SHG members, FPO members, etc., participated in the quiz competitions.

HUMAN RESOURCES DEVELOPMENT

Training within India

Scientific

Name and designation	Title of the programme	Place and date
Dr. Sandip Shil, Senior Scientist (Agricultural Statistics)	Online training on Data Visualization using R	ICAR-NAARM, Hyderabad 01st to 08th March, 2023

Awards / Honours

Name and designation	Name of the Award	Place and date
Dr. Vinayaka Hegde, Dr. V. H. Prathibha, Dr. Rajkumar, Dr. M. Sujithra, Dr. Daliyamol, Dr. C. Thamban and Dr. M. K. Rajesh	Interdisciplinary Award of ICAR-CPCRI	Foundation Day Celebration held at Kasaragod, on 05th January, 2023
Dr. T. Sivakumar, SMS (Ag. Entomology)	Best Technical Staff Award of ICAR-CPCRI	Foundation Day Celebration held at Kasaragod, on 05th January, 2023
Dr. R. T. P. Pandian, Dr. S. H. Thube, Mr. Bhavishya, Dr. Merin Babu, Dr. Chaithra M., Dr. H. Rajashekara, Dr. T. N. Madhu, Dr. Y. Diwakar, Dr. Balanagouda Patil, and Dr. Vinayaka Hegde	Best Oral presentation award for the work on "First report of *Colletotrichum kahawae* subsp. ciggaro causing leaf spot disease on arecanut, *Areca catechu* L. in India"	Indian Phytopathological Society (IPS) at University of Mysuru, Mysuru, Karnataka, during 02nd to 04th February, 2023

PUBLICATIONS

Research articles

Balanagouda Patil, Narayanaswamy, H., Vinayaka Hegde, Sridhara, S., R. ThavaPrakasa Pandian, and Shivaji H. Thube. 2023. Development and evaluation of fungicide-amended urea briquettes (FAUB's) to combat fruit rot disease of arecanut: A farmers-friendly approach. *Crop Protection*. 165: 106155. https://doi.org/10.1016/j.cropro.2022.106155.

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Suchithra, M., Suma, B. Minimol, J. S. Deepu Mathew and Santhosh Kumar, A.V. 2022. Physiological response of cocoa (*Theobroma cacao* L.) genotypes to drought. *Journal of Plantation Crops*, **50**(3): 136-144. doi: 10.25081/jpc.2022.v50.i3.8073.

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Sudha, R., Rajesh, M.K, Niral, V., Samsudeen, K., Shil, S., Ramchander, S and Diwakar, Y. 2023. Analysis of genetic diversity and population structure in worldwide coconut germplasm (*Cocos nucifera* L.) using microsatellite markers, *Scientia Horticulturae*, 309, 111681.

Conference papers

Elain Apshara, S. 2023. Plantation Crops: The future of high value horticulture. *In*: Souvenir and compendium of abstracts of Progressive Horticulture Conclave (PHC 2023)- Transforming horticulture science into technology organized by G.B Pant University & Indian Society of Horticultural Research & Development (ISHRD), Pantnagar, Uttarakhand, Feb 3-5, 2023, p.331.

Shareefa, M., Thomas, R.J. and Mayalekshmi, 2023. Varietal improvement in coconut- A review. In: *Book of abstracts of the National Workshop on 'Science History of India'* ICAR-CPCRI, Regional Station, Kayamkulam 28.02.2023

Sreelekshmi, J.S., Shareefa, M., Thomas, R.J. and Mayalekshmi 2023. Story of coconut tissue culture research in India. *In: Book of abstracts of the National Workshop on 'Science History of India'* ICAR-CPCRI, Regional Station, Kayamkulam 28.02.2023

Thomas, R.J., Shareefa, M. Merin Babu, Mayalekshmi, Sasikala, M., Jacob, P. M. and Nair, R. V. 2023. History of breeding for resistance to root (wilt) disease of coconut. *In: Book of abstracts of the National Workshop on 'Science History of India'* ICAR-CPCRI, Regional Station, Kayamkulam 28.02.2023

Popular articles

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TRANSFER OF TECHNOLOGY

Trainings

Programme	Conducting Organisation and Date	Participants
Workshop on 'Coconut - God Gifts for mankind'	ICAR-CPCRI, Research Centre, Mohitnagar, West Bengal (on campus) 06th January, 2023	30 (College students)
Training programme on 'Coconut cultivation'	ICAR-CPCRI, Regional Station Kayamkulam, 10th January, 2023	22 farmers and 04 agricultural officials
Training on scientific coconut cultivation for better livelihood	11th January, 2023	30 participants
Workshop on importance of coconut on human life	12th January, 2023	50 participants
Arecanut based cropping system for better livelihood	25th January, 2023	34 (Tribal women)
Training programme on 'Basic and advanced nursery techniques in arecanut'	ICAR-CPCRI, Regional Station, Vittal, 01st February to 31st March, 2023	Scheduled Caste youths
Arecanut based cropping system for better livelihood	10th February, 2023	29 (Tribal Women)
Technology Clinic on 'Coconut Based Micro-Enterprises'	IICAR-CPCRI Kasaragod in collaboration with the District Industries Centre, Government of Kerala, 27th to 28th February, 2023	60 prospective entrepreneurs participated
Scientist-Farmers interface programme on "Plant health management in arecanut"	Balnadu village, Puttur Taluk, Dakshina Kannda District, Karnataka, sponsored by Directorate of Arecanut and Spices Development (DASD), Calicut, on 07th March, 2023	Farmers, stakeholders and scientists
Workshop on 'Farmer Producer Companies in Assam - Status and Strategies'	ICAR-CPCRI, RC, Kahikuchi, 09th March, 2023	39 participants
Workshop on 'Coconut-God gifts for mankind'	ICAR-CPCRI, Research Centre, Mohitnagar 31st March, 2023	30 (College students)
Training programme on farm machinery	ICAR-CPCRI, Research Centre, Kahikuchi	280 numbers of participants from Morigaon, Kamrup, Nalbari and Baksa districts of Assam
Exposure visit-cum training programme 'Coconut production and value addition technologies'	ICAR-CPCRI, Kasaragod	

SCSP Off-campus training

Programme	Conducting Organisation and Date	Participants
Training cum field demonstration of Honey frame (super) construction	Pillankatta village in Badiadaka Panchayath of Kasaragod on 01st to 07th February, 2023	35 scheduled caste farmers were selected to receive 350 beehive boxes (each farmer 10 beehives), along with colonies (brood chamber), stands, smokers, and a honey extractor
Training on Scientific Cultivation Practices of Coconut to SC Farmers from Marayur	ICAR-CPCRI, Regional Station, Kayamkulam, 14th March, 2023	25 SC farmers and 05 officials from Marayur Krishi Bhavan, Idukki, Kerala

Demonstration and distribution programme

Capacity building and demonstration of bio-suppression of exotic whiteflies on coconut in Lakshadweep Islands

A scientific team visited Agatti and Kavaratti Islands in Lakshadweep during and empowered the farmers and other stakeholders during 12th to 17th February, 2023. Demonstrations on soil and water conservation and bio-suppression on exotic whitefly complex were conducted.

Scientists interacting with the farmers during the demonstration

Training cum distribution of inputs programme at Tripura

A view of the training programme at Tripura

A training programme on 'Scientific cultivation and management practices of arecanut in Tripura' was conducted by ICAR-CPCRI, Kahikuchi, in collaboration with MTTC&VTC, College of Fisheries, CAU, Lembucherra and Youth for Integration Trust, NGO, Tripura on 12th March, 2023 under NEH activity. Altogether, 100 farmers from Lalijuri, Kanchanpur, North Tripura, participated in the day-long programme.

Distribution of *Metarhizium majus* to suppress coconut rhinoceros beetle

As part of area-wide suppression of coconut rhinoceros beetle in Vallikunam panchayat, Alappuzha District through farmer participatory mode, *Metarhizium majus* packets multiplied in semi-cooked rice were distributed to 200 dairy farmers on 20th and 24th March, 2023.

Diagnostic field visit and field survey

Field survey of leaf spot disease in arecanut gardens

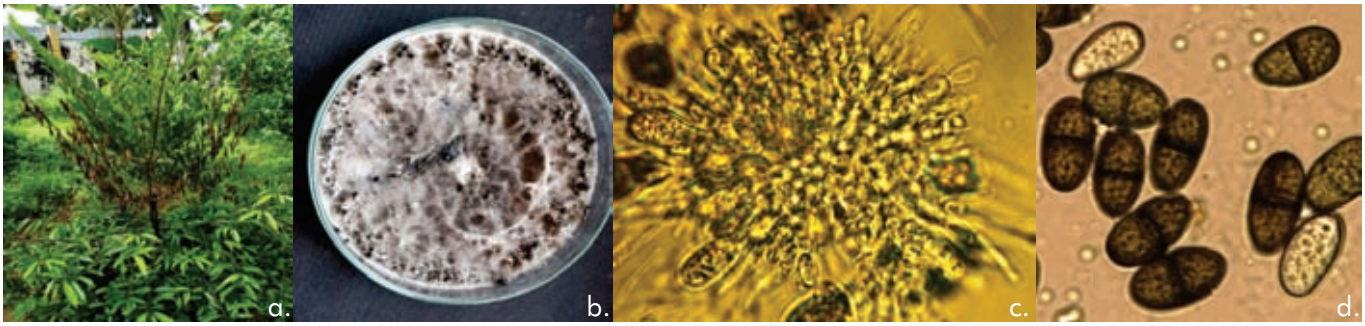
In order to determine the prevalence of emerging leaf spot disease in arecanut, a field survey was conducted in disease affected areas in Dakshina Kannada, Chikkamangaluru, Udupi, Kodagu, Shivamogga, and Hassan districts of Karnataka, and Kasaragod district of Kerala. Out of 75 gardens surveyed, the disease incidence was recorded as high, moderate and low in 36, 21 and 18 arecanut gardens respectively.

Leaf spot affected arecanut palms

Scientists visiting leaf spot desease affected arecanut garden

Diagnosis of dieback disease of nutmeg in coconut based cropping system

Dieback disease was observed in nutmeg planted in coconut based cropping system. Combined analysis of gene sequences, phenotypic characterization and pathogenicity test of associated pathogen confirmed it as *Lasiodiplodia theobromae*.



a.) Dieback disease affected nutmeg, **b.**) Colony, **c.**) Conidiogenous cells and **d.**) Conidia of *L. theobromae*

Field visit to the arecanut gardens in Amasebail village

Experts from ICAR-CPCRI, RS, Vittal, visited the arecanut gardens in Amasebail village of Udupi district. Severe infestation of mite was observed on both young and old arecanut palms. Boron deficiency was also observed in two arecanut gardens. Micro nutrient management and IPM for mite was suggested to the farmers.

Radio talks

Title	Telecasted On and Date	Host
'Pest, diseases and their management in mango'	AIR Thiruvananthapuram, on 13th January, 2023	Dr. T. Sivakumar
Interactive radio talk on 'Integrated Pest Management in coconut'	Broadcast on 07th February, 2023	Dr. A. Josephrajkumar, Principal Scientist
Interactive radio talk on Integrated Disease Management in coconut	Broadcast on 07th February, 2023	Dr. Merin Babu, Senior Scientist
Scientific coconut cultivation for better livelihood and pests and diseases management	AIR, Kolkata, 14th March, 2023	Dr. Arun Kumar Sit, Principal Scientist
'Integrated nutrient management in arecanut'	Paanchajanya community radio centre, Puttur, on 21st March, 2023	Mr. Bhavishya
'Integrated disease management in arecanut'		Dr. Vinayaka Hegde
'Integrated pest management in arecanut'		Dr. Madhu, T. N.

Participation in exhibition

Programme	Venue and Date	Participants
Golden Jubilee ceremony of AAU-HRS, Kahikuchi	AAU-HRS, Kahikuchi on 06th February, 2023	ICAR-CPCRI, RC, Kahikuchi

OTHER INFORMATION

Infrastructure development

An advanced centre for leaf tissue analysis was established at ICAR-CPCRI, RS, Kayamkulam with the funding of RKVY with an outlay of Rs. 54.40 lakhs.

Mushroom spawn production unit established at ICAR-KVK, Alappuzha with funding support (Rs. 15 lakhs) from State Horticulture Mission (Kerala).

ICAR-KRISHI VIGYAN KENDRAS

KRISHI VIGYAN KENDRA, KASARAGOD

International Year of Millet — Shree Anna programme at Kasaragod

The ICAR KVK Kasaragod and ICAR-CPCRI organized a seminar on 'Enhancing productivity and value addition of millets' at ICAR-CPCRI on 18-03-2023. Dr. Manojkumar T.S., Head, ICAR-KVK Kasaragod delivered the inaugural address and stressed for the promotion of millet cultivation in Kasaragod district. More than 60 various food products and value-added products made out of Millets were displayed during the event by the KVK trained SHG groups. More than 60 persons including 52 farmers participated in the meeting.

Dr. Manojkumar T. S., Head, ICAR-KVK Kasaragod, delivering inaugural speech

KRISHI VIGYAN KENDRA, ALAPPUZHA

Scientific Advisory Committee (SAC) Meeting

Twenty first SAC meeting of KVK-Alappuzha was conducted in the chairmanship of Dr. K. Muralidharan, Acting Director, ICAR-CPCRI, Kasaragod on 20th January, 23. The meeting was attended by Dr. D. V. S. Reddy, Principal Scientist, ICAR-ATARI, Bengaluru, ADE (Central Zone), KAU, Acting Head, ICAR-CPCRI, Regional Station, Kayamkulam.

Release of KVK Newsletter during the SAC meeting

SCSP programme launched at Puliyur and Mulakkuzha panchayaths

SCSP programme of ICAR-NBAIR, Bengaluru implemented through ICAR-ATARI, Bengaluru was launched in Puliyur on 17th March, 2023 and Mulakkuzha panchayath of Chengannur block of Alappuzha district by KVK-Alappuzha on 23rd March, 2023. Seedlings, turmeric seeds and a vegetable cultivation kit, bio agents - Nanma, fish amino acid, Yellow Stick traps, and micronutrient fertilizergs were provided to 300 SC farmers from these two panchayaths for their food and nutritional security. The farmers were oriented on the importance and methods of cultivation of these crops.

SCSP Puliyur

SCSP Mulakkuzha

Workshop on "Cultivation and Value addition of Millets" organized

As part of the celebration of the "International Year of Millets-2023", a workshop on "Scientific cultivation and value addition of Millets" was organized in the KVK on 27th March, 2023 in collaboration with NABARD. There were about 80 participants. An attractive display on the unipole hoarding highlighting the importance of millets in our daily life was hoisted from February, 2023.

Unipole

Distribution of millet products

Capacity building of extension officials and master farmers on 'Farm Based Planning'

A district level capacity building programme on 'Farm Based Planning' was organized on 4th January, 2023, in collaboration with ATMA, Alappuzha. A total of 40 participants attended the programme.

A view of the capacity building programme

Vocational training on Mushroom production technologies to college students

Twenty two undergraduate students from Sree Ayyappa College, Eramallikkara, Chengannur attended a two days vocational training programme on 'Mushroom production technologies' on 23rd and 24th January, 2023 in KVK-Alappuzha. Exposure visits to commercial mushroom units at Devikulangara and Chettikulangara were conducted.

Capacity building on 'Value addition of Jackfruit' for tribal farmers from Odisha

Capacity building programme on 'Value addition of Jackfruit' for selected master farmers of the NABARD supported NGOs, and Sakha foundation funded by NALCO from Koraput District of Odisha, was conducted for 4 days from 23rd January, 2023 to 26th January, 2023. NABARD consultant, official of Sakha foundation and 6 trainees from the tribal community attended the programme. More than 25 jackfruit products were demonstrated and prepared through the hands-on-training. Visit to a Jackfruit processing unit was also arranged.

Foliar nutrition in paddy using drone demonstrated

Foliar nutrition of the multi-nutrient mixture 'KAU Sampoorna'for paddy crop using drone was carried out in 10 ha area on 10th February, 2023 in Edathua Panchayathas part of the NICRA project.

Foliar nutrition of nano urea in paddy using drone demonstrated

Foliar nutrition of nano urea for paddy crop using drone was carried out in 16 ha area in Vallikunnam and Thamarakulam Panchayaths as FLD on 'Aerial spray of Nano urea for enhanced nutrient efficiency and profitability in paddy' on 22nd February, 2023. 40 paddy farmers participated in the programme.

Foliar nutrition of nano urea for paddy

Training programmes

Training	No. of Programmes	Participants		
		Men	Women	Total
On campus	7	92	70	162
Online	1	15	8	23
Off campus	2	19	22	41
Vocational	1	9	14	23
Total	11	135	114	249

NEW PROJECTS/ INITIATIVES

New project on "Establishment of state of art YLD diagnostic laboratory" funded by Department of Horticulture, Government of Karnataka (Budget: 50 Lakhs; PI: Dr. Vinayaka Hegde) at ICAR-CPCRI, Regional Station, Vittal.

A new project 'Horticulture based crop cafeteria for nutritional and livelihood security of marginal farmers' funded by State Horticulture Mission, Govt. of Kerala under Technology dissemination through demonstration at ICAR-CPCRI, RS, Kayamkulam.

COMMERCIALIZATION OF TECHNOLOGY

Name of Technology Commercialized	Date of Signing MoA	Value (in INR)	To Whom Commercialized
Aqua formulation of EPN Kalpa EPN (CPCRI- SC1)	19th January, 2023	5000	Mr. Krishna Kumar, Pollachi Farm, Belathur, Sathyamangalam, Erode - Dist, Tamil Nadu -638461
Snowball Tender Nut Machine	25th January, 2023	2500	Mr. Jyothish K.M., Karithakarakuzhiyil, P.O., Kolayadu, Menachody, Kannur – 670650, Kerala, India
	28th March, 2023	2500	Mr Akash Kumar Shakya, M/s. Fastest Service, Bhawapur, Allahabad - 211003, Uttar Pradesh
Production of virgin coconut oil (VCO)	13th February, 2023	40000	Mr. Rajakumar M., Srilayam, R.C. Street, Neyyattinkara P.O., Thiruvananthapuram - 695121
	15th March, 2023	40000	M/s Organo Resource Management, Kizhsery building, Perinthalmanna, Malappuram Dist.
Matured coconut water based value added products	13th February, 2023	40000	Mr. Rajakumar M., Srilayam, R.C. Street, Neyyattinkara P. O., Thiruvananthapuram - 695121, Kerala
	20th February, 2023	--	The General Manager, Eramala Service Co-Operative Bank Ltd., Orkkatteri P. O., Vadakara, 673501, Kozhikode, Kerala
	15th March, 2023	--	M/s Organo Resource Management, Kizhserybuilding, Perinthalmanna, Malappuram Dist., Kerala
Foam mat dried coconut milk powder	20th February, 2023	10000	The General Manager, Eramala Service Co-Operative Bank Ltd., Orkkatteri P. O., Vadakara, 673501, Kozhikode, Kerala
	08th March, 2023	10000	Mr. Ameen Ashraf T.P., Maataste Food Products LLP, KINFRA, Nadukani, Kannur, PIN- 686691
	15th March, 2023	10000	M/s Organo Resource Management, Kizhsery building, Perinthalmanna, Malappuram Dist., Kerala
Coconut Chips	20th February, 2023	25000	The General Manager, Eramala Service Co-Operative Bank Ltd., Orkkatteri P. O., Vadakara, 673501, Kozhikode, Kerala
Collection of fresh and hygienic Kalparasa and production of natural coconut sugar	20th February, 2023	100000	Global Coconut Farmers Producer Company Ltd., 39, Chettipalayam Road, Palladam-641664, Tirupur District, Tamil Nadu
Technology for mass production of *Trichoderma harzianum* using arecanut leaf sheath	27th February, 2023	5000	Raitajanya Farmer Producer Company Limited, Yashvi Paradise, Alangar, Moodubidire – 574227, Dakshina Kannada (dist), Karnataka
Preservation of Carbonated Tender Coconut Water	15th March, 2023	25000	M/s OrganoResource Management, Kizhserybuilding, Perinthalmanna, Malappuram Dist., Kerala
	Total	2,75,000	

WOMEN'S WELFARE COMMITTEE ACTIVITIES

International Women's Day

Ms. Oli Aman Jodha, inaugurating the International Women's day function

International Women's Day was celebrated at ICAR-CPCRI on 8th March, 2023, with Ms. Oli Aman Jodha, from Thirunelli of Wayanad district of Kerala, the first woman farrier in India and young entrepreneur as the chief guest. Dr. K. B. Hebbar, Director CPCRI chaired the function Dr. V. Niral Principal Scientist and Chairperson of the Institute Women's Welfare Committee delivered introductory remarks.

In the function four women entrepreneurs trained under Krishi Vigyan Kendra, CPCRI Kasaragod viz., Mrs. Ramya K V, Mrs. Rathi Mohan, Mrs. Usha Nair, Mrs. Suhrabi Fayaz were felicitated and the fortified coconut oil for pain relief as well as millet based healthy food products developed by them were launched on the occasion. Two female coconut climbers namely Mrs. Sharadha T. and Mrs. Krishnaveni K. who were trained at KVK Kasaragod under FoCT programme, were also felicitated on the occasion.

'Naari Shakthi Mela' and Dakshina Kannada district level seminar on cocoa

Dakshina Kannada District level seminar and Naari Shakthi Mela on Cocoa was conducted at ICAR-CPCRI, Regional Centre, Vittal on 8th March, 2023 with DCCD funding in commemoration of International Womens' Day. 51 members of Self Help Groups from Puttur and members of coconut producers company participated and benefitted.

View of 'Nari Shakthi Mela'

PARTICIPATION IN NATIONAL SEMINARS/ SYMPOSIA/ CONFERENCES/ WORKSHOPS/WEBINARS

Name and Designation	Title	Place and Date
Dr. M. Shareefa, Senior Scientist, Dr. Maya Lekshmi, Technical Officer	2nd DAE-BRNS Workshop on 'Cryogenic Facility Management'	Tata Institute of Fundamental Research, Colaba, Mumbai, 04th to 07th January, 2023
Dr. Arun Kumar Sit, Principal Scientist	Conclave of Farmer's Producer Company of Jalpaiguri	NABARD, Jalpaiguri Unit, 31st January, 2023
Vinayaka Hegde, Head (Acting) and R. Thava Prakasa Pandian, Scientist	Oral presentation in "National Platinum Jubilee Conference on "Plant and Soil Health Management: Issues and Challenges"	Indian Phytopathological Society (IPS) at University of Mysuru, Mysuru, Karnataka during 02nd to 04th February, 2023
Dr. S. Elain Apshara, Principal Scientist (Hort.)	Progressive Horticulture Conclave (PHC 2023)	GB Pant University of Agri. & Tech., Pantnagar, Uttarakhand, 03rd to 05th February , 2023
Dr. Regi Jacob Thomas, Principal Scientist	Scientific Advisory Committee meeting	ICAR-KVK, Pullad, Pathanamthitta, 08th February, 2023
Dr. Rajkumar, Senior Scientist	Capacity building workshop on 'What makes incubator successful' organized by Start-Up India	IIT, Madras, 16th to 17th February, 2023
Dr. Sandip Shil, Senior Scientist (Agril. Stat)	National level Workshop on Big Data Analytics in Agriculture (Online Mode)	ICAR-NAARM, Hyderabad, 09th to 10th March, 2023

PERSONALIA

APPOINTMENTS

Dr. K. B. Hebbar is the New Director of CPCRI

Dr. K. Balachandra Hebbar, Principal Scientist, was appointed as the Director, ICAR-CPCRI, Kasaragod. He assumed office on 23rd January, 2023.


Dr. K. Balachandra Hebbar

PROMOTIONS

Name of the staff	From (designation)	To (designation)	w.e.f.
Dr. Bikash Chowdhury, CPCRI, RC, Kahikuchi	Chief Technical Officer	Chief Technical Officer (Advance Increment)	25th November, 2021
Shri. Sajnanath, KVK, Alappuzha	Assistant Chief Technical Officer	Chief Technical Officer	11th March, 2021
Smt. Bijila P. V., KVK, Alappuzha	Technical Officer	Senior Technical Officer	04th February, 2018
Shri. Ansary K. M., KVK, Alappuzha	Technical Officer	Senior Technical Officer	11th January, 2018
Smt. Rupa Manikandan, CPCRI, Kasaragod	Assistant, MACP(Level 6)	Assistant, MACP (Level 7)	26th November, 2022
Shri. K. Ravi, CPCRI, RS, Kayamkulam	Skilled Supporting Staff, MACP (Level 3)	Skilled Supporting Staff, MACP (Level 4)	01st October, 2022
Shri. Mahadev Misra, CPCRI, RC, Mohitnagar	Skilled Supporting Staff, MACP (Level 1)	Skilled Supporting Staff, MACP (Level 2)	03rd January, 2023

TRANSFERS

Name of the staff	From (Place)	To (Place)	w.e.f.
Smt. Jessymol Antony, FAO	ICAR- CPCRI, Kasaragod	ICAR- CTCRI, Thiruvanthapuram	17th February, 2023

RETIREMENTS

Name of the staff	Designation	Place	Date
Smt. Girija Chandran	Personal Secretary	CPCRI, Kasaragod	28th February, 2023
Shri. A. K. Ramadas	Technical Officer	CPCRI, Kasaragod	28th February, 2023
Shri. Divakaran A.	Technical Assistant	CPCRI, Kasaragod	28th February, 2023

OBITUARY

Sri. Sheenapa Gowda, of ICAR-CPCRI, Research Centre, Kidu, breathed his last on 3rd March, 2023. He joined service on 29.04.1995. Director and staff of ICAR-CPCRI, pray the Almighty for the peace and tranquility to the departed soul.

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