KALPA

CPCRI Newsletter

Volume 40 No. 3 July–September, 2021

40th Year of Publication of News, Views and Advancements of Coconut, Arecanut and Cocoa

ICAR-Central Plantation Crop Research Institute
Kasaragod - 671 124, Kerala, India
An ISO 9007:2015 Certified Institution

FROM THE DIRECTOR'S DESK

Amrutakalasam for the Mahotsav

75 Weeks ahead of 15 August 2022, Hon'ble Prime Minister of India Shri Narendra Modi said while launching the Seventy-fifth-year celebration of India's independence at Sabarmati Ashram on 12 March 2021 that the "Azadi ka Amrut Mahotsav" be on five pillars: Freedom Struggle, Ideas at 75, Achievements at 75, Actions at 75 and Resolves at 75. Inspiring from this, the ICAR-CPCRI rolled out a series of programmes till 15 August 2023 to mark the occasion of the 75th year of India's independence

The vision of Mahatma Gandhi on Independent India was centred on self-reliance and self-confidence. Agriculture has contributed substantially towards transforming India into a self-reliant nation and helped develop not only the nation's economy but also the democracy itself in a larger perspective. Food security is the first and formidable challenge to achieve self-reliance.

Post-independence, the Indian agriculture sector had an unparallel developmental trajectory reflecting extraordinary resurgence and resilience. Once stigmatized by inefficiency, dependency and deprivation, it had schematically changed the fortunes and turned out as a 'bread basket'. For most commodities, we are the world's number one or two in production. Nevertheless, dwindling farm income remains a challenge to be addressed with urgent priority. How to upgrade a farmer from a food provider to an entrepreneur? Especially in the wake of agriculture reforms that ensure the farmer's freedom to grow, the choice to sell, and freedom to evade exploitation.

With regard to plantation sector, the major challenge is developing an equitable and sustainable system that ensures inclusive growth and international competitiveness. The synergy from the developmental efforts of various institutions needs to be channelled through effective functional linkages and cross-disciplinary approaches. It is the perfect time to focus our energies and resources on ensuring a great leap in farmer prosperity. In this enlightening backdrop, ICAR-CPCRI has conceived the 'Azadi ka Amrut Mahotsav' programmes on the thematic area 'Beyond the Periphery: The Resilient Saga of Indian Agriculture'. It includes commemorative lectures, seminars, workshops, the release of technologies, and various contests targeting farmers, researchers, extension personnel, students and the public. Dr. A. K. Singh, DDG (Horticultural Science), ICAR, New Delhi, launched the programme on 16 July 2021, in which he called upon the researchers to come up with cost-effective technologies without compromising quality so as to ensure access by all, especially in the wake of the pandemic that demands immunity-boosting food.

Dr. V. Rajagopal, Former Director, ICAR-CPCRI and President, Society for Hunger Elimination, delivered the first lecture entitled "Health and nutritional benefits of coconut". In his talk, he detailed the various products from coconut and their health and nutritional benefits. He highlighted tender coconut as "Amrutakalasam" as it is a reservoir of many health benefits. The Institute has released two technologies for better handling of tender coconut recently.

Dr. Anitha Karun

Inside...

SPECTRUM

Evaluation of Regional Cocoa Beans

Cocoa cultivated in southern region of India covering Karnataka, Kerala, Andhra Pradesh and Tamil Nadu with different agro climatic conditions and palm based cropping models comprising of arecanut, coconut, oil palm and in upper hills along with fruit trees. Beans collected from farmers' gardens and multi-location trial plots were assessed for the regional diversity and quality.

In Andhra Pradesh, single dry bean weight varied from 0.80-1.62 g with 34.9- 64% fat. In Karnataka, 1- 1.56 g bean weight had 51- 52% fat, in Kerala, 1-1.66 g bean weight recorded had low fat of 42-47% and in TN, beans are of 1- 1.2 g size with fat of 42- 50%. These variations observed to be of bulk cocoa grown, environment and mainly the general farm level primary processing of fermentation and drying methods followed.

Beans grown in 1500 m above msl from high hills of Karnataka were assessed for quantitative and qualitative parameters. Criollo, had a bean size of 1.24 g with 15% shelling, 84.7% nib recovery, 62% fat. Forastero, recorded 1.36 g dry bean weight, 9% shelling, 90.6% nib recovery, 58.5% fat. Amelonado, had 1.49 g dry bean weight, 14.4% shelling, 85.5% nib recovery, 58.5% fat and Trinitario, recorded 1.09 g dry bean weight, 12.4% shelling, 86.8% nib recovery, 49% fat. Seggregated processing will ensure single origin - single farm chocolate preparations and marketing opportunities.

Elain Apshara, S.

Nut crinkler (*Paradasynus rostratus* Dist.) induced nut drop in coconut

Severe incidence of the nut crinkling coreid bug, *Paradasynus rostratus* Dist. on young buttons was observed in South Kerala, causing nut drop syndrome. Immature stages of the pest (nymphs) were found in clusters during the inflorescence opening during July-September and their feeding could cause necrotic spindle-shaped lesions on young buttons at meristematic region. Such buttons fall in most cases and those retained, possible feeding impact on the mid or terminal region of the immature nut, exhibit nut crinkling symptoms. Drying of inflorescence could also be observed in certain cases when the nymphs feed on emerging buttons during blooming of inflorescence. Coconut eriophyid mite (*Aceria guerreronis* Keifer) and nut disease (*Lasiodiplodia* sp.) would add more injury and infections to the tender buttons in some cases. All these infestations in synergy with the disease lead to nut drop syndrome. Application of neem oil 1% or thiamethoxam 25% WG (0.2 g per litre) on bunches preferably after pollination and along the dwelling zones of leaf and inflorescence axils could reduce the damage potential significantly. Alternate hosts such as mango, cashew, Malabar tamarind, false mangosteen, guava, passion fruit, etc are to be critically monitored for off-season hibernation.

Fig. 1. Symptoms of coried bug incidence on coconut

Josephrajkumar, A., Anes K.M., Merin Babu and Chandrika Mohan

Characterization of *Pochonia chlamydosporia*, a potential fungal bio-agent against plant parasitic nematodes

A virulent and local nematode-pathogenic fungal bio-agent (CPNPF1) associated with root-knot nematode infesting guava was isolated from the ecological engineering garden of ICAR-CPCRI, Regional Station, Kayamkulam. Molecular characterization of the fungal bio-agent by sequencing the ITS region, revealed the sequence similarity of the isolate with Pochonia chlamydosporia. Preliminary evaluation on the bio-control potential of the isolate revealed significant reduction in the root galls induced by root knot nematodes in okra under net house condition.

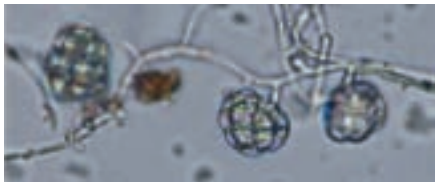


Fig.2. Chlamydospores of *Pochonia*

Anes K.M., Merin Babu and Josephrajkumar A.

Effect of different colored LED lights on arecanut embryogenic calli multiplication

An experiment was taken up to check the influence of different colored LED lights (5 to 100 PPFD) and their combinations on arecanut embryogenic calli multiplication and plantlet growth. Embryogenic calli multiplication was found to be high i.e. 0.028±0.001 $gg^{-1}d^{-1}$ under white colored LED with a PPFD value of 8 μ mol/ m^2/Sec. which was followed by dark (0 μ mol/ m^2/Sec) and blue colored LED (5 μ mol/ m^2/Sec) lights with Relative Growth Rate (RGR) of 0.026±0.004 $gg^{-1}d^{-1}$ and 0.025±0.003 $gg^{-1}d^{-1}$ successively. While least multiplication rate 0.008±0.001$gg^{-1}d^{-1}$ was noticed in white colored LED with a PPFD of 100 μ mol/ m^2/Sec.

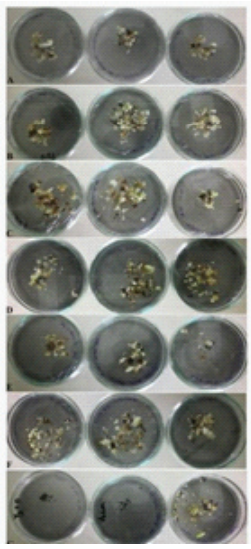


Fig. 3. Multiplication of arecanut embryogenic calli under different colored LED light conditions (a). White LED- PPFD 8 μ mol/ m2/Sec; (b). Dark condition; (c). Blue LED- PPFD 5 μ mol/ m2/Sec; (d).Blue + red LED- PPFD 10 μ mol/ m2/Sec; (e).Red LED- PPFD 14 μ mol/ m2/Sec; (f) Yellow LED- PPFD 6 μ mol/ m2/Sec; (g). White LED- PPFD 100 μ mol/ m2/Sec

Aparna Veluru, Neema M, Muralikrishna, K. S. Rajesh M.K. and Anitha Karun

Genome-wide identification, characterization of the MADS-box gene transcription factor family proteins in coconut

Twenty one potential MAD-box genes were predicted from whole genome sequence data of dwarf coconut cultivar 'Chowghat Green Dwarf' (CGD) using MADS-box protein sequences in date palm and oil palm as queries. Among the 21 potential MAD box genes, eight were AGAMOUS, three APETALA, one DEFICIEN and remaining nine were belong to SQUAMOSA type. Primary and secondary sequence information of all these proteins was conducted and derived the information about their motifs and domains. The NJ phylogenetic dendrogram derived for each protein subfamily group revealed the similarities and dissimilarities among these proteins between and within the palm species. Validation of SQUAMOSA subfamily proteins in different coconut tissues using RT-PCR study revealed the involvement of these genes in various physiological and developmental processes of the coconut.

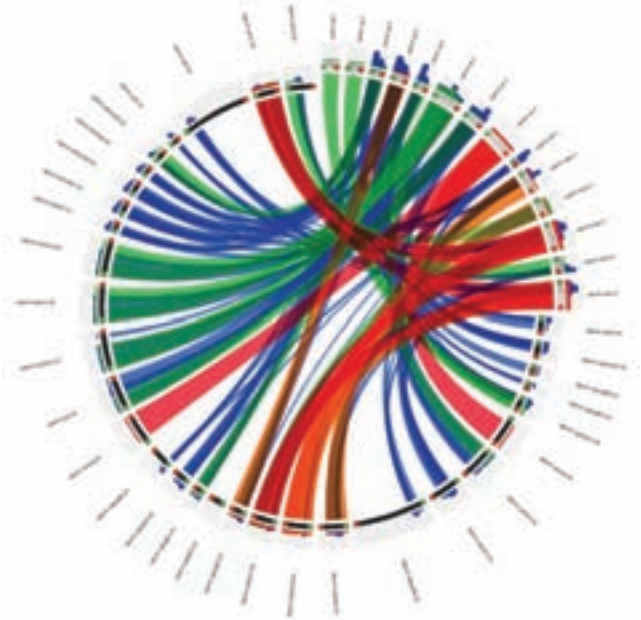


Fig. 4. Circus diagram of mad-box proteins in coconut in comparison with date palm and oil palm mad proteins

Aparna Veluru, Gangaraj K.P. and Rajesh M.K.

Dragon fruit as a profitable intercrop in coconut garden

For crop diversification and intensification in coconut garden with compatible crops to increase the productivity and income for ensuring effective and efficient utilization of soil space and solar radiation different crops were evaluated. Similarly, the potential of dragon fruit as an intercrop under coconut garden to upgrade the productivity of coconut lands and the profitability of farmers has been evaluated. The plants of dragon fruit resembles with others cactus with angular fleshy, thorny stem. The plants are perennials and may survive for more than 20 years. It is non-climacteric fruit. Dragon fruit plants can easily multiply through stem cuttings. Generally 20-25 cm long stem cuttings are used for planting. Generally, planting should be done in rainy season. The main advantage of this crop is that once planted, it will grow for about 20 years, and produce significant crops two to three years after planting and reach full production after five years. Agronomic practices are easy and less expensive; maintenance cost is low and aftercare is minimal due to fewer pest and disease attacks. The studies on intercropping of dragon fruit with coconut carried out in CPCRI, Kasaragod. The research work was initiated during the year 2016. The dragon fruit yield was recorded during the year 2019-2020 is average of 2.5 kg per plant.

Fig. 5. Dragon fruit intercropping under coconut plantation

Panjavarnam, G., Subramanian, P., Surekha.R and Ravi Bhat

Bacillus megaterium in 'Kera Probio' is now *Priestia megaterium*

Plant growth promoting *Bacillus megaterium*, recommended as a bioinoculant in talc-based formulation for coconut seedlings by the brand name 'Kera Probio', is recently recognized by Gupta and coworkers of McMaster University, Canada (2020) as a novel Bacillaceae genus with the specific name — *Priestia* gen. nov. — based on phylogenetic and molecular evidences (https://doi.org/10.1099/ijsem.0.004475). The genus *Priestia* is described as a monophyletic clade with currently ten species in its fold, *Priestia megaterium* comb. nov. being the type species. The species name is retained and henceforth, the constituent microorganism of 'Kera Probio' bioinoculant will be *Priestia megaterium*.

Alka Gupta and Murali Gopal

'Kera Probio' induces calcite precipitation

Kera Probio® is a talc-based bioinoculant recommended by ICAR-CPCRI for application in coconut seedlings to improve their health and vigour and has been taken up by an FPO for popularizing it among coconut farmers. The constituent microorganism of the bioinoculant is the bacterium- *Bacillus megaterium*. Now renamed as Priestia megaterium, its versatility is constantly under study for varied applications. Collaborative research with Amrita School of Engineering, Coimbatore showed induction of calcite precipitation by 'Kera Probio' in presence of calcium chloride. Formation of extracellular calcium carbonate resulted via urea hydrolysis by the bacterium. The property implies its usefulness in self repair of cracks caused in cement due to shrinkage, if the organism forms part of the concrete mixture called biocement. Use of a biological is desirable for producing high concentrations of $CaCO_3$ in short period of time for natural crack treatment process. Kera Probio's ability to have optimum growth at alkaline pH is advantageous for its integration in concrete making process as concrete is basic in nature; additionally, its tolerance to a wide range of temperature from 15 to 50 °C and ability to produce endospores during adverse conditions offers scope for its enhanced survival in biocement as concrete structures are exposed to thermal and other weathering processes.

Alka Gupta, Murali Gopal, Shaheen Sulaiman and V. Poornima

Occurrence and spread of *Lasidiplodia* fruit rot of coconut in Kasaragod district

Occurrence and spread of fruit rot disease of coconut was noticed in Kasaragod districts especially in hilly tracts of Paramba, Adukkalampaadi, Kattamkavala of West Eleri Panchayath and Eettithattu of East Eleri Panchayath after monsoon showers. Initial symptoms include pinkish discoloration on the immature green nuts. Later on, sunken spots develop over the discolorations which later coalesce to form large lesions leading to drying and drooping of the nuts. The diseased nuts were collected from these areas and were then isolated for the fungal pathogen. The pathogen of this disease was identified as *Lasidiplodia theobromae*. Spraying of 0.2% hexaconazole was recommended as ad hoc management strategy.

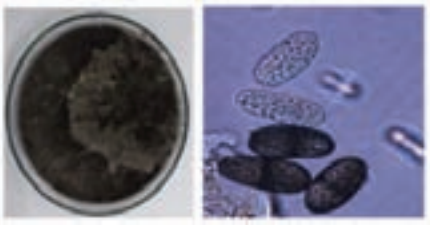


Fig. 7. Microscopic view of the pathogen *Lasidiplodia*

Fig. 6. Disease symptoms - (a) Pinkish discoloration of nuts in the initial stages of disease development, (b) Sunken spots during later stages, (c) *L. theobromae* on PDA plate and (d) Microscopic view of fungal spores.

Daliyamol, Prathibha V.H. and Vinayaka Hegde

Management of burrowing nematodes in palms

The burrowing nematode (*Radopholus similis*) and lesion nematode (*Pratylenchus coffeae*) are commonly infecting coconut and arecaut roots which cause lesions and rotting of roots. Field trial indicated that palms rhizosphere drenched with nematicide Carbosulfan 25 EC (Marshal) @ 0.1% (5ml / 5 litres of water / palm) in coconut and in arecanut (2ml / 2 liters water / palm) during post monsoon two time at 60 days interval suppress the nematode population significantly.

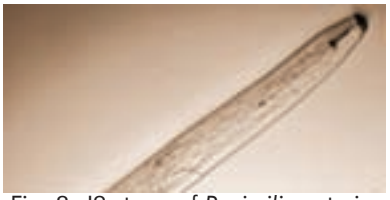


Fig. 8. J2 stage of *R. similis* anterior portion showing prominent stylet

Rajkumar

Development of coconut cake and coconut halwa

Cake is a confectionary made from flour, sugar, and other ingredients that is usually baked. The ingredient of cake were replaced with coconut products such as coconut milk, coconut sugar, desiccated coconut powder, coconut milk powder, coconut vinegar and virgin coconut oil. The optimized formulation consists of 38.7% coconut milk, 27.9% wheat flour, 24.8% coconut sugar, 4.6% desiccated coconut powder, 1.5% virgin coconut oil, 0.8% coconut milk powder, 0.4% coconut vinegar with 0.6% baking powder, 0.3% baking soda and 0.4% vanilla essence. The optimized conditions were, preheating and baking at 180°C for 10 min and 40 min respectively. The product had 25% fat and 2% protein with a moisture content of 20%.

Fig. 9.Coconut cake

Halwa is a very popular sweet of India made out of wheat flour. Many different verities of halwa are available in the market, however availability of coconut milk halwa is limited. An experiment was conducted to develop halwa using coconut milk, sugar and wheat flour. The optimized combination consists of 70% coconut milk (pooled extraction) 25% refined sugar and 5% maida with an overall acceptability score of 8.5. The optimized halwa had 11% moisture, 57.1% carbohydrates, 30.6% fat, 0.7% protein and 0.6% ash.

Fig. 10. Coconut halwa

Manikantan, M.R., Shameena Beegum, P.P. and Pandiselvam, R.

Mineral profiling of coconut vinegars and apple cider vinegar: A comparative analysis

Vinegar is widely used as a flavoring agent and a preservative in foods which can be naturally produced via different methods and from various substrates. Mature coconut water and coconut inflorescence sap are also used as substrates for vinegar production. Mature coconut water was converted to vinegar by alcoholic fermentation using dry yeast after increasing the TSS to 12°Bx with sucrose followed by acetic fermentation using 10% mother vinegar for 35-40 days. Similarly, coconut inflorescence sap was allowed to ferment naturally for 35-40 days to convert into vinegar. The result of comparative mineral profiling of fresh and stored coconut vinegar samples, with and without pasteurization with that of a traditional source (Apple cider vinegar) revealed that total P, K, Na and Mg content of pasteurized and unpasteurized coconut vinegars were comparatively higher than that of apple cider vinegar. Total K and Na content were the highest for vinegar prepared from coconut water compared to neera vinegar and apple cider vinegar. Apple cider vinegar recorded higher sulphur content than coconut vinegars. Both pasteurized and unpasteurized one year old neera vinegar recorded the highest value for total Fe, Mn and B than fresh neera vinegar and apple cider vinegar. Thus the study showed that coconut-based substrates, serve as an excellent substrate for natural vinegar which can provide good amount of minerals than apple cider vinegar.

Neenu, S. Shameena Beegum, P.P. Manikantan, M.R. and Hebbar, K.B.

Development and evaluation of automatic tender coconut cutting machine

Tender coconut water is a natural and nutritious drink from coconut tree widely grown in tropical countries. The nutritional and therapeutic value of tender coconut water has resulted in increased consumption and demand globally. Although technologies are available for the processing of tender coconut water and matured water into packed soft drinks, consumer preference is for the natural taste of tender coconut. Tender coconut punching and cutting are important unit operations during the process of making many high value products including frozen coconut delicacy and tender coconut water beverages. Currently, the street vendors and tender coconut processing industries are using lengthy knife to cut open the tender coconut, which is not safe, messy, laborious and time consuming process. The gender friendly automatic machine to perform cutting of tender coconut is the current need. In this context, ICAR-CPCRI developed an automatic cutting machine that working based on the concept of conversion of rotary motion to linear motion. The important components associated with the developed machine are cutting knife, collection tray, and electrical circuit to operate the cutting knife (Fig. 11.). Total power required to operate this machine is 12 V. The cost and capacity of the developed machine is Rs. 25000 and 180-210 nuts/h, respectively. Street vendors, farmer's producer companies and coconut processing industries are the potential buyers for this machine.

Fig. 11. Automatic tender coconut cutting machine

Pandiselvam, R., Manikantan, M. R., Mathew, A.C., Shameena Beegum, P.P. and Ramesh, S.V.

Hydraulic mechanism based tender coconut cutting machine for processing industries

The hydraulic mechanism based cutting machine was developed for the tender coconut processing industries. A hydraulic mechanism generally that converts energy stored in the hydraulic fluid to a force used to move the piston in a linear/straight line direction. The developed machine consists of SS 304 grade cutting knife and coconut water collection tray (Fig. 11). It can be easily operated with foot. The limit switchers and sensors were fixed to control the movement of the knife and operator safety. Dimension of the developed machine is 1829mm×610mm×610mm. The capacity and cost of the developed machine is 250-300 nuts/h and Rs. 88000/-, respectively.

Fig. 12. Hydraulic tender coconut cutting machine

Pandiselvam, R., Manikantan, M. R., Mathew, A.C. and Shameena Beegum, P.P.

IMPORTANT EVENTS

National Seminar organized

As a part of Bharat ki Azadi ka Amrut Mahotsav, ICAR-CPCRI, Regional Station, Kayamkulam organized a one-day National Seminar on 'Advances in Biological Suppression of Pests' on 22 September 2021 in virtual mode. Dr. Anitha Karun, Director, ICAR-CPCRI, Kasaragod delivered the presidential address. The National Seminar was inaugurated by Dr. Chandish R. Ballal, Former Director, ICAR-NBAIR, Bengaluru. She also delivered the key note address on the topic 'Classical Biological Control - India as a Beneficiary and Benefactor. Dr. Chandrika Mohan, Principal Scientist delivered the first 'Dr. K.K. Nirula Memorial lecture (2021)' on 'Advances in Bio-Suppression of Coconut Pests'. The special guests Dr. Madhu Subramanian, Director of Research, KAU and Dr. M. Nagesh, Director, ICAR-NBAIR, Bengaluru offered felicitations. Two publications *viz.*, Entomology Luminaries @ Kayamkulam and Proceedings of the National Seminar on Advances in Biological Suppression of Pests" with abstracts from PG scholars as well as a short video on "Ecological engineering for Pest Regression" were released. A panel discussion moderated by Dr. C.P.R. Nair, Former, Head, ICAR-CPCRI, RS, Kayamkulam and attended by esteemed dignitaries, Dr. Santhosh J. Eapen, Head, Crop Protection, ICAR-IISR, Kozhikode, Dr. C.A. Jayaprakas, Head Division of Crop Protection, ICAR-CTCRI, Thiruvananthapuram, and Dr. G. Suja, Head, ORARS, Kayamkulam. Dr. R. Chandramohanan, Former Head, Division of Crop Protection, ICAR-CPCRI, Kasaragod chaired the Technical session on 'Bio-control of pests, nematodes and diseases of crops'. Dr. Rohini Iyer, Former Head, Division of Crop Protection, ICAR-CPCRI, Kasaragod and Dr. K. Subaharan, Principal Scientist, ICAR-NBAIR, Bengaluru served as co-chairs of the session. About 30 students participated in the technical session and made their oral and poster presentations. Dr. Vinayaka Hegde, Head, Division of Crop Protection, ICAR-CPCRI chaired the valedictory function and farewell felicitation meeting for Dr. Chandrika Mohan, PS. Dr. K. Subaharan, presented the seminar recommendations and announced the best oral presentation awards for successful three scholars. Dr. A. Joseph Rajkumar, PS outlined the Entomology Luminaries at Kayamkulam from Dr. Nirula to Dr. Chandrika Mohan briefly.

Dr. C.P.R. Nair, Former Head, ICAR-CPCRI, Regional Station, Kayamkulam felicitating Dr. Chandrika Mohan

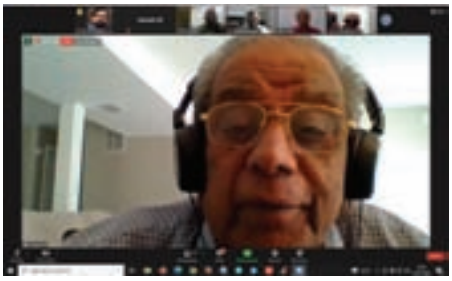
Dr. R. Chandramohan, Former Head (Crop Protection), ICAR-CPCRI, Kasaragod releasing a publication 'Entomology Luminaries@ Kayamkulam'

Recommendations of the Seminar

- Virulence validation, smart packaging of entomophaga and quality assessment of entomopathogen formulations used in palm system
- Ecological intensification through crop pluralism induced conservation biological control for tackling pest outbreaks and conserving pollinators and defenders.
- Promoting one-health approach encouraging animal, plant, human and environmental health for sustainable food production system
- Ecosystem services of pollinators in plantation crops
- Deciphering the Functional genomics and evolutionary approaches to unravel the questions to betterment for development of strategies
- Imaging techniques for non-invasive diagnosis of pest and diseases
- Impact of climate change in palm pest and disease dynamics and their mitigation measures.

Can Kerala overcome Covid-19 with coconut?

Quoting latest research papers on the beneficial role of coconut oil for enhancing immunity, Dr. V. Rajagopal, former Director, ICAR-CPCRI suggested to explore the possibility of developing a medium chain fatty acid based nasal spray from coconut oil for arresting the spread of Corona virus. The virgin coconut oil is found to lower the virus load by 60-90% in mild cases and has a key mechanism in upregulating the immune response. He was delivering a lecture on health and

Dr. A.K. Singh, Deputy Director General (Hort. Sci.) and Dr. V. Rajagopal, Former Director, ICAR-CPCRI, addressing online

nutritional benefits of coconut on 16 July 2021 organized by ICAR-CPCRI as part of 'Bharat ka Amrit Mahotsav' (celebration on 75 years of India's independence). Summarizing the international research data from India, China, Philippines, Sweden, Japan, US and UK, Dr. Rajagopal reiterated that coconut is the super food of the world.

Dr. A. K. Singh, DDG (Horticulture Science), ICAR inaugurated the commemorative lecture series. He highlighted various initiatives of the Government to improve the livelihood of farmers that include the Kisan Rail. He said that recommendation was made to run Kisan Rail trains from Kerala to Delhi to transport tender coconuts which are of high demand and sold at premium price in North India.

Dr. Anitha Karun, Director, ICAR-CPCRI in her welcome address mentioned that the Institute is planning to conduct 75 lectures for farmers in different languages and many seminars as part of Amrit Mahotsav. Dr. R. Sudha, Scientist CPCRI proposed vote of thanks. Over 60 scientists from India and abroad attended the online lecture.

In the Amruth Series of webinars, Emergence of Modern Science in India in the Era of Freedom Movement by Dr. K Muralidharan, Acting Head Social Science, ICAR –CPCRI, Kasaragod on 15th August 2021 and Coconut Nutrients: Role in disease prevention by Dr. K.B Hebbar, Acting Head, PB&PHT, ICAR – CPCRI, Kasaragod on 26th August 2021 were held in which more than 120 participants have taken part.

HUMAN RESOURCES DEVELOPMENT

Participation in training programmes

Name & designation	Title of the programme	Organizer & Date
Dr. V. Niral, Principal Scientist (Genetics), Crop Improvement	Online Training on DUS testing	Protection of Plant varieties and Farmers Rights Authority 1st July, 2021
Dr. P. Muralidharan, Head, KVK, Mr. M.S. Rajeev, Dr. S. Ravi, Dr. K. Sajnanath, Mrs. Jissy George and Mrs.Lekha, G SMS (Pl.Path)	Capacity Building in 'Skill Development Management Process for KVKs' of ATARI Zone 11'	Organized by ASCI and ICAR ATARI, Bengaluru on 14th July 2021 (Online).
Mr. M.S.Rajeev and Dr. T.S ivakumar	Training on 'Use of statistical tools in agriculture and allied fields'	Organized by Society of Krishi Vigyan, Punjab during 16-19th July 2021 (online)
Mr. M.S.Rajeev, Dr. S. Ravi and Dr. K. Sajnanath	Training programme on "Strategies for climate risk management and resilient farming"	Organized by ICAR-CRIDA & MANAGE during 20-24 September 2021. (online)
Dr. T. Sivakumar	Training on 'Social Skills for Extension Approaches Management''	Organized by MANAGE during 22-24th Sept.2021 (online)
Dr. Regi Jacob Thomas Principal Scientist	Ten days DBT funded training on 'Biosecurity and Biosafety: Policies, Diagnostics, Phytosanitary treatments and Issues'	ICAR-NBPGR, NewDelhi 15.09.2021 to 24.09.2021

Best KVK Award

In recognition of the outstanding achievements made in the transfer of banana related technologies, ICAR-KVK-Alappuzha was conferred with "Best KVK Award-2021" during the 28th foundation day ceremony of ICAR-NRC Banana, Tiruchirappalli. Technology interventions taken up in nutrient, pest and disease management practices, Value addition of fruits and various parts of the banana,

and Utilization of the waste materials of pseudo stem and leaves for mushroom production leading to overall enhancement of income of banana farmers in the district were acknowledged and appreciated by the institute for conferring this award. The award was virtually presented in the function held on 21st August, 2021 in the presence of Dr. A.K. Singh, DDG (Hort), ICAR; Dr. S.K. Malhotra, Agriculture Commissioner, Govt of India; Dr. V. Venkatasubramanian, Director, ICAR-ATARI Bengaluru; Dr. S. Uma, Director, ICAR-NRCB and other dignitaries. Different stake holders in banana sector across the country attended the virtual function.

Other Awards

Dr. Chandrika Mohan, Principal Scientist (Agricultural Entomology), ICAR-CPCRI, Regional Station, Kayamkulam was awarded the first Dr. K.K. Nirula Memorial Prize-2021 in recognition of her outstanding contributions in Biocontrol of Coconut Pests. She also delivered the first Dr. K.K. Nirula Memorial lecture-2021 during the 'National Seminar on Advances in Biological Suppression of Pests' held at ICAR-CPCRI, Regional Station, Kayamkulam on 22 September 2021.

Research paper entitled 'Antagonistic interaction of bacterial symbionts of entomopathogenic nematodes against fungal pathogen associated with coconut leaf rot disease' presented by Arsha G. Madhu, Anes K.M., Merin Babu, Indhuja S., Vidya J. and Josephrajkumar A. was conferred the third best oral presentation award during the 'National Seminar on Advances in Biological Suppression of Pests' held at ICAR-CPCRI, Regional Station, Kayamkulam on 22 September 2021.

PUBLICATIONS

Research articles

Murali Gopal, Sandip Shil, Alka Gupta, K. B. Hebbar and M. Arivalagan. 2021. Metagenomic investigation uncovers presence of probiotic-type microbiome in Kalparasa® (fresh unfermented coconut inflorescence sap). *Frontiers in Microbiology*. **12**: 662783. doi: 10.3389/fmicb.2021.662783

Phukon, R.M., Nath, J.C., Sumitha, S., Maheswarappa, H.P. and Elain Apshara, S. 2021. Early evaluation of cocoa clones as intercrop in coconut gardens under red river region of Assam state, India. *Journal of Plantation Crops* **49**(2): 77-82.

Rajesh, M.K., Antony, G., Arvind Kumar, Jeffrey Godwin, Gangaraj, K. P., Sujithra, M, Josephrajkumar, A. and Tony Grace. 2021. Draft genome sequence, annotation and SSR mining data of *Oryctes rhinoceros* Linn. (Coleoptera: Scarabaeidae), the coconut rhinoceros beetle. *Data in Brief* **38**. 2021. 107424 https://doi.org/10.1016/j.dib.2021.107424.

Conference/ Seminar Proceedings

Anes, K.M., Josephrajkumar, A., Mohan, C., Babu, M. and Kalavathi S. 2021. *Proc. National Seminar on Advances in Biological Suppression of Pests,* 22 September 2021, ICAR-CPCRI, Regional Station, Kayamkulam, 32p.

Arsha G.M., Anes K.M., Babu, B., Indhuja S., Vidya J. and Josephrajkumar A. 2021. Antagonistic interaction of bacterial symbionts of entomopathogenic nematodes against fungal pathogen associated with coconut leaf rot disease. *In: Proc. National Seminar on Advances in Biological Suppression of Pests*, Eds Anes *et al*. September 22, 2021, ICAR-CPCRI, Regional Station, Kayamkulam 7p,

Josephrajkumar A. 2021. Advances in pest management in coconut system. *Abstract of the Technical Paper presented during the Technical Session held on September 02, 2021. Indian Cocon. J.* **64**(3): 7

Mohan, A., Anes K.M., Babu, M. and Josephrajkumar A. 2021. Isolation and characterization of entomopathogenic nematodes from coconut intercrops. *In: Proc. National Seminar on Advances in Biological Suppression of Pests*, Eds Anes *et al*. September 22, 2021, ICAR-CPCRI, Regional Station, Kayamkulam, 16 p.

Mohan, C. 2021. Advances in bio-suppression of coconut pests (1st K.K. Memorial Lecture-2021). *In: Proceedings of National Seminar on Advances in Biological Suppression of Pests*, Eds Anes *et al*. September 22, 2021, ICAR-CPCRI, Regional Station, Kayamkulam, 3-4p.

Nihad, K., Haris, A.A. and Bhat, R. 2021. Floriculture in coconut plantation-an income generating production system *In: Proc. International Horticulture Conference - NEXTGEN – HORT* (Abstracts) TNAU, Coimbatore 16-19 September, 2021

Sreelekshmi, J. S., Harsha, P. R., Shareefa, M. and Babu, M. 2021. Fungal contaminants of coconut tissue culture and their management. *In: Proc.National Seminar on Advances in Biological Suppression of Pests,* Eds Anes *et al*. September 22, 2021, ICAR-CPCRI, Regional Station, Kayamkulam, 29p.

Thomas, R.J. 2021. Coconut breeding with special emphasis on Eastern India. *In: Proc. National Seminar on Horticulture for Next Generation in Eastern India (2021: International Year of Fruits and Vegetables)*, 5-6 August 2021. Bihar Agricultural University, Sabour,

Vidya, J. and Josephrajkumar, A. 2021. Endophytic bacteria as a potential biocontrol agent against phytopathogens and pests. *In: Proc. National Seminar on Advances in Biological Suppression of Pests,* Eds Anes *et al*. September 22, 2021, ICAR-CPCRI, Regional Station, Kayamkulam, 32p.

Popular articles

Anithakumari P., Alka Gupta, S. Indhuja, Merin Babu and Stephin Srambikkal. 2021. *CPCRI ude sanketikvidhya; karshakarude parishodhan shala* (Technology of CPCRI; Farmers' laboratory). *Indian Nalikera Journal*. **12**(9): 16-17. (Malayalam)

Bhavishya, Pandian, R. T. P., Thube, S. H. and Nagaraja, N. R. 2021. Adikeyalli hechhuttiruva pentatomid tiganeya baadhe, mattu adara nirvahane. *Krishi Bimba*, **19**(9): 30-32.

Neenu, S. 2021.*Thenginchottile mannu paripalanam*. *Indian Nalikera Journal*. **12**(8):17-18

Priya, U.K., Bhavishya, Elain Apshara, S., Jose, C.T., Chaithra, M., Nagaraja, N.R., Shivaji Hausrao Thube, R.Thavaprakasa Pandian, Karthika, K.S. 2021. Nutrient management in cocoa. Kerala Karshakan 9(2): 18-22.

Jissy George. 14.07.2021. Banana provides extra income. *Mathrubhoomi Daily,* Kasaragod Edn.21.

Jissy George. 2021. Success story of Smitha Matathil with coconut products. *Karshakashree* 27 (8) : 70.

Jissy George. 2021. The silent revolution in Karnataka on Banana flour production with KVK's assistance. *Karshakashree* 27 (9) : 50-51.

Josephrajkumar, A., Mohan, M., Paul, J., Jayalakshmi, T., Rajendran, K., Hegde,V., Kalavathi, S. and Karun, A. 2021. Digital Devise for Diagnosing Red Palm Weevil Infested Palms. *E-Kerala Karshakan* **9**(3): 9-12.

Josephrajkumar A. 2021. Sooty mould scavenger beetle, *Leiochrinus nilgirianus* Kaszab (Tenebrionidae: Coleoptera) on palms. *Insect Environment* **24**(3): 402-403.

Kalavathi, S., Rajeev, G. and Abe Jacob. 2021. Coconut farmers to be ready to face Monsoon. *Indian Nalikera Journal* **12**(7): 11-12.

Mathew, J. and Haris, A. A. 2021. Nutrient deficiencies and amelioration in coconut farming (*In Malayalam*) *Indian Nalikera Journal* **12**(1):18-20.

Rajeev, G., Mohan, B., Narayanan, A., Shareefa, M. and Thomas, R.J. 2021. Geotagging for coconut (*In Malayalam*) *Indian Nalikera Journal* **12**(9): 21-23

Thomas, R.J. and Shareefa, M. 2021. Caution needed against dwarf varieties of coconut (*In Malayalam*). *Karshakasree* August Issue: 65.

Thomas, R.J., Shareefa, M., Harsha, H. and Sreelekshmi, J.S. 2021. Pink husked coconut types and its biochemical properties. *Indian Coconut Journal* **64**(1): 11-12.

Thomas, R.J., Shareefa, M., Harsha, H. And Sreelekshmi, J.S. 2021. Pink husked coconut types and its biochemical properties (*In Malayalam*). *Indian Nalikera Journal* **12**(8): 12-14

E-bulletin

Josephrajkumar A., Anes K.M., Nair, C.P.R., Mohan, C., Thajudin, S., Thomas, S., Babu, M. and Kalavathi, S. 2021. *Entomology Luminaries @ Kayamkulam,* ICAR-CPCRI, Regional Station, Kayamkulam,9p.

Nihad, K., Anes, K.M. and Kalavathi, S. 2021. E-booklet on *Proceedings of Webinar Series on 'Redefining Agricultural Research and Education Priorities-Way Forward'* ICAR-CPCRI, Regional Station, Kayamkulam 9-11 August, 2021, 62p.

TRANSFER OF TECHNOLOGY

Trainings

Horticulture Based Industrial placement training for Final B.Sc. (Hort.) students of College of Horticulture, Mudigere, UAHS, Shivamogga was conducted from 15.09.2021 to 25.09.2021, 13 students benefitted and had industrial interactions at Cashew Factory, Vittal and Areca Plate Making Industry- Eco Bliss, VAST centre, CAMPCO Chocolate Factory, Cadbury processing unit, Puttur and Poongavana Areca products, Vittal.

As a part of Azadi Ka Amrit Mahotsav, an off campus training programme was organised to the farmers of Kadur taluk, Chikmagaluru on 15.09.2021 with a theme "Plant health management in arecanut" to disseminate information on recent nutrition, disease and pest management practices in arecanut. Farm talks on 'Integrated nutrient management in arecanut', 'Integrated disease management in arecanut' and 'Integrated pest management in arecanut' were delivered by scientists.

Cocoa nursery raising by horticulture students

Students with Mr. Rajaram of Eco Bliss industry on areca plate

Cocoa nursery management by horticulture students

Students with Mr. Shankara Bhat Badnaje on areca products

50 farmers from different villages of Kadur taluk attending the training program

A field level training on plant health management in arecanut was given to DAESI students of KVK Mangalore in Keddalike farm. Mr. Bhavishya, scientist (Horticulture) delivered a talk on "Plant health management in arecanut" to 40 DAESI students.

Participants od DAESI programme

Organized three days Hands on training on '*Trichoderma* coir-pith cake production to 'KVK Kannur, from 21-23rd April 2021.

Coordinated RAWE programme for BSc (Agri) students of Sharadchandraji Pawar College of Agriculture, Dapoli from 29.09.2021 to 06.10.2021.

The students from agricultural college Gurgaon as part of the Rural Agricultural Work Experience (RAWE) programme delivered lecture on biological pest management using entomopathogenic nematodes in coconut cropping system and organized method demonstrated on the application Kalpa EPN liquid formulation @ 50 ml solution containing 2500 IJs delivering in leaf whorl as prophylectic and curative for management of banana stem weevil in coconut system.

Demonstration of Kalpa EPN application

Coconut Advisory Series Online

As part of 'Bharat ki Azadi Ka Amruth Mahotsav' ICAR-CPCRI, Regional Station Kayamkulam organized 'Coconut Advisory Series-2021' entitled 'Coconut Based Sustainable Agriculture' on every Monday, Wednesday and Friday during 16th July to 1st September, 2021. The series started with ICAR Foundation Day lecture by Dr. S. Kalavathi, Acting Head on the topic 'How to make coconut cultivation sustainable in the changing climate'. There were a total of twenty lectures in the series wherein the farmers were empowered in a comprehensive manner on every aspects of coconut cultivation including information on coconut varieties, mother palm selection, nursery management, planting and aftercare, nutrition management, irrigation, intercropping, pest and disease management in coconut and intercrops, incursion management of invasive pests, organic recycling, use of microbes, value addition and entrepreneurial opportunities in coconut sector. Farmers from all over the Kerala attended the advisory series which was conducted online in Zoom platform and simultaneously as YouTube live. More than 11000 views have been registered averaging more than 500 views per session in YouTube, which is an evidence on the success of the programme.

Webinar series on 'Redefining Agricultural Research and Education Priorities – Way Forward conducted

Webinar Series on 'Redefining Agricultural Research and Education Priorities – Way Forward' was organized as part of 'Bharat Ki Azadi Ka Amruth Mahotsav' at ICAR-CPCRI, Regional Station, Kayamkulam during August 9-11, 2021 for orienting BSc Agricultural/Life Science graduates towards research-studded career. A total of 193 students from 41 colleges covering 12 states of India registered and the programme was conducted online through Zoom platform and simultaneously broadcasted live through ICAR-CPCRI YouTube channel. The webinar consisted of Inaugural session, 3 technical sessions and a valedictory session led by eminent speakers. The Webinar enlightened the participants towards the future research and education priorities in agriculture related sciences. The programme attracted a total of 1918 viewers with an average of 383 views per session in YouTube.

Field visits

High incidence of leaf spot in arecanut was observed in Markanja village. A team of scientists of CPCRI, RS, Vittal visited the gardens and suggested suitable control measures. The disease was observed in many gardens including yellow leaf disease affected gardens. Scientists suggested following control measures at community level.

Arecanut garden with high incidence of leaf spot disease in Markanja Sullia, Karnataka

Incidence of crown rot and bud rot was observed in farmer's gardens in Kadaba taluk.

A team of scientists from ICAR-CPCRI, Regional Station, Vittal visited the gardens and suggested suitable control measures.

Students' visit

A virtual educational tour to ICAR-CPCRI for final year students of B.Sc. Agri-Horticulture of UAHS Shivamogga, Karnataka was conducted on 7 July 2021. Another virtual educational tour for final year students of B.Sc. Horticulture college Hiriyur of UAHS Shivamogga, Karnataka was conducted on 16 July 2021. The programme was benefitted to more than 60 students.

Radio talks

'Value addition of Banana' by Smt. Jissy George broadcasted by AIR, Kannur on 20 July 2021.

Mr. Bhavishya delivered a radio talk on "Arecanut cultivation practices (Kannada)", broadcast from AIR Mangalore on 10 August 2021.

Kalpa Green Chat

Kalpa Green Chat online programmes were held as per the details given below:

Topic	Speakers	Date	No. of partici-pants
Coconut Novel Products for Micro Enterprises	Dr. R. Pandiselvam Scientist (AS&PE)	31.07.2021	85
EDP on Coconut Value Addition-Curtain Raiser	Dr. K. Muralidharan, ICAR – CPCRI and Dr. Vikram Singh, ICAR	11.09.2021	45
The Art & Science of Chocolate Making	Dr. Shameena Beegum P.P., (Scientist - PHT, ICAR - CPCRI)	25.09.2021	90

Daliyamol delivered a Radio talk on 'Disease management in arecanut' for All-India radio on 18 September 2021.

Mr. Bhavishya delivered a radio talk on "Water management in arecanut (Kannada)", broadcast from AIR Mangalore on 28 September 2021.

TV programme

'Activities of KVK-Alappuzha on Value addition of Banana' in Kissan Krishi Deepam of Asianet TV broadcasted on 31 July 2021.

Mera Gaon - Mera Gaurav

Dr. K. Nihad, Senior Scientist conducted online class on 'Coconut pest management' and Scientist-Farmer interface for farmers of Velanchira and Koppareth villages on 23 September 2021.

Literature support provided- Cocoa Notebook (English 10, Kannada 49), Cocoa Guide (English 23), Cocoa Health Card, Care Card, Nutri Card- 13 each.

Mobile based advisory- 56 Nos.

ICAR - Krishi Vigyan Kendra, Kasaragod

World Breast Feeding Week

Celebration was held during first week of August 2021. Nutrition counselling programmes were organized for mothers' groups and a Webinar on "Foods that promote Lactation" was conducted for mothers' group in collaboration with ICDS Manjeshwar and Department of Women and child Development Kasaragod, in which 81 mothers participated.

Azadi ka Amrit Mahothsav

A webinar for extension functionaries was conducted on "Energy dense foods for addressing anaemia" on 12th August 2021 with a participation of 45 members. Capacity building programme on value addition of Amla was organized in which nearly 1 quintal of amla was processed into value added products at ICAR KVK, Kasaragod by a SHG of 6 women entrepreneurs.

Under National level campaign on Food and nutrition for farmers, a webinar was conducted on 26th August 2021 about "Farming system for nutrition" and "Using biointensive agriculture to improve income and food security – a pathway to Dietary diversity" with an online participation of 20 farmers.

Rashriya Poshan Maas and Tree Plantation campaign

Planting materials of pomegranate, lemon, curry leaves, moringa and guava were distributed among farmers of various locations of the district as a part of Tree plantation campaign.

Rashtriya Poshan Maas was celebrated by distributing tree saplings to anganwadis towards Poshan Vatika during the first week of September 2021. During the second week, nutri-dense ladoos were distributed to identified anaemic children with low BMI as a

Distribution of fruit tree saplings

part of the theme "Distribution of regional nutrition kit to anganwadi beneficiaries of high burdened diet". Vegetable seeds were also distributed to the beneficiaries. Based on the theme "Identification of severe acute malnutrition children and distribution of nutritious food', display of more than 70 low cost nutritious food items was done by 60 anganwadis under Manjeswar panchayat wherein Dr Saritha Hegde, SMS, ICAR KVKM, Kasaragod gave an orientation regarding the theme and judged the products. The programme was inaugurated by Shri Rajmohan Unnithan, Hon MP, Kasaragod and presided over by Shri N.A. Nellikkunnu, Hon MLA, Kasaragod. Farmer scientist interface on "Fruit crops for higher income" was conducted on 28th September, 2021 at Diamond Jubilee Hall of ICAR CPCRI wherein topics like cultivaiton practices of exotic fruit crops, intercropping fruit crops in coconut garden, etc. were detailed by master farmers.

Webinar on crop cultivation

A webinar on Cultivation practices for Coconut, arecanut and paddy was arranged by Youth Club, Udma with 42 participants on July 19th 2021 as a part of Azadi ka amrit Mahotsav 2021.

Zonal workshop on doubling farm income through strengthening KVKs with inclusive technologies and innovations organized by ATARI, Bangaluru.

Training programmes

An off campus training programme on Nursery management in vegetables was organized in Bedadka on 18th September 2021, in collaboration with ATMA wherein 18 men and 12 women participated.

RAWE students training

ICAR KVK Kasaragod conducted two batches of BSc Agriculture students from G D Goenka University, Haryana and Dapoli University to undergo their RAWE course. Dr Anitha Karun, Direcrtor ICAR CPCRI inaugurated the course on August 10th 2021. The course lasted for 6 weeks. The students explored various technologies in agriculture and allied sectors utilizing the facilities available both at ICAR KVK Kasaragod and ICAR CPCRI, Kasaragod. A great deal of exposure was obtained to the students through classes by eminent scientists at ICAR CPCRI, extensive field visits and practical classes of farm machineries.

RAWE students course at Kasaragod

ICAR - Krishi Vigyan Kendra, Alappuzha

Orientation to the Grama panchayath members on NICRA project implementation

In order to sensitize the Grama Panchayath ward members on the implementation of the technology demonstrations under the NICRA project (Phase II: 2021-25) and ensure their involvement in the activities, an orientation was arranged in Edathua panchayath on 17 September 2021. Details of the technology demonstrations of Climate resilient cages for poultry rearing, Stress and disease management in dairy animals, Improved goat shelters to withstand water logging/flood, Large scale composting of aquatic weeds, Soil health card for better soil health management, Recycling of organic residues for energy generation and crop production using portable biogas units, Climate resilient practices for paddy in Kuttanad region, Modified rain shelter for year-round vegetable production, Short duration cassava variety – Sree Jaya for escaping flood during monsoon season, Modified season cultivation of HY ginger for vegetable purpose, Oyster mushroom production using locally available substrates during crop holidays for income generation, and culture of traditional fish variety *Opheocephalus* (Varaal) in homestead ponds were detailed by Dr. S. Ravi (SMS, AH) and Muhammed Ijaz N (YP-II) to the ward members. Grama panchayath president Smt Mariyama George presided over the meeting.

Orientation to Panchayath members at Edathua

International year of millets/ Campaign on Nutrigarden and Tree Plantation

As part of the national campaign on 'Nutri garden and Tree Plantation', programmes were organized in two Panchayaths of Chengannur Block of Alappuzha on 17 September 2021. At Puliyoor, Grama Panchayth President Sri. M. G. Sreekumar inaugurated the distribution of seeds and planting materials. Seven members of Grama Panchayath, staff of Puliyoor Agricultural office and 24 farmers attended. At Mulakkuzha Grama Panchayth Vice President Smt. Remya Mohan inaugurated the distribution of seeds and planting materials. Two members of the Panchayath staff of Mulakkuzha Agricultural office and 21 farmers attended. Seeds of Amaranthus, bhindi, cowpea, chilly, brinjal, cucumber, pumpkin, ashgurd, bitter groud and seedlings of Malayan rose apple and curry leaf and Micro nutrient mix Vegetable Sampoorna were distributed to the farmers. Sri. M.S. Rajeev and Mrs. Jissy George handled sessions on Importance of Nutri Garden and Tree Plantation. IFFCO representative Sri. Sachin Satheesh also addressed the gathering. As part of the campaign, fruit trees were planted in the KVK farm also.

Awareness programme on nutrigarden

Distribution of seedlings during nutrigarden campaign

Tree planting campaign at KVK, Alappuzha

Webcasting of the Video conferencing of the PM

Webcasting of the video conference of the Hon. Prime Minister on the occasion of 'Dedication of 35 crop varieties to the nation, and interaction with progressive farmers' organized by ICAR was arranged in the KVK training hall on 28 September 2021. A Farmer-Scientist interface programme on "Climate Resilient Agricultural Practices" also was conducted on the day in which 20 farmers attended.

Farmers attending videoconferencing

Training programmes

During the period 25 training programmes were organized benefitting a total number of 968 farmers/rural youths. The details of the training programmes were as follows:

Training	No. of Programmes	Participants		
		Men	Women	Total
On campus (online)	23	436	514	950
Off campus	2	4	14	18
Total	**25**	**440**	**528**	**968**

COMMERCIALIZATION OF TECHNOLOGY

During the period from July to September, 2021, 13 technologies were commercialised by the Institute to entrepreneurs through MoA as per the details given below, an amount of Rs. 3,72,000/- have been collected as technology transfer fees.

SN	Technology	Date of licensing	Transfer fees Rs.	Entrepreneurs
1	Kalpa vardhini	12-07-2021	10000	ICAR-Krishi Vigyan Kendra, CARD, Kolabhagom P.O., Thadiyoor, Thiruvalla, Pathanamthitta District – 689545
2	Kalpa Soil Care (coir pith composting (urea free))	22-07-2021	10000	The Secretary, Rajapuram Agricultural Improvement Co-operative Society Ltd., Rajapuram P.O., Kasaragod – 671532, Kerala
3	Collection of fresh and hygienic Kalparasa and production of natural coconut sugar	29-07-2021	100000	The Senior Scientist and Head, KVK Lakshadweep, ICAR CMFRI, Kavaratti

4	Frozen Coconut Delicacy	29-07-2021	100000	The Senior Scientist and Head, KVK Lakshadweep, ICAR CMFRI, Kavaratti
5	Technical knowhow of production of virgin coconut oil (VCO)	29-07-2021	40000	The Senior Scientist and Head, KVK Lakshadweep, ICAR CMFRI, Kavaratti
6	Coconut Chips	29-07-2021	25000	The Senior Scientist and Head, KVK Lakshadweep, ICAR CMFRI, Kavaratti
7	Preservation of carbonated tender coconut water	29-07-2021	25000	The Senior Scientist and Head, KVK Lakshadweep, ICAR CMFRI, Kavaratti
8	Matured coconut water based value added products	29-07-2021	15000	The Senior Scientist and Head, KVK Lakshadweep, ICAR CMFRI, Kavaratti
9	Preservation protocol for trimmed tender coconut	29-07-2021	15000	The Senior Scientist and Head, KVK Lakshadweep, ICAR CMFRI, Kavaratti
10	Matured coconut water based value added products	11-08-2021	15000	The Director, NAS POOMTHALIR FOODS PVT LTD.(1773), Thalir Building, Opp. Payyoli Village Office, Kizhoor, Payyoli, Kozhikode – 673522, Kerala
11	Foam mat dried coconut milk powder	12-08-2021	10000	Mr. Narendran C, Nandanam Agro Food Industries, Palace Road Cross, Urakam, Thrissur – 680562, Kerala, India
12	Operation of Chocolateunit at ABI centre	25-08-2021	2000	Mr. Anmol Gupta, White Mountain Collectives LLP, R21 Second floor, Hauz Khas, delhi 110016, India.
13	Trichoderma Coir Pith Cake.	29-09-2021	5000	The Programme Coordinator, ICAR Krishi Vigyan Kendra, Kanhirangad (PO), Taliparamba, Kannur – 670142, Kerala, India.

Total Rs. 3,72,000/-

Participation in national seminars/ symposia/ conferences/ workshops/webinars

Name & designation	Title	Place and date
Dr. S. Elain Apshara, Principal Scientist (Hort.)	Azadi Ka Amrut Mahotsav (AKAM)- Conservation and utilization of horticultural genetic resources in India	ICAR-DCR Puttur, 13.08.2021
Dr. S. Elain Apshara, Principal Scientist (Hort.)	Swadeshi Science Movement in Kerala (Vijnana Bharati)-Emergence of modern science in India in the Era of Freedom Movement	ICAR-CPCRI, Kasaragod, 15.08.2021
Dr. S. Elain Apshara, Principal Scientist (Hort.)	Introduction to ARMS- Agricultural Research Management System	ICAR-CPCRI, Kasaragod, 18.08.2021
Dr. S. Elain Apshara, Principal Scientist (Hort.)	Post Covid Reforms	ICAR AKAM 19.08.2021
Dr. S. Elain Apshara, Principal Scientist (Hort.)	Coconut nutrients: Role in disease prevention (Food and Nutrition for farmers)	ICAR-CPCRI, Kasaragod, 26.08.2021
Dr. S. Elain Apshara, Principal Scientist (Hort.)	WORLD COCONUT DAY - Stakeholders meet on coconut	ICAR-CPCRI, Kasaragod, 03.09.2021
Dr. S. Elain Apshara, Principal Scientist (Hort.)	Foundation day lecture ICAR- IIHR- Role of horticulture in Indian Economy	ICAR- IIHR, Bangalore, 07.09.2021
Dr. S. Elain Apshara, Principal Scientist (Hort.)	Cocoponics – A new method of growing vegetables in soilless culture	ICAR-DCR Puttur, 09.09.2021
Dr. S. Elain Apshara, Principal Scientist (Hort.)	International Millets Day- Millets and coconut based products for health and immunity	ICAR-CPCRI, Kasaragod, 17.09.2021

Dr. S. Elain Apshara, Principal Scientist (Hort.)	Kalpa Green Chat- The art and science of chocolate making	ICAR-CPCRI, Kasaragod, 25.09.2021
Dr. A. Joseph Rajkumar, Principal Scientist	Online workshop on the Management of Rodents, mites and Soil Arthropods	ICAR-CAZRI, Jodhpur & ICAR-NCIPM, New Delhi on 01.07.2021
Dr.T.Sivakumar, SMS (Ag. Ent)	Webinar 'World Zoonosis Day'	Organized by ICAR-NIVEDI, Bengaluru on 6th July (online)
Mr. M.S.Rajeev SMS (Agron) Dr.T.Sivakumar Dr.K.Sajnanath SMS (Soil Sci.)	Sustainable integrated cropping and farming system models with special reference to banana for enhanced income for farmers	Organized by ICAR-NRC Banana, Tiruchirapalli on 7th July 2021 (Online)
Dr.S.Ravi SMS (AH)	Webinar on 'Kharif fodder technologies'	Organized by ICAR-Indian Grassland and Fodder Research Institute, Jhansi from Jul 12-14, 2021
Dr. Chandrika Mohan, Dr. A. Joseph Rajkumar, Principal Scientists, Dr. K.M Anes, Scientist	Virtual online Annual Group Meeting of AICRP on Biological Control	ICAR-NBAIR, Bengaluru 14-15 July, 2021
Dr. A. Joseph Rajkumar, Principal Scientist	Brainstorming session on Invasive whitefly complex in plantation crops: Technical Knowledge and Technological Interventions for Management and delivered an invited talk on Diagnosis and molecular lineage of exotic whiteflies on palms	ICAR-IIOPR, Pedavegi on 17.07.2021
Dr. A. Joseph Rajkumar, Principal Scientist	Online meet on Biannual Subcommittee Meeting on National Network of Plant Health Experts	NIPHM, Hyderabad on 22.07.2021
Mr. M.S.Rajeev	Webinar on "Precision Farming with IoTs"	Organized by MANAGE, Hyderabad on July 23, 2021
Dr. S. Ravi	Webinar on Clinical management of metabolic and nutritional diseases in sheep and goat under Continuing learning intensive farming	Organized by Alembic pharmaceutical on 25.07.2021
Dr. P. Muralidharan, Mr. M.S. Rajeev, Dr. T. Sivakumar, Dr. S. Ravi, Dr. K. Sajnanath, Mrs. Lekha G.	Zonal Workshop-2021 on 'Doubling the Farmer's Income through Strengthening KVKs with Inclusive Technologies and Innovative Approaches'	Organized by ICAR ATARI, Bengaluru on 30-31 July, 2021 (Online).
Dr. Regi Jacob Thomas, Principal Scientist	National seminar on 'Horticulture for Next Generation in Eastern India' and presented a lead paper on 'Coconut breeding with special emphasis on Eastern India'	Bihar Agricultural University, Sabour 05.08.2021
Dr. P. Muralidharan	As moderator of the webinar on "Climate resilient Practices in Dairy Farming"	Organized by ICAR-KVK-Pathanamthitta on 12th August, 21 (online)
Dr. A. Joseph Rajkumar, Principal Scientist	Webinar on 'Agricultural Research and Educational Priorities-Way Forward' and delivered a talk on 'Role of ICAR and CPCRI in transforming Agriculture'	ICAR-CPCRI, RS, Kayamkulam 9-11 August, 2021
Dr.T.Sivakumar	Webinar on Tools at workspace for personal Efficiency'	Organized by ICAR-NIAP on 7th August 2021 (online)
Mr. M.S.Rajeev Dr.K.Sajnanath	National webinar on Banana Value Chain and Marketing -New Business Horizons'	Organized by ICAR-NRC Banana, Tiruchirapalli on 21st August 2021 (Online)
Dr. A. Joseph Rajkumar, Principal Scientist	Webinar on Transforming food system under changing climate - Key strategies and Actions	ICAR-CRIDA on 23.08.2021
Dr. Rajkumar, Scientist	National webinar on 'Integrated pest management : A paradigm shift	ICAR – NCIPM, New Delhi 27 - 28 August 2021

Dr. P. Muralidharan, Mrs. Lekha, G. Dr. K. Sajnanath	Stakeholders meet (online) in connection with World Coconut Day	Organised by ICAR – CPCRI, Kasaragode on 2.9.21
Dr.K.Sajnanath	Webinar on 'Microbial Management of crop residues for improvement of soil health: Useful methodologies to assess compost maturity and quality'	Organized by ICAR-NBAIM, Uttar Pradesh on 13th September 2021
Dr. S. Kalavathi Dr. P. Muralidharan	ICAR Regional Committee (VIII) meeting	Organized by ICAR-CMFRI on 14.09.21 (online)
Dr.S.Ravi	Application of ICTs in Livestock Management"	Organized by ICAR-NIVEDI - on 15th September 2021
Dr. K. Nihad Senior Scientist	International Horticulture Conference- NEXTGEN -HORT	TNAU, Coimbatore 16-19 September,2021
Dr. T. Sivakumar	Webinar on 'Space technologies in Agriculture'	Organized by ICAR-NIAP 18th September 2021(online)
Dr. P. Muralidharan Mrs. Lekha, G.	National Seminar on "Advances in Biological Suppression of Pests"	Organized by ICAR – CPCRI on 22.09.21 (Online)
Dr. S. Kalavathi, Head, Dr .Chandrika Mohan, Dr. P. Anitha Kumari, Dr A, Abdul Haris, Dr. A. Joseph Rajkumar, Principal Scientists, Dr. K. Nihad, Dr. M. Shareefa, Dr. Merin Babu, Dr. Jeena Mathew, Senior Scientists, Dr. K.M Anes, Dr. S. Indhuja Scientists	National Seminar on Advances in Biological Suppression of Pests and delivered a talk on Entomology Luminaries @ Kayamkulam	ICAR-CPCRI, RS, Kayamkulam on 22.09.2021
Dr. A. Joseph Rajkumar, Principal Scientist, Dr. K.M. Anes, Scientist	International Webinar on Biological Control-A global sustainable approach for Eco-friendly agriculture and delivered a talk on Biological Pest Suppression in Plantation Crops	NIPHM, Hyderabad on 24.09.2021

CELEBRATIONS

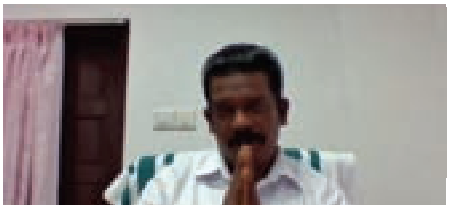
ICAR Foundation Day

As part of the national tree plantation campaign on the occasion of the "ICAR Foundation Day-2021", fruit trees were planted in the KVK farm on 16th July 2021. All the staff members were present on the occasion.

Tree planting on ICAR Foundation Day

World Coconut Day

ICAR-CPCRI celebrated this year's coconut day by organising various programmes involving different stakeholders during 2-3 September 2021. Shri. P. Prasad, Hon'ble Minister of Agriculture & Farmers' Welfare, Government of Kerala, inaugurated the 'World Coconut Day' celebration online. A Capacity Development Programme for SC/ST farmers on 'Enhancing Income and Employment Opportunities through Coconut Based Farming Systems and Enterprises' was conducted at Aralam on 2nd September 2021 as part of coconut day celebrations. The programme was conducted as a collaborative initiative involving ICAR-CPCRI Kasaragod, Aralam Farming Corporation and Coconut Development Board. The training programme was inaugurated by Smt. P.P. Divya, President, Kannur District panchayat.



Shri. P. Prasad, Hon'ble Minister of Agriculture & Farmers' Welfare, Government of Kerala Inagurated the programme online

Distribution of coconut seedlings on the World Coconut Day at Bhubaneswar

As part of coconut day celebration 5500 coconut seedlings were distributed to selected SC/ST farmers on 2nd September 2021 in a function held at Bubaneswar. The programme was conducted under SCSP/STC scheme in collaboration with Kalpabrukhya Foundation. Dr. Satya Tapas, Smt. Deepa Prajwalana and Dr. Gobinda Chandra Acharya addressed the gathering.

As part of the 'Bharat ki Azadi ka Amruth Mahotasav' World Coconut Day was celebrated on 2nd September 2021 at ICAR-CPCRI, Regional Station, Kayamkulam. The programme consisted of a farmer seminar on 'Coconut for Healthy life' and also included the valedictory function of 'Coconut Advisory Series' which commenced on the ICAR Foundation Day on July 16, 2021. The programme sensitized farming fraternity on the nutritional and health benefits of coconut oil and other value added products for the wellness of mankind. Fifteen selected farmers who had attended the online coconut advisory series were invited to the station and were honored during the programme. The special lecture on the topic 'Nutritional values of coconut and health' was delivered by Dr. B. Chempakam, Former Head, Division of Crop Production, ICAR-IISR, Kozhikode. In the afternoon session, farmers visited various experimental plots including, fertigation trial, ecological engineering, coconut nursery, coconut dwarf varieties and Krishi Vigyan Kendra under the guidance of relevant scientists and officers.

Distribution of coconut seedlings on the World Coconut Day at Kayamkulam

हिंदी पखवाड़ा समारोह

हिंदी पखवाड़ा समारोह का उद्घाटन डॉ. के. मुरलिधरन, प्रमुख (सामाजिक विज्ञान), केंरोफअसं, कासरगोड़ की अध्यक्षता में हुआ। श्रीमती श्रीलता, सहायक मुख्य तकनीकी अधिकारी (राजभाषा) ने समारोह के मुख्य अतिथि डॉ तारु एस पवार, एसोसिएट प्रोफसर, केरल केंद्रीय विश्वविद्यालय, कासरगोड़ का परिचय कराया। अध्यक्ष महोदय ने 14 सितंबर की विशेषता पर प्रकाश डाला और सभी अधिकारियों एवं कर्मचारियों से एकसाथ सहायोग की भावना से अधिकाधिक हिंदी शब्दों का प्रयोग करने की अपील की। डॉ त्रिलोचन महापात्र, महानिदेशक, भाकृअनुप, नई दिल्ली की अपील पढ़कर श्रीमती श्रीलता के, सहायक मुख्य तकनीकी अधिकारी (राजभाषा) ने सभी स्टाफ सदस्यों से अधिकाधिक कार्य हिंदी में करने की प्रार्थना की। डॉ तरु एस पवार, एसोसिएट प्रोफसर, केरल केंद्रीय विश्वविद्यालय, कासरगोड़ ने हिंदी भाषा का विकास और विश्व में प्रथम स्थान की ओर अग्रसर हिंदी भाषा के महत्व पर प्रकाश डाला।

हिंदी पखवाड़ा समापन समारोह डॉ अनिता करुण, निदेशक महोदय की अध्यक्षता में हिंदी पखवाड़ा समारोह का समापन मनाया गया। डॉ सीमा चोपड़ा, निदेशक (राजभाषा) भारतीय कृषि अनुसंधान परिषद, नई दिल्ली इस समारोह की मुख्य अतिथि रही। निदेशक महोदय ने अपने अध्यक्षीय भाषण में अपील की कि इसी प्रकार राजभाषा के कार्यान्वयन में, प्रयोग में सहयोग देकर हिंदी के प्रयोग को

डॉ सीमा चोपड़ा, निदेशक (राजभाषा), भारतीय कृषि अनुसंधान परिषद ऑनलाइन पर भाषण देते हुए

उत्तरोत्तर बढ़ावा दें और इस संस्थान का मान बढ़ाएँ।

डॉ सीमा चोपड़ा, निदेशक (राजभाषा), भारतीय कृषि अनुसंधान परिषद ने हिंदी भाषा के महत्व पर प्रकाश डाला कि इन विशेष गुणों के कारण ही संविधान निर्माताओं ने हिंदी भाषा को राजभाषा का दर्जा दिया है। इस संवैधानिक कर्तव्यों के अनुपालन हेतु प्रत्येक सदस्यों की मानसिकता और प्रतिबद्धता बढ़ाने की आवश्यकता की ओर ध्यान आकर्षित किया। प्रधान मंत्री जी के मार्गदर्शन से राजभाषा विभाग की ओर से कार्यान्वित 12 'प्र' कार्यक्रमों जैसे प्रेरणा, प्रोत्साहन, प्रशिक्षण, प्रेम, प्रतिबद्धता पर भी विवरण दिया। संसदीय राजभाषा समिति के निरीक्षण की गंभीरता और हिंदी पदों के सृजन और खाली पदों को जल्दी ही भरने की आवश्यकता पर जोर दिया। राजभाषा के प्रयोग बढ़ाने के लिए हिंदी वातावरण सृजित करने हेतु आयोजित संस्थान की गतिविधियों और राजभाषा कार्यान्वयन की सराहना की।

हिंदी पखवाडा समारोह की अवधि पर आयोजित विभिन्न प्रतियोगिताओं के विजेताओं को नकद पुरस्कार डॉ अनिता करुण, निदेशक महोदया और श्री रामअवतार पाराशर, वरिष्ठ वित्त एवं लेखा अधिकारी ने वितरित किए। श्रीमती श्रीलता के, सहायक मुख्य तकनीकी अधिकारी (राजभाषा) ने अपने धन्यवाद प्रस्ताव में अपनी 33 वर्षों की सेवा में सभी स्टाफ सदस्य और परिषद से प्राप्त हुए सहयोग और मार्गदर्शन के प्रति आभार प्रकट किया।

APPOINTMENT

Name	Designation	Place	Date
Smt. Rohini N	SSS	CPCRI, Kasaragod	21.09.2021

PROMOTIONS

Name of the staff	From (Designation)	To (Designation)	w.e.f.
Dr. M.S. Rajeev	ACTO	CTO	24.04.2018
Smt. Jissy George	ACTO	CTO	22.05.2018
Smt. Lekha G.	ACTO	CTO	27.05.2018
Sri K.K. Sudhanandan	STO	ACTO	19.05.2019
Sri Jacob Kurian	ACTO	CTO	01.07.2019
Sri K. Raghavan	Technical Assistant	Sr.Technical Assistant	27.12.2019
Sri A. Sanjeeva	Technical Assistant	Sr.Technical Assistant	27.12.2019
Sri V.P. Joy	Technical Assistant	Sr.Technical Assistant	31.12.2019
Sri Bhavani Shankar Naik	Senior Technician	Technical Assistant	24.08.2020
Sri M.V. Sreedharan	Senior Technical Asst.	Technical Officer	27.12.2019

TRANSFER

Name of the staff	From (Place)	To (Place)	w.e.f.
Sri Ancil Perera	CPCRI, RS, Kayamkulam	CMFRI, Kochi	20.07.2021
Sri Ram Avtar Parashar	CPCRI, Kasaragod	ICAR-IIWBR, Karnal	28.09.2021
Smt. Remya	CPCRI, Kasaragod	CMFRI. Kochi	30.09.2021

RETIREMENT

Name	Designation	Place	Date
Smt. K.S. Vishalakshy	Asst.	CPCRI, Kasaragod	31.07.2021
Smt. K. Baby	SSS	CPCRI, Kasaragod	31.07.2021
Sri K.N. Pankajakshan	Sr Tech.Asst.	CPCRI, Kasaragod	31.07.2021
Sri Ramesh Babu	PS	CPCRI, RS, Kayamkulam	31.07.2021
Sri K. Sreedharan	SSS	CPCRI, RS, Kayamkulam	31.07.2021
Dr. C. Keshavan Namboothiri	CTO	CPCRI, RS, Kayamkulam	31.07.2021
Sri K.V. Vijayan	SSS	CPCRI, RS, Kayamkulam	31.07.2021
Dr. Chandrika Mohan	Principal Scientist	CPCRI, RS, Kayamkulam	01.10.2021(FN)
Sri K. Saseendra	SSS	CPCRI, RS, Kayamkulam	01.10.2021(FN)

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Published by: Dr. Anitha Karun, Director (Actg.)
Compiled and edited by: Dr. Murali Gopal, Dr. K. Muralidharan, Shri H. Muralikrishna and Dr. Anitha Karun
Cover/ Photo credits: Shri K. Shyama Prasad
ICAR-Central Plantation Crops Research Institute, Kudlu P.O., Kasaragod, Kerala - 671 124
Phone: 04994 232893, 232894, 232895, 233090, 232333 (Director); Fax: 04994 232322
E-mail: director.cpcri@icar.gov.in, cpcrinews@gmail.com
Website: https://cpcri.icar.gov.in; Facebook: cpcrikasaragod.kerala; YouTube: ICAR-CPCRI