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ICAR-CENTRAL PLANTATION CROPS RESEARCH INSTITUTE

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From the Director's Desk



The parting-time

Being the last quarter of the year, it is a time of parting to embrace the New Year and to recapture the good things that happened. The year 2022 left with many memories and achievements; it also left with a few unfinished targets as well.

The coconut sector realized an impressive growth in exports to the tune of Rs.3236.8 crores. In addition to this, the coir sector fetched export earnings of Rs.3236 crore in 2021 to 22. According to the final estimates for 2020 to 21, India has produced 20736 million nuts from 2.198 million ha; 1.208 million tonnes of arecanut (chali) from an area of 0.730 million ha; and 27072 tonnes cocoa from 97536 ha area.

It is most heartening to scribble here the coveted achievement of the Institute to be ranked 16th position in ICAR ranking for the biennium 2019 to 2020. Total revenue generation, including planting material sales, in 2022 will be Rs. 4.99 crore. A total of 35 MoUs were signed on 15 technologies to realize Rs.5.75 lakh as revenue. The year also marked the sanctioning of 11 externally funded projects with a funding of Rs. 3.15 crores.

Most noticeable research achievements in the year include recommendation/identification for release of three new varieties (coconut: Kalpa Vajra; Forastero cocoa I-14; and Trintario cocoa hybrid I-14XI-56);

intercropping cultivation practices for cinnamon and marigold under coconut; mass production of *Trichoderma harzianum* (CPTD28) using arecanut leaf sheath; motorized tender coconut punching machine.

The institute received many national and international visitors, including Dr. A. K. Singh, DDG (Hort. Sci.), Dr. A. K. Malhotra, (Project Director, DKMA), and international experts from COGENT (in connection with the ICC-COGENT coconut tissue culture workshop, 16th to 20th May 2022).

The Institute has organized several events in 2022, including the Rural India Business Conclave 2.0 (9th to 13th Jun 2022); the Rural Innovators Meet (25th to 27th Nov 2022) besides various events in connection with the Platinum Jubilee celebration of ICAR-CPCRI Regional Station, Kayamkulam, and the Golden Jubilee celebration of ICAR-CPCRI Research Centre, Kidu, including a mega Kisan Mela and Agri Expo (19th to 23rd Nov 2022).

On 30th November, 2022, the Institute bid farewell to Dr. Anitha Karun on her superannuation from the service. She led from the front as Director (Acting) for nearly four years, the COVID-19 pandemic period in particular; she also held additional charge of ICAR-DCCR, Puttur, for 15 months during that difficult time. Dr. Anitha is committed to her work, and her colleagues left behind a great joy working with her. In honour of Dr. Anitha Karun, the Institute organized National Conference on enhancing competitiveness in horticulture during 17th to 18th November 2022 along with a farewell meeting in hybrid mode to facilitate participation from different institutions in India and abroad. We wish her good luck and an amazing time ahead.

Dr. K. Muralidharan
Director (Acting)

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Slow release fertilizer preparations

Slow release fertilizer materials were prepared using coconut husk biochar, talc and neem cake with

two fertilizer concentrations (20 & 40%). These products were made into pellets using indigenous

methods and are being used for studying nutrient release patterns using column leaching method.

Neenu, S., Ravi Bhat and Mathew, A.C.

Development and characterization of neera honey infused extrudates

Ready-to-eat corn and rice based extrudates infused with neera-honey were made. The combination of

60% rice flour, 25% corn flour, 15% coconut milk residue infused with neera honey (16% feed moisture)

was found suitable for the preparation of extrudates.

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

Optimization of baking conditions and slice thickness for production of coconut chips

The feasibility of using baking oven for coconut chips production was evaluated and compared with osmo-convective drying. The optimal processing condition to

yield the desired product was determined by analyzing the nutritional profile and sensory acceptability. The experimental findings reveal that, baking

temperature of 160 °C for 35 min baking time with osmotic treatment yield tasty coconut chips.

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

Phosphate solubilization ability of arecanut endophytic bacteria

Apparently healthy roots of yellow leaf disease (YLD) affected arecanut palms from endemic area viz., Sampaje and Kalmakar were collected. Endophytic isolates, viz., SAR-1-1, SAR-3A, KAR-P-21, SAR-2, KARP-12 and KAR-P-21A from these were found positive ('P' solubilization) by forming a

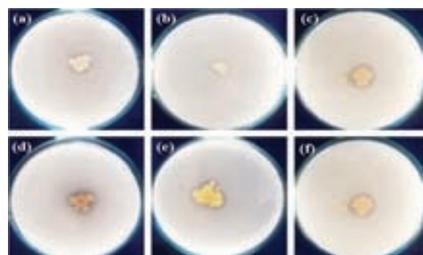


Fig 1. 'P' solubilization in Pikovskaya's medium, (a) SAR-1-1 (b) SAR-3A (c) KAR-P-21 (d) SAR-2 (e) KARP-12 (f) KAR-P-21A.

clear halo zone around it (Fig. 1). The positive isolates will be evaluated further for plant growth promotion activity (PGPR).

Chaithra M., Thava Prakasa Pandian, Priya, U.K., Bhavishya, Merin Babu and Vinayaka Hegde

Spotted Spodoptera in cocoa seedlings at Vittal

During September to October 2022, sudden insect pest attack was noticed with feeding marks, punctures, scrapping of leaves and defoliation in 2 to 4 months old cocoa seedling nursery of ICAR-CPCRI, Regional Station, Vittal. The symptoms were typical with scraping of lower surface, leaving upper epidermis, causing windowing, eating away of soft leaves, leaving midribs, causing skeletonization, with extensive defoliation. Morphological inspection of larvae of different instars confirmed as first



Different stages of caterpillars collected from cocoa nursery

Spodoptera litura

Fig. 2. *Spodoptera* damage on cocoa seedlings

incidence of *Spodoptera litura* in cocoa in India. Use of disease-free potting mixture can help avoiding

pest incidence.

Elain Apshara, S. and Madhu, T.N

Rearing brown marmorated bug *Halyomorpha picus*

Infestation of arecanut pest armored stink bug, *H. picus* (Fabricius) is noticed during February and August since 2018; its population will decline thereafter. Laboratory rearing of *H. picus* is essential to develop management strategies. The available natural substrates including arecanut, french bean, carrot and cowpea were offered as a food for *H. picus* in

laboratory under choice and no-choice conditions. Of these, all stages of *H. picus* preferred to feed on cowpea pods, completes its life cycle within 60 to 70 days and laid at least 3 to 4 egg mass/female. Further, the overall mean survival percentage was higher (>80%) on cowpea among other substrates. However, only 4th, 5th instars nymphs and adults prefer on tender

arecanut; whereas, carrot was least preferred.

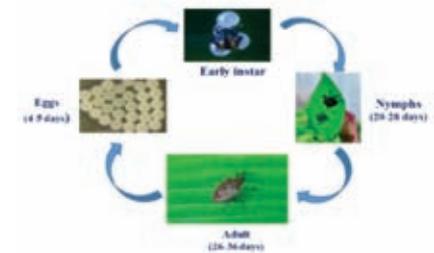


Fig. 3. Life-cycle of Pentatomid bug

Madhu, T.N., Thava Prakasa Pandian, R., Bhavishya, Santhosh Kumar, P. and Nirmal Kumar, B. J.

Record of new egg laying hosts of coreid bug, *Paradasynus rostratus* Distant

Three new egg laying hosts were recorded in coconut system viz., sour sop (*Annona muricata*), nutmeg (*Myristica fragrans*) and mangosteen (*Garcinia mangostana*) from Kayamkulam, Kerala. *P. rostratus* lays 10 to 71 eggs in clusters on the adaxial surface of the new-host leaves. These were

identified with 1.5 mm long and 0.75 mm wide individual eggs. The freshly laid eggs were yellowish orange, with a crescent shaped black marking with two red dots near the cephalic end within 3 to 4 days. The eggs changed their colour to reddish orange with golden tinge and shagreened

appearance towards hatching. The antenna and legs of nymphs were visible through the translucent chorion. The nymphs emerge by removing a flap from dorsal surface of the egg. The margin of emergence hole was smooth and oval shaped. After hatching, the chorion became golden coloured.

Jilu V. Sajan, Josephraj Kumar, A. and Prathibha, P.S.

Isolation and characterization of symbiotic bacteria associated with indigenous EPN isolates

The bacterial symbionts of local EPN (*Steinernema* sp.) isolates CPCRI0804, CPCRI2101 and CPCRI0825 was isolated using NBTA medium and all the cultures

exhibited the typical colony morphology of *Xenorhabdus* spp. Each isolate was confirmed to be Gram negative. Analysis of the 16S rRNA gene region of the bacterial

symbionts revealed genetic relatedness of the bacterial symbionts to *Xenorhabdus griffinae* with 98.99%, 99.86% and 98.92% homogeneity in order.

Tinkle, K.J., Anes, K.M., Merin Babu and Josephraj Kumar, A.

Local varieties of *Amorphophallus*, tolerant to root knot nematode in coconut

The *amorphophallus* varieties Gajendra and Sree Padma varieties are found to be highly

susceptible with a gall index of 3 to 5, whereas, the local variety was observed to be highly tolerant to

the nematode infestation with gall index ranging from 0 to 1.

Kesavakumar, H., Anes, K.M., Anithakumari, P. and Josephraj Kumar, A.

Iron toxicity and phosphorus deficiency in coconut palms under highly acidic soil condition

High iron concentration in soil solution and consequent stunted appearance of seedlings and young palms, necrosis of lower leaves and leaf browning is generally observed in waterlogged lowlands and earth filled areas and lateritic areas. Low lying areas with

prolonged submergence during rainy season show soil acidification. This result in the release of soluble iron when ferric iron change to ferrous form and can lead to the fixation of available phosphorus which resulted in manifestation of phosphorus deficiency symptoms

as purplish discoloration of the outer leaves.

Analysis of soil samples from farmers' field at Koippallikaraima (Onattukara Region) showed the pH of the soil as 4.85. The available phosphorus content was as low as 12.5 kg/ha. The iron

content in the soil was as high as 87.5 ppm, confirming the observation. Recommended management practices for iron toxicity: i) Provide adequate drainage in such soils ii) Apply

liming materials such as lime or dolomite @ 1 to 2 kg per palm and incorporate iii) Rock phosphate may be applied as recommended iv) Follow all the recommended INM practices) Green manuring

/green leaf manuring and mulching practices may be followed to promote aeration and microbial activity.

Abdul Haris, A.and Jeena Mathew

SUCCESS STORY

Impact of Farmer FIRST programme on root (wilt) disease management

The ICAR CPCRI Farmer FIRST Program (FFP) is being implemented in six modules in Pathiyoor Grama panchayath, Alappuzha district in an area of 1627 ha since 2016. In this project, integrated root (wilt) disease management was attempted

in 55.65 ha area covering of 142 marginal farmers (6450 bearing palms). Results indicated that there was improvement in the number of marketed nuts by 43.09%, domestic level coconut oil making from their own harvest by 61.74%, pointing to

increased consumption, and 9.73% increase in average domestic consumption of raw nuts, all of which was due to the improvement in production of coconut over the period.

IMPORTANT EVENTS

Kisan Samman Sammelan

In connection with the PM Agri Startup Conclave and Kisan Samman Sammelan on 17th to 18th October 2022 in Delhi, ICAR-KVK, Kasaragod had organized a Kisan sammelan at Kasaragod on 17th October 2022. Sri. N. A. Nellikunnu, Hon'ble, MLA, Kasaragod was the Chief



Sri. N. A. Nellikunnu, Hon'ble MLA, Kasaragod, addressing the gathering

Guest. More than 100 farmers from different FPOs and 55 SC farmers attended.

At ICAR-KVK- Alappuzha 65 farmers attended the programme. In both the places farmers and staff attended the Address of Sri Narendra Modi, Hon. Prime Minister of India.

Mega Kisan Mela and Agri Expo held at Kidu, Karnataka

A Mega Kisan Mela and Agri Expo were organized as part of the Golden Jubilee celebrations of ICAR-CPCRI, Research Centre, Kidu, Karnataka from 19th to 23rd November 2022. Shri. Kishore Kumar Kodgi, President, CAMPCO, inaugurated the mela in the presence of Dr. S.K. Malhotra, Project Director, DKMA, ICAR, New Delhi, Dr. Homey Cheriyan, Director, DASD, Kozhikode, Shri. Dadasaheb Desai, Deputy Director, DCCD, Kochi and Shri K. Shivashankar, President, Grama Panchayat, Bilinele. The Padma Sri awardees from Dakshina Kannada district Shri Mahalinga Naik and Sri. H. Hajabba were

felicitated in the function. Three publications were released including the "Indian Horticulture – Special Issue on Plantation Crops". Dr. Anitha Karun, Director (Acting), ICAR-CPCRI presided over the function.

Sri Angara, Hon'ble Minister for Fisheries, Ports and Inland Transport, Government of Karnataka inaugurated the Naree Shakti Mela on cocoa production and processing on 21st November 2022.

Other events organized in the Mega Kisan Mela include (i) Bio-diversity conservation fair; (ii) Demonstration of drone technology; (iii) Farmer scientist interface programme; (iv) Sustainable arecanut farming



Inauguration of Kisan Mela



Sri. Angara, Hon'ble Minister, addressing the gathering.

and plant protection technologies; (v) Hi-tech horticulture technologies; (vi) Natural resources management; (vii) Value addition and mechanization in plantation crops and spices; (viii) Farmers Producer

Organizations – Scope and opportunities; and (ix) Awareness on protection of plant varieties and farmers rights.

Valedictory function was held on the 23rd November 2022, in the

presence of Sri Sri Sri Vidya Prasanna Teertha Swamiji (Sri. Subrahmanya Mata, Kukke Subrahmanya).

Rural Innovators Meet 2022

ICAR-KVK Kasaragod, ICAR-CPCRI and Kerala State Council for Science Technology & Environment (KSCSTE) jointly organized 'Rural Innovators Meet (RIM)-2022' at ICAR-CPCRI, Kasaragod during 25th to 27th November 2022. During the event 34 innovations by rural innovators across Kerala were demonstrated. The event was inaugurated by Dr. B. Ashok, Secretary, Kerala State Agriculture Department and was presided over by Dr. K. P. Sudheer, Executive Vice President, KSCSTE and Secretary, Science Technology & Environment



Dr. V. Venkatasubramanian, Director, ICAR-ATARI, Bengaluru, addressing the gathering

Department, Government of Kerala. The exhibition of innovations and agri. expo 'Krishi Darpan-2022' was inaugurated by Dr. V. Venkatasubramanian, Director, ICAR-

ATARI, Bengaluru. Dr. K. Muralidharan, Head, Social Sciences division, ICAR-CPCRI delivered the special address. Sri Shaji Vargese and Joseph Peechanattu bagged 'The NABARD Rural Innovation Award' for their invention organic seed tray and paper bag machine, respectively. The awards were given away by Dr. Gopakumaran Nair, Chief General Manager, NABARD, Kerala Region during the valedictory function which was chaired by Dr. Anitha Karun, Director, ICAR-CPCRI.

Brainstorming session on coconut and arecanut pest and diseases

A Brainstorming session on 'Coconut and arecanut pest and diseases in different regions of Karnataka' was jointly organized by Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga and ICAR-AICRP on Palms, ICAR-CPCRI, Kasaragod on 12th October 2022 at



Dr. Anitha Karun, Director (Acting), ICAR-CPCRI, addressing the gathering

Shivamogga.

Dr. R.C. Jagadeesha, Vice Chancellor of KSNUAHS, Shivamogga inaugurated in the presence of Dr. Anitha Karun, Director and Project Coordinator (Palms) Dr. Vinayaka Hegde, Head (Crop Protection) and Dr. Ravi Bhat, Head (Crop Production).

National conference on enhancing competitiveness of horticulture through technology innovations

Dr. V.A. Parthasarathy, the former director of ICAR-IISR Kozhikode, inaugurated the two-day national conference on 17th to 18th November 2022 at CPCRI, Kasaragod in the presence of Dr. Nirmal Babu, former director ICAR-IISR.

Dr. Vikramaditya Pandey, Asst. Director General (Hort. Sci. – I) delivered his plenary lecture on 'Technology innovations on fruits and vegetables' (online).

On the same day, as part of the Conference, a special session, 'Stakeholders meeting on technology



Dr. V.A. Parthasarathy, Former Director, IISR, addressing the gathering

innovations to improve horticulture competitiveness' was held.

Palmyrah Breeders' Meet

Palmyrah breeders meet was organised in AICRP on Palms center, Killikulam to 28th October 2022 to prepare the road map for palmyrah breeding. Dr. Anitha Karun, Director, ICAR – CPCRI, Kasaragod, Dr. Ravi Bhat, Head (Crop Production), Dr. V. Niral,

Dr. P. Chowdappa, the former Director of ICAR-CPCRI, chaired

the meeting which was organized by Kalpa Agri Business Incubator.



Dignitaries releasing publication during the meet at Killikulam

Principal Scientist (Plant Breeding and Genetic), Dr. B.A. Jerard, Head (Horticulture and Forestry), ICAR- CIARI, Port Blair and Scientist from AICRP on Palms, attended the meeting.

PUBLICATIONS

Research articles

- Aparna, V., Bhat K.V., Janakiram, T., Prasad, K.V., Raju D.V.S, Namita, Sapna Panwar and Singh, K.P. 2022. Molecular characterization and relationship among wild and partially cultivated *Rosa* species. *Indian J. Hortic.* **79** (4): 387-393.
- Beegum, P.P.S., Pandiselvam, R., Ramesh, S.V., Sugatha, P., Nooh, A., Neenu, S., and Hebbar, K.B. 2022. Sensorial, textural and nutritional attributes of coconut sugar and cocoa solids based 'bean to bar' dark chocolate. *Journal of Texture Studies*, **53** (6); 870-882. <https://doi.org/10.1111/jtxs.12698>
- Beegum, P.P., Nair, J.P., Manikantan, M.R., Pandiselvam, R., Shill, S., Neenu, S. and Hebbar, K.B., 2022. Effect of coconut milk, tender coconut and coconut sugar on the physico-chemical and sensory attributes in ice cream. *Journal of Food Science and Technology*, **59**(7): 2605-2616.
- Gawankar, M.S., Sumitha, S., Maheswarappa, H.P., Mathur, R.K., Haldankar, P.M. and Debaje, P.P. 2022. Evaluation of tenera oil palm hybrids in western coastal region of India. *Indian Journal of Horticulture*, **79**(4): 410 – 14. DOI: 10.5958/0974-0112.2022.00057.3
- Jacob, A., Sudagar, I. P., Pandiselvam, R., Rajkumar, P., and Rajavel, M. 2022. Optimization of ultrasound processing parameters for preservation of matured coconut water using a central composite design. *Quality Assurance and Safety of Crops & Foods*, **14**(SP1), 33-41.
- Neema, M., Hareesh, G.S., Aparna, V., Chandran, K.P. and Anitha Karun. 2022. Electrical Induction as Stress Factor for Callus Growth Enhancement in Plumular Explant of Coconut (*Cocos nucifera* L.). *International Journal of Bio-resource and Stress Management* **13**(1):921-927.
- Pandiselvam, R., Kaavya, R., Martinez Monteagudo, S.I., Divya, V., Jain, S., Khanashyam, A.C., Kothakota, A., Prasath, V.A., Ramesh, S.V., Sruthi, N.U. and Kumar, M. 2022. Contemporary Developments and Emerging Trends in the Application of Spectroscopy Techniques: A Particular Reference to Coconut (*Cocos nucifera* L.). *Molecules*, **27**(10), 3250. <https://doi.org/10.3390/molecules27103250>
- Pandiselvam, R., Prithviraj, V., Manikantan, M.R., Beegum, P.S., Ramesh, S.V., Kothakota, A., Mathew, A.C., Hebbar, K.B., Maerescu, C.M., Criste, F.L. and Socol, C.T. 2022. Dynamics of biochemical attributes and enzymatic activities of pasteurized and bio-preserved tender coconut water during storage. *Frontiers in Nutrition*, **9**: 977655. doi:10.3389/fnut.2022.977655
- Preetha, P., Varadharaju, N., Jeevarathinam, G., Deepa, J., Kumar, A.M., Balakrishnan, M., Rajkumar, P. and Pandiselvam, R. 2022. Optimization of continuous flow pulsed light system process parameters for microbial inactivation in tender coconut water, pineapple and orange juice. *Journal of Food Process Engineering*, e14254. <https://doi.org/10.1111/jfpe.14254>
- Priya, R. B., Rashmitha, R., Preetham, G. S., Chandrasekar, V., Mohan, R. J., Siniya, V. R., and Pandiselvam, R. 2022. Detection of Adulteration in Coconut Oil and Virgin Coconut Oil Using Advanced Analytical Techniques: A Review. *Food Analytical Methods*, 1-14.
- Radhakrishnan, K., Chrispin, C.L., Sendhil, R., Krishnan, M., Shil, S., Infantina, J.A., Karthy, A., Chutia, A., Prakash, S., 2022. Vulnerability of white leg shrimp production to climate change in coastal India: An indicator approach, *Aquaculture Research*, **53**(16): 5486-5499.
- Sabana, A. A., Ginny Antony, Rajesh, M. K., Gangaraj, K. P., Niral, V., Sudha, R., Jerard, B. A. 2022. Development and characterization of non-coding RNA derived simple sequence repeat markers in coconut (*Cocos nucifera* L.). *Functional & Integrative Genomics*. <https://doi.org/10.1007/s10142-022-00911-2>.

- Shameena Beegum, P. P., Manikantan, M. R., Anju, K. B., Vinija, V., Pandiselvam, R., Jayashekhar, S., and Hebbar, K. B. 2022. Foam mat drying technique in coconut milk: Effect of additives on foaming and powder properties and its economic analysis. *Journal of Food Processing and Preservation*, **46**(11), e17122. <https://doi.org/10.1111/jfpp.17122>.
- Sharanabasav, H., Devanna, P., Amoghavarsha, C., Sridhara, S., Chidanandappa, E., Prasannakumar, M.K., Manjunatha, C., Patil, B., Shil, S., Pushpa, H.D. 2022. Spatial Distribution Patterns for Identifying Risk Areas Associated with False Smut Disease of Rice in Southern India, *Agronomy*, **12**, 12, 2947.
- Sudha R, Niral V, Samsudeen K, Aparna V, Selvamani V and Neema M 2022. An insight into pollen morphology and evaluation of pollen viability, germination and mineral composition of some coconut (*Cocos nucifera* L.) genotypes. *South African Journal of Botany* **151**: 485-494.
- Sudha, R., Samsudeen, K., Rajesh, M.K. and Niral, V. 2022. Molecular marker assisted confirmation of hybrids in coconut (*Cocos nucifera* L.). *Indian Journal of Genetics*, **82**(3): 369-372.
- Thube, S.H., Pandian, R.T.P., Josephraj Kumar, A., Bhavishya, A., Nirmal Kumar, B.J., Firake, D.M., Shah, V., Madhu, T.N. and Ruzzier, E., 2022. *Xylosandrus crassiusculus* (Motschulsky) on Cocoa Pods (*Theobroma cacao* L.): Matter of Bugs and Fungi. *Insects*, **13**(9), p. 809.

Popular articles

- Anitha Karun, Rajesh, M.K., Ramesh, S.V. and Muralikrishna, K.S. 2022. Biotechnological advancements in the improvement of Coconut and Arecanut, *Indian Horticulture*, **67** (6): 38-43.
- Anithakumari, P., Regi J. Thomas, Josephraj Kumar, A., Abdul Haris, A. and Anitha Karun 2022. History and research accomplishments of ICAR-CPCRI, Regional Station, Kayamkulam. *Indian Horticulture*, **67**(6): 19-23.
- Anithakumari, P., Regi Jacob Thomas, Joseph Rajkumar, Abdul Haris, A. and Anitha Karun 2022. History and research accomplishments of ICAR-CPCRI, Regional Station, Kayamkulam, *Indian Horticulture*, **67** (6): 19-23.
- Diwakar, Y., Niral, V. and Karun, A. 2022. ICAR-CPCRI Research Centre, Kidu - Celebrating golden jubilee: The saga of progress and contributions, *Indian Horticulture*, **67** (6): 12-18.
- Hebbar, K.B., Abhin Sukumar, P. and Ramesh, S V. 2022. Climate change: Response, adaptation strategies and mitigation potential of Coconut, Arecanut and Cocoa, *Indian Horticulture*, **67** (6): 66-69.
- Janakiram, T., Lakshmi Durga, M. and Aparna, V. 2022. A fact sheet on clove. *Indian Horticulture*, **67**(5): 51.
- Jayasekhar, S., Chandran, K P. and Muralidharan, K. 2022. Economic impact of ICAR-CPCRI technologies, *Indian Horticulture*, **67** (6): 70-73.
- Jissy George. 2022. Incubation centers in Kerala. *Karshakasree diary for 2023*. p 44-50 (In Malayalam).
- Jissy George. 2022. Value addition of banana from fruit to pseudo-stem. *Karshakasree*. **28**(11): 57 (In Malayalam).
- Lakshmi Durga, M., Aparna, V. and Srinivas, G. 2022. Udhyavanana pantallo coco peat pradhanyam *Annadata*, **54**(10):12-15.
- Lekha, G. 2022. Prophylactic management practices in banana for better yield. *Krishiyankanam*. **5**(4): 32-33 (In Malayalam).
- Manikantan, M.R., Shameena Beegum, P., Pandiselvam, R. Ramesh, S.V. and Mathew, A.C. 2022. Avenues of value addition in Coconut, Arecanut and Cocoa, *Indian Horticulture*, **67** (6): 78-83.
- Muralidharan, K., Jayasekhar, S. and Jaseem Shakeel, M. 2022. Technology commercialization and agri-business incubation, *Indian Horticulture*, **67** (6): 74-77.
- Nagaraja, N.R., Elain Apshara, S. and Niral, V. 2022. Improved varieties of Coconut, Arecanut and Cocoa for higher productivity, *Indian Horticulture*, **67** (6): 31-37.
- Nagaraja, N.R., Elain Apshara, S. and Niral, V. 2022. Improved varieties of coconut, arecanut and cocoa for higher productivity. *Indian Horticulture*, **67**(6): 31-37.
- Ravi Bhat, Sumitha, S., Maheswarappa, H.P. and Anitha Karun 2022. Five decades of the AICRP on Palms - Tasks accomplished, *Indian Horticulture*, **67** (6): 24-30.
- Shameena Beegum, P.P., Niral, V., Thamban, C. 2022. Coconut Cabbage: an underexploited value added coconut product. *Indian Coconut Journal* **65** (1): 6-9.
- Singh, A.K. and Anitha Karun 2022. Research perspectives on Coconut, Arecanut and Cocoa, *Indian Horticulture*, **67** (6): P 05-11.
- Subramanian P, Alka Gupta, Selvamani, V., Surekha and Ravi Bhat 2022. Technologies for organic cultivation in Coconut, *Indian Horticulture*, **67** (6): 54-58.
- Surekha, Bhavishya, Subramanian, P., Ravi Bhat and Elain Apshara, S. 2022. Adoption of advanced agrotechnologies: A harbinger of enhanced income from Coconut, Arecanut and Cocoa farming, *Indian Horticulture*, **67** (6): 44-53.
- Vinayaka Hegde and Josephraj Kumar, A. 2022. Integrated management of pests and diseases for the successful cultivation of Coconut, Arecanut and Cocoa, *Indian Horticulture*, **67** (6): 59-64.

Papers presented in seminar/ symposia/ conference/ workshops

- Josephraj Kumar A., Anes, K.M., Merin Babu, Jilu V. Sajan and Hegde, V. 2022. Advances in pest management in oil palm Keynote lecture 4.1.2. pp 52 *In: Souvenir and Abstracts of Third National Conference on Oil Palm-Way Forward for increasing vegetable oil pool through Atma Nirbhar Bharat for doubling the income and social security to farmers*, (Eds.) P. Rethinam, K. Suresh and V. Krishnakumar, Society for Promotion of Oil Palm Research and Development, ICAR-IIOPR, 23-25 November 2022, Vijayawada 87p.
- Josephraj Kumar A., Thomas, R.J., Merin Babu, Jilu V. Sajan, Anes K.M. and Hegde V. 2022. Insect-regulated ecosystem services in coconut. *In: Seventh National Conference on Biological Control on 75 Years of Biological Control of Pests and Diseases in Agriculture: Challenges and the Way Forward* (Eds.) U. Amala et al., Society for Biocontrol Advancement, ICAR-NBAIR, 15-17 December 2022 Bengaluru (Book of Abstracts) pp25.
- Josephraj Kumar, A., Anes, K.M., Merin Babu, Jilu, V., Sajan and Vinayaka Hegde 2022. Advances in pest management in oil palm Keynote lecture 4.1.2. pp 52 *In: Souvenir and Abstracts of Third National Conference on Oil Palm-Way Forward for increasing vegetable oil pool through Atma Nirbhar Bharat for doubling the income and social security to farmers*, (Eds.) P. Rethinam, K. Suresh. and V. Krishnakumar, Society for Promotion of Oil Palm Research and Development, ICAR-IIOPR, November 23-25, 2022, Vijayawada 87p.
- Josephraj Kumar, A., Merin Babu, Regi, J. Thomas, Anes, K.M., Jilu, V. Sajan and Vinayaka Hegde 2022. Exotic pests and preparedness for potential invasives on coconut. pp 12 *In: Abstracts of Contributory Papers-National Conference-Bioinvasions: Trends, Threats and Management* (Eds.) C. George Thomas and A.V. Santhosh Kumar, December 3-4, 2022, Kerala State Biodiversity Board, Thiruvananthapuram, 94p.
- Logesh Kumar, P., Srinivasan, G., Shanthi, M., Chinnadurai, S., Josephraj Kumar, A., Poorani, J., Venkatesh, K. and Murugan, M. 2022. First record of *Amitus* sp. (Hymenoptera: Platygasteridae) parasitizing exotic *Acacia* whitefly, *Tetraleurodes acaciae* (Quaintance) [Hemiptera: Aleyrodidae] from India. *In: Seventh National Conference on Biological Control on 75 Years of Biological Control of Pests and Diseases in Agriculture: Challenges and the Way Forward* (Eds.) U. Amala et al., Society for Biocontrol Advancement, 15-17 December, 2022 ICAR-NBAIR, Bengaluru (Book of Abstracts) pp 123.
- M'BO Kacou Antoine Alban and Elain Apshara, S. 2022. Screening of markers for drought tolerance in cocoa hybrids. *In: Booklet of Abstracts of International Symposium on Cocoa Research (ISCR), 5-7 CIRAD, Montpellier, France, p.179.*
- Nagaraja, N.R., Shahala, M.I. and Shreeranjini. 2022. Low cost biodegradable eco pots for raising arecanut seedlings. Pp.247. Souvenir and book of abstracts. National Symposium on Horticultural Crops of Humid Tropics for Nutritional and Livelihood Security. Rajendiran et al. (eds.), 02-03 December 2022, Hotel Crystal Court, Madikeri, Kodagu, Karnataka. 269 pp.
- Ramesh, S.V., Hebbar, K.B., Rajesh, M.K., Sandip Shil and Elain Apshara, S. 2022. Transcriptomic response of cocoa genotypes to water-deficit stress: Implications for drought tolerance. *In: Booklet of Abstracts of International Symposium on Cocoa Research (ISCR), 5-7 CIRAD, Montpellier, France, p.46.*

Book chapters

- Elain Apshara, S. 2022. Cocoa. *In: Handbook of Horticulture Vol.II.*, ICAR, New Delhi. p. 786- 791.
- Niral, V. and Sudha R. 2022. Cocoa. *In: WS Dhillon (ed.). Plantation Crops in India.* Narendra Publishing House, New Delhi (ISBN 978-93-91063-83-2). pp. 135-188
- Ramesh, S.V., Josephraj Kumar, A., Merin Babu, Prathibha, V. H., Aparna, V., Muralikrishna, K.S., Vinayaka Hegde and Rajesh, M.K. 2022. Genomic designing for biotic stress resistance in coconut. *In: Kole, C. (eds.) Genomic Designing for Biotic Stress Resistant Technical Crops.* Springer, Cham. https://doi.org/10.1007/978-3-031-09293-0_3

Books

- Rajesh, M.K., Ramesh, S.V., Muralikrishna, K.S., Neema, M. and Aparna, V. (eds.) 2022. Book of Abstracts. National Conference on Enhancing Competitiveness in Horticulture Through Technology Innovations, 17-18 November 2022, ICAR- Central Plantation Crops Research Institute, Kasaragod, Kerala, 73 pp.
- Aparna Veluru., Neema, M., Krishna Prakash, Muralikrishna, K.S., Rajesh, M.K., and Anitha Karun 2022. Validation of different methods of cryopreservation for long-term conservation of coconut genetic resources in the form of plumular tissues. 7p.
- Bhalerao, P.P., Maheswarappa; H.P., Bhat, R. and Sumitha, S. 2022. Evaluation of Tall x Tall coconut hybrids under south Gujarat conditions.
- Daliyamol, Keerthana, J., Prathibha, V.H., Thamban, C., Rajesh, M.K., and Vinayaka Hegde. 2022. First report of occurrence of crown rot disease of coconut in India.
- Diwakar, Y., Niral, V., Vishnuvardhana, Venkatesh, J., Ramesh, S.V., Halesh, G.K. and Anitha Karun. 2022. Fruit

- morphology studies in coconut germplasm native to island and coastal ecosystem in India.
- Elain Apshara, S. and Harshapriya, M. 2022. Performance of Ghana cocoa collections in India. p.18.
- Elain Apshara, S., Muralidharan, K. and Rajkumar 2022. Impact of scheduled caste sub plan of ICAR - CPCRI on Socio-economic empowerment of the community, P60.
- Ghavale, S.L., Malshe, K.V., Wankhede, S.M., Bhave, S.G., Ravi Bhat and Sumitha, S. 2022. Assessment of Dwarf x Dwarf coconut (*Cocos nucifera*) hybrids for yield and quality parameters in coastal track of Maharashtra (India), 73 pp.
- Indhuja, S., Shareefa, M., Feba Susan John, Radhika, G., Sreelekshmi, J.S. and Merin Babu. 2022. Taxonomic characterization and antimicrobial sensitivity pattern of bacterial contaminants in *Cocos nucifera* *in vitro* culture, 73 pp.
- Jeena Mathew, Abdul Haris, A., Indhuja, S., Nihad, K., Subramaniyan, P. and Ravi Bhat. 2022. Soil quality enhancement through the intercropping of grass and leguminous fodder combination in coconut gardens grown in tropical sandy soils of Kerala.
- Muralidharan, P. and Rajeev, M.S. 2022. Impact of value chain interventions on horizontal and vertical expansion of turmeric production in Alappuzha district.
- Nagaraja, N.R., Dhanyashree, Pankaja, B.D., Shahala, M.I., Geetha Shetty, S., Thanuja, G. and Shreeranjini. 2022. Developing soil-less media for raising polybag arecanut (*Areca catechu* L.) seedlings. pp.38.
- Nagaraja, N.R., Rajkumar and Muralidharan, K. 2022. Impact of improved coconut seed nuts distribution and coconut tree climbing programme on scheduled caste farmers in Chikkamagaluru District of Karnataka. Pp.61.
- Neema, M., Aparna, V., Muralikrishna, K.S., Nagaraja, N.R., Rajesh, M.K. and Anitha Karun. 2022. Polyamine spermine enhances somatic embryogenesis in immature inflorescence explants of arecanut (*Areca catechu* L.). Pp.6.
- Neenu, S., Murali Gopal, Elain Apshara, S. and Alka Gupta. 2022. Understanding the dynamics of phosphorus sorption on addition of cocoa pod husk biochar to an acid soil. p.39.
- Nihad, K., Namita, Abdul Haris, A. and Balakumbahan, R. 2022. Performance of selected marigold varieties as intercrop in coconut gardens of coastal humid tropics.
- Pratibha V. H., Rajesh M. K., Daliyamol, Rajkumar, Keerthana, J., Monisha, M., Subramanian P. and Vinayaka Hegde 2022. First record of spindle dry rot disease in coconut induced by *Lasiodiplodia theobromae* and *L. iranensis*. P54.
- Rajkumar, R. Surekha, V. H. Pratibha, M. Sujithra and Vinayaka Hegde 2022. Field demonstration on plant parasitic nematode management in coconut and arecanut based cropping systems. P50.
- Ranjini, T.N., Niral, V., Samsudeen, K., and Sudha R. 2022. Characterization and assessment of variability for vegetative, floral, fruit component traits and yield in selected coconut accessions
- Selvamani, V., Elain Apshara, S., Shruthi, M.K. and Ravi Bhat. 2022. Effect of soil nutrient balance on the nutritional quality of cocoa beans. p.40.
- Shameena Beegum, P.P., Manikantan, M.R., Josna, S., Pandiselvam, R., Murali Gopal, Ramesh, S.V. and Hebbar, K.B. 2022. Studies on shelflife extension of coconut gratings.
- Shareefa, M., Regi J. Thomas., J.S. Sreelekshmi., Mayalekshmi., Muralikrishna, K.S., Rajesh, M. K. and Anitha Karun. 2022. Factors influencing *in vitro* shoot regeneration from immature inflorescence of coconut through direct organogenesis.
- Sudha, R., Rajesh, M.K., Niral, V., Samsudeen, K., Sandip Shil, S., Ramchander and Diwakar, Y. 2022. Analysis of genetic diversity and population structure in worldwide coconut germplasm (*Cocos nucifera* L.) using microsatellite markers.
- Thomas, R.J., Shareefa, M., Rajesh, K.S., Diwakar, Y., Niral, V., Shinde, V.V., Sivakumar, V., Maheswarappa, H.P. and Anitha Karun. 2022. Application of modified ground pollination technique for hybridization in coconut (*Cocos nucifera* L.), 73 pp.

Technical bulletins

- Ravi Bhat, Sumitha, S. and Niral, V. 2022. Improved varieties of coconut, arecanut and oil palm: Contributions of ICAR – AICRP on Palms. Golden Jubilee Technical Bulletin No. 1. ICAR-Central Plantation Crops Research Institute, Kasaragod. 41 p.
- Ravi Bhat, Sumitha, S. and Sudhalakshmi, C. 2022. Contributions of ICAR – AICRP on Palms to farming community: Success stories. Golden Jubilee Technical Bulletin No. 2. ICAR-Central Plantation Crops Research Institute, Kasaragod. 54 p.

Extension folders

- Nagaraja, N.R. and Ananda, K.S. 2022. CPCRI ya adike thaligalu mattu sankarana thaligalu (Kannada). Extension folder no. 313. ICAR-CPCRI, Kasaragod, Kerala.
- Rajkumar, Sujithra, M., Shivaji Thube, Joseph Rajkumar and Ramchandran, E. 2022. Mithra Neema vrakal Kauvingile veruthinnipulukkale niyanthirikum. ICAR- Central Plantation Crops Research Institute, Kasaragod. Extension folder No.265.
- Shareefa, M. and Thomas, R.J. 2022. Thai thengukalude sasthreeya paripalanam. (In Malayalam). Extension Folder No. 241 (Fourth revised version). CPCRI, Regional Station, Kayamkulam.

Electronic publications

- Rajkumar, Shivaji Thube, Thava Prakash, Bhavishya, Surekha and Nagraj, N. R.2022. You tube on Arecanut white grub management using EPN and other diseases (<https://youtu.be/-pSl4MSqRCw>).

Mobile APP

- Rajkumar, Surekha, Pratibha, V.H. and Muralidharan, K. 2022. Developed mobile App on 'Farmers Training Programme (FTP) conducted by ICAR - CPCRI. <https://www.appsheet.com/newshortcut/2018a992-eb9b-49ae-a802-7007c37534f9>

— HUMAN RESOURCES DEVELOPMENT —

Deputation Abroad

- Dr. Anitha Karun, Director (Acting), Dr. Vinayaka Hegde, Head (Acting), Div. of Crop Protection, Dr. V. Niral, Principal Scientist (Genetics) and Dr. Rajesh M. K., Principal Scientist (Biotechnology) participated in the 50th International Cocotech conference, held at Kuala Lumpur, Malaysia from 7th to 12th November 2022 and presented invited papers. Dr. S.V. Ramesh, Sr. Scientist (Biotechnology), Div. of PB & PHT participated in the International Symposium on Cocoa Research (ISCR) at Montpellier, France, during 5th to 7th December 2022. Dr. Ramesh S.V., Senior Scientist also attended INCOCOA Workshop "Building cocoa collaborations to deliver research impact on climate change, deforestation and living income" at Montpellier, France on 8th December, 2022.

Trainings within India

Name & Designation	Programme	Conducting Organisation and Date
Dr. R. Pandiselvam, Scientist	Online refresher course on 'Mechanical Processing Natural Fibre'	ICAR-NINFET, Kolkata. 11 th to 20 th October 2022
Dr. Merin Babu, Sr. Scientist, Dr. Indhuja S. and Dr. Chaithra, Scientists	Online training on 'Metagenomic Data Analysis' under the project 'ICAR-Consortium Research Platform on Genomics'	ICAR-IASRI, New Delhi. 18 th to 21 st October 2022
Mr. Arunji G., Technical Assistant (Library)	Online training programme on 'Computer Applications' for technical personnel of ICAR	ICAR-IASRI, New Delhi. 15 th to 21 st December 2022
Sh. Benjamin Mathew, SMS, KVK, Kasaragod	Two days workshop on 'Energy transition in agricultural sector-Kerala: Towards energy efficiency & climate resilience'	Energy Management Centre (EMC), Thiruvananthapuram. 28 th & 29 th December 2022

Awards/Honours

Dr. M. R. Manikantan, Principal Scientist received Dr. J. C. Anand Award in Post-Harvest Management of Horticultural Crops – 2022 by Indian Academy of Horticultural Sciences, New Delhi on 2nd December 2022 at IARI, New Delhi.

Dr. M. R. Manikantan, Principal Scientist received CDB Best Coconut Research Worker Award for his findings on coconut products during the world coconut day function organized by Coconut Development Board.

The paper entitled 'First record of *Amitus* sp. (Hymenoptera: Platygasteridae) parasitizing exotic



Dr. M.R. Manikantan, receiving the award

Acacia whitefly, *Tetraleurodes acaciae* (Quaintance) [Hemiptera: Aleyrodidae] from India' presented by Logeshkumar P., Srinivasan G., Shanthi M., Chinnadurai S., Josephraj Kumar A., Poorani J., Venkatesh K. and Murugan M. during the *Seventh National*

Conference on Biological Control on 75 Years of Biological Control of Pests and Diseases in Agriculture: Challenges and the Way Forward held at ICAR-NBAIR, Bengaluru during 15th to 17th December, 2022 was adjudged as the best poster paper in the session VI on *Alien invasive pests & prospects of classical biological control*.

Dr. Jilu V. Sajan received 'Reviewer Excellence Award' as reviewer of '*Bhartiya Krishi Anusandhan Patrika*' by Agricultural Research Communication Centre Journals on 10th October 2022.

TRANSFER OF TECHNOLOGY

Trainings

Coconut hybrid seedling production approach

Training cum awareness program on 'Technology enabled participatory coconut hybrid seedling approach' was conducted at ICAR-CPCRI, Regional Station, Kayamkulam on 12th October 2022. (Number of participants: 92 including people's representatives, officials from Department of Agriculture and farmers).

Awareness on integrated management of arecanut leaf spot disease in Udupi district of Karnataka

It was conducted on 30th December 2022. Dr. Pratibha V.H. and Dr. Rajkumar along with Mr. Nandisha, SADH, Horticulture department, Kundapur visited the arecanut gardens.



View of leaf spot affected gardens in Udupi district

Harvest festival of groundnut as intercrop in coconut gardens

It was conducted on 17th October 2022. Groundnut Variety G2-52 from UAS, Dharwad was introduced as intercrop in coconut root (wilt) disease affected gardens in an area of 10 acres in three wards of Devikulangara (Alappuzha District) under Farmer FIRST project. The programme was inaugurated by Smt. Prathibha, Hon'ble MLA, Kayamkulam.

Modified ground pollination technique

A training on 'Hybridization techniques with emphasis on modified ground pollination technique in coconut' was conducted at Elavally (Thrissur) for officials of Department of Agriculture, Govt. of Kerala during 29th to 30th November 2022. Dr. Regi Jacob Thomas, Principal Scientist was the resource person; in two batches, 130 pollinators and staff participated.

National Farmers Day at FFP

Farmer interaction and training on 'Soil conservation, scientific

nutrient management and organic recycling methods' were organized on 23rd December 2023 at Odanadu. RAWE students (12) from College of Agriculture, Vellayani, 42 FFP farmers, women SHG and FPO shareholders attended the programme.

ICAR-CPCRI distributes *Metarhizium majus* to suppress coconut rhinoceros beetle:

As part of Area-wide suppression of coconut rhinoceros beetle in Vallikunam panchayat through farmer-participatory mode, *Metarhizium majus* packets multiplied in semi-cooked rice were distributed to dairy farmers on 27th October 2022 and 22 December 2022 at Kanjipuzha and Kinalmukku.

Training on Scientific arecanut cultivation for improvement of livelihood was organized at ICAR-CPCRI, Mohitnagar on 11th October 2022 attended by 50 participants.

Training on Crop Diversification in plantation garden Kuchlibari, Coochbehar on 12th October 2022

attended by 35 participants.

Entrepreneurship in mushroom cultivation:

It was held on 28th October 2022 at Devikulangara Panchayath. Twelve entrepreneurs participated.

Good agricultural practices (GAP) in coconut gardens:

Interventions on dissemination and adoption of GAP in coconut gardens were launched in Devikulangara Panchayath (500 ha) on 8th December 2022. Dr. A. Abdul Harris, Principal Scientist, ICAR-CPCRI, RS, Kayamkulam handled the session. Sixty eight farmers participated.

Field day on Integrated management of fruit rot disease of Arecanut

It was organized in Alangar village of Udupi district of Karnataka on 16th December 2022 in collaboration with Raitha Janya Farmer Producer Company (FPO). Sixty farmers participated.

Students Twinning Programme

It was conducted during 7th to 13th December 2022 at ICAR-CPCRI, RS, Kayamkulam. Twenty two M.Ed. Students from NSS College, Pandalam attended.

Training for RAWE students of KAU, Thrissur

ICAR-CPCRI, RS Kayamkulam conducted for 10 students from College of Agriculture, Vellanikkara during 26th to 30th November 2022.

Training for DAESI trainees of Kottayam District

One day training programme on 'Varieties, nutrient management, cropping systems and integrated pest and disease management in

coconut' was organized for DAESI trainees of Kottayam District on 27th October 2022 at ICAR-CPCRI, Regional Station, Kayamkulam.

Off campus training on EPN for management of insect pests

A farmers training programme on 'Recent advances in arecanut health management and entomopathogenic nematode (EPN) technologies was held at Puthige village in Kasaragod district and Palthady village in Puttur Taluk on 27th October 2022 and 9th November 2022 with the financial support of Directorate of Arecanut and spices development (DASD), Calicut. A total of 114 farmers participated.



A view of the Field Day programme at Alangar, Udupi district



Field diagnostic visit of pest and diseases at Puthige village

Radio talks/TV programme broadcast

Dr. P. Muralidharan, Principal Scientist and Head, ICAR-KVK-Alappuzha: 'Soil and water conservation practices during summer season'

(in Malayalam), 9th December 2022, AIR-Thiruvananthapuram. Shri M.S. Rajeev, SMS (Agronomy) ICAR-KVK-Alappuzha: 'Scientific

cultivation of sesame and its pest, disease management' (in Malayalam), 12th December 2022 AIR-Thiruvananthapuram.

Mera Gaon – Mera Gaurav

As a part of Kalpa Vajra—75 years of Regional Station, Kayamkulam, under the Mera Gaon Mera Gaurav

programme, 'Kalpa Farm Clinic' was inaugurated in the Bharanikavu village by Smt. Deepa, President,

Bharanikavu Panchayat on 27th October 2022.

SCSP outreach activities

SCSP training and distribution of planting material

On 1st November 2022 training programme was conducted in the MGMG adopted village Kilingar of Badiadka Panchyath of Kasaragod; 25 women farmers participated received vegetable seeds.

Distribution of 212 coconut seedlings

was done to 106 farmers and another 1240 arecanut seedlings were distributed to 62 farmers belonging on the occasion of World Soil Day at Mohitnagar.

Beneficiaries meeting and training on 'mother palm selection and nursery management' was conducted for 23 SC families on 11th November 2022 at Koliyoor Service Co-

Operative Society, Thiruvallam, Thiruvanthapuram.

Organic cultivation vegetables in homesteads of 1000 SC families in Kayamkulam Municipality was initiated by KVK-Alappuzha. The programme was inaugurated by Adv. U. Prathibha, Hon. MLA, Kayamkulam in which fifty farmers attended.

Training programme on Apiculture for Scheduled Caste Farmers

It was organized at ICAR-CPCRI, Kasaragod, during 12th to 13th October 2022. Dr. K. Muralidharan,

Director (i/c), ICAR-CPCRI, Kasaragod. Seventy farmers participated in the programme.

A view of the apiculture training programme for SC farmers



KRISHI VIGYAN KENDRAS

Krishi Vigyan Kendra, Kasaragod

Kisan Diwas Celebrations 2022

It was organized jointly with Green Chandragiri FPO, at Padne Village, Nileshwar, Kasaragod on 23rd December 2022. Dr. K. Muralidharan, Director (Act.), ICAR-CPCRI inaugurated. A total of 85 farmers and officials participated.

Promotion of Vegetable cultivation under SCSP programme:

Two training programmes were conducted (17th and 21st October 2022): 72 trainees attended. They were provided with vegetable kits. It was inaugurated by Dr. Anitha Karun, Director, ICAR-CPCRI, Kasaragod. Training and Swachh Bharat Activities

A training programme at Paduppu watershed area Near Kuttikol on 15th October 2022. As part of the Swachatha Abhiyan programme, the farmers of this watershed were encouraged to undertake vermicomposting. Number of participants was 66.

OFT and FLDs

Carried out two OFTs (assessment of pepper varieties suitable for mid



Dr. Anitha Karun, Director (Acting), distributing vegetable seeds kit to beneficiary

and high ranges in Kasaragod and assessment of foam mat drying for fruit pulps). 2022. Eight frontline demonstrations under National Food Security Mission Programme were also conducted.

Value addition training for FPO members

It was conducted during 27th to 30th December 2022 at Padne Village, Nileshwar. Forty six FPO-farmers participated.

Other Trainings

The ICAR-Krishi Vigyan Kendra, Kasaragod carried out 16 on-campus training programmes with a participation of 243 (70 M and 173 F) and 4 off-campus training programmes with a participation of 93 (8 men, 85 women).

Krishi Vigyan Kendra, Alappuzha

Capacity building programme on Value addition of banana and tubers for FPO

It was organized for 20 farmers of "Banana and Tapioca Farmer Producer Company" of Kunnathoor taluk, Kollam on 9th November 2022.

Seminar on 'Small scale enterprises in agricultural sector'

It was conducted jointly with Karshakasree magazine on 13th December 2022. Fifty farmers, attended.

KVK-Module of RAWE programme conducted

Final year B.Sc. (Hon.) Agriculture students from College of Agriculture,

Vellanikkara and Vallayani under Kerala Agricultural University have undergone the KVK-Module of RAWE programme during 21st to 25th November and 26th to 29th December 2022, respectively.

Technology management development programme for entrepreneurs

TMDP on 'Food Processing' sponsored by District Industries Centre for upcoming entrepreneurs from Alappuzha district was conducted during 14th to 25th November 2022. Twenty five youths attended.

Animal health campaigns organized at NICRA village

Three animal health campaigns were conducted in Edathua village on 28th

October, 3rd and 10th November 2022. A total of 75 farmers attended.

Orientation programme on agro-processing to cooperative sector officials

An orientation programme on Agro-Processing for the co-operative sector officials from five southern districts of Kerala was conducted during 1st to 2nd December 2022. Thirty-one officers attended.

Skill training for rural youth (STRY)

A skill training programme on 'Dairy, goatary and poultry management' sponsored by ATMA-Alappuzha was organized during 19th to 27th December 2022. Fifteen rural youths participated.

COMMERCIALIZATION OF TECHNOLOGY

Name of Technology	Date of Signing MOU	Value (In INR)	Entrepreneur details
Technology for mass production of <i>Trichoderma harzianum</i> using arecanut leaf sheath	14-11-2022	5000	Mr. Sathish Balyaya K. Kannadakumeru, Savanur 574202 Dakshina Kannada, Karnataka
Coconut Chips	17-11-2022	25000	The Managing Partner, Green Valley Oils, Irumpakachola P.O. 678591 Palakkad, Kerala
Preservation of carbonated tender coconut water	07-12-2022	25000	Mr. AjasParambath, Konolly Foods International, Vakkad P.O. Malappuram, Kerala – 676502
Knowhow for production of bean to bite chocolate	28-12-2022	10000	Mrs. Dhanalakshmi R., Unique Victuals, M.K.K Road, Gate 2 nd Stage, Rajajinagar, Bengaluru-560010, Karnataka
Total		65,000	



Exchange of MoA on aerated tender coconut water technology to an entrepreneur from Malappuram

PARTICIPATION IN NATIONAL SEMINARS/SYMPOSIA/CONFERENCES/WORKSHOPS

Name and designation	Programme	Place & Date
Dr. A. Joseph Rajkumar, Principal Scientist	Entomology Society of India Annual Meeting and Award distribution	ICAR-IARI, New Delhi. on 14-10-2022
Dr. A. Joseph Rajkumar, Principal Scientist, Dr. K.M. Anes, Scientist	Annual Group Meeting AICRP on Biocontrol	ICAR-NBAIR, GVKV campus, Bengaluru during October 20-21 2022
Dr. Sandip Shil, Senior Scientist	73 rd Annual Conference of Indian Society of Agricultural Statistics, Statistics and Machine Learning for Big Data Analytics	Sher-E-Kashmir University of Agricultural Sciences and Technology of Kashmir (SKUAST-K), Srinagar, J&K during November 14-16 2022
Dr. K.M. Anes, Senior Scientist	International workshop on 'Complementing current techniques with next generation technology for crop health improvement' in online mode	Aligarh Muslim University, Aligarh 14-19 November 2022
Dr. K. Muralidharan, Dr. K.B. Hebbar, Dr. Ravi Bhat, Dr. Vinayaka Hegde, Dr. Thamban C., Dr. P. Anitha Kumari, Dr. Regi J. Thomas, Dr. P. Muralidharan, Principal Scientists	National Conference on 'Enhancing competitiveness of horticulture through technology innovations'	ICAR-Central Plantation Crops Research Institute, Kasaragod. 17-18 November 2022

Name and designation	Programme	Place & Date
Dr. Elain Apshara, Dr. Subramanian P., Dr. Murali Gopal, Dr. Alka Gupta, Dr. Niral V., Dr. M.K. Rajesh, Dr. Samsudeen K, Dr. M. R. Manikantan, Dr. Chandran K.P., Principal Scientists Dr. Jayasekhar S., Dr. Sudha R., Dr. Neenu S., Dr. Selvamani V., Dr. Paulraj S., Dr. Ramesh S.V., Dr. Prathibha P.S., Dr. Rajkumar, Dr. Shareefa M, Dr. Jeena Mathew, Dr. Nihad K, Dr.Sujithra M., Dr. N.R. Nagaraja, Dr. Prathibha V.H., Senior Scientists Dr. Neema M., Dr. Aparna V., Dr. Induja S., Dr. Shameena Beegum, Dr. Panjavarnam, Dr. Daliyamol, Dr. Surekha R., Mrs. Ranjini T.N. and Dr.Diwakar Y., Scientists Dr. K.S. Muralikrishna, Senior Technical Assistant	National Conference on 'Enhancing competitiveness of horticulture through technology innovations'	ICAR-Central Plantation Crops Research Institute, Kasaragod. 17-18 November 2022
Dr. A. Joseph Rajkumar, Principal Scientist	Third National Conference on Oil Palm-Way Forward for increasing vegetable oil pool through AtmaNirbhar Bharat for doubling the income and social security to farmers	Society for Promotion of Oil palm Research and Development, ICAR-IIOPR at Vijayawada during November 23-25 2022
Dr. Nagaraja N.R., Senior Scientist(Plant Breeding)	National Symposium on Horticultural crops of humid tropics for nutritional and livelihood security	Hotel Crystal Court, Madikeri2-3 December 2022
Dr. A. Joseph Rajkumar, Principal Scientist	National Conference-Bioinvasions: Trends Threats and Management	Kerala State Biodiversity Board at Kerala Arts and Crafts village Vellar Thiruvananthapuram during December 3-4 2022
Dr. K. Nihad, Senior Scientist	XXI Conference of the Heliconia Society International USA (online)	Quindío Botanical Garden, Colombia, USA5-6 December 2022
Dr. S. Elain Apshara, Principal Scientist (Hort.)	INCOCOA- INGENIC group meeting (online)	CIRAD, France 8 December 2022
Dr. A. Joseph Rajkumar, Principal Scientist	Seventh National Conference on Biological Control on 75 Years of Biological Control of Pests and Diseases in Agriculture: Challenges and the Way Forward	Society of Biocontrol Advancement, ICAR-NBAIR, Bengaluru during December 15-17 2022

CELEBRATIONS

Mahatma Gandhiji's Birthday

As part of the Mahatma Gandhi Jayanti Celebrations and as per the directives from the Government of India and the Ministry of Youth Affairs and Sports, Fit India Freedom

Run 3.0 - Azadi ka Amrut Mahotsav was organized at ICAR-CPCRI, Kasaragod



Fit-India freedom run 3.0 at Kasaragod

Mahila Kisan Diwas

KVK-Alappuzha celebrated Mahila Kisan Diwas (15th October 2022) at Thrikkunnapuzha grama panchayath with various programmes. The event

honoured Mrs. Ammini M., a septuagenarian farmer who has worked for more than 60 years manufacturing coir from coconut

fibre. A total of 65 farmwomen participated in the programme.

World Soil Day

World Soil Day was celebrated on 5th December 2022 with the theme 'Soils: Where food begins'. Field demonstration of soil sample collection was held at Bandadka in collaboration with Payaswini Farmers Producer Company. Dr. C. Thamban, Principal Scientist inaugurated.

At Kayamkulam, an exhibition was arranged and an essay contest for the students was organized.

At Mohitnagar, Sri. Asish Chakraborty,

Deputy Director of Agriculture, inaugurated the programme in the presence of Sri. Alok Mandal, Deputy Director of Horticulture, Jalpaiguri and District Development Manager, NABARD, Jalpaiguri and Dr. Khurshid Alam, Asst. Director of Horticulture, Jalpaiguri. A total of 106 farmers attended. The use of the Soil Sathi analysis kit was demonstrated and soil test-based nutrient recommendation was also given on this occasion.

ICAR-KVK, Kasaragod organized a programme at Mundithadka in Badiadka Grama Panchayat.



Field demonstration of soil sample collection



Planting material distribution



Inauguration of function



Soil testing

Vigilance Awareness Week

In connection with the observance of the Vigilance Awareness Week from 31st October to 6th November 2022, various activities were conducted on

the theme 'Corruption free india for developed nation' at ICAR-CPCRI, Kasaragod, Regional Stations at Vittal and Kayamkulam and Research

Centres at Kidu, Mohitnagar and Kahikuchi to create awareness.

National Farmers Day

A training programme on 'Varietal wealth in arecanut and integrated pest and disease management in arecanut' sponsored by the Directorate of Arecanut and Spices Development (DASD), Calicut,

was organized at ICAR-CPCRI, Regional Station, Vittal on 23rd December 2022 in connection with the Farmers' Day celebrations.



Inauguration of function

NEW PROJECTS

Project Title	Funds	Principal Investigator
Establishment of a center of excellence of biotechnology for plantation crops breeding	Rs. 60 lakhs funding from RKVY-RAFTAAR, Karnataka	Dr. N. R.Nagaraja
Cocoa seed gardens/ clonal orchards-establishment and enrichment	Rs. 55 lakhs funding from RKVY-RAFTAAR, Karnataka	Dr. Elain Apshara
Demonstration of 'Kalpa Vardhini' as a component of integrated nutrient management for sustained soil and palm health in coconut	Rs. 25 lakhs funding from CDB, Kochi	Dr. Jeena Mathew

DISTINGUISHED VISITORS

Shri. Sreedharan Pillai, Hon'ble Governor of Goa visited ICAR-CPCRI, Regional Station, Kayamkulam on 28th November 2022. He planted a Kalpa Vajra coconut seedling at Kayamkulam during the occasion.



Shri. Sreedharan Pillai, Hon'ble Governor at ICAR-CPCRI, RS, Kayamkulam



Shri. Sreedharan Pillai, Hon'ble Governor, planting coconut seedling

OTHER INFORMATION

Swachhta Pakhwada Campaign

Swachhata Pakhwada programmes were conducted at the headquarters, Regional Stations and Research

Centres. From 16th December 2022 various activities were conducted as a part of the Pakhwada.

Awareness on Sanitation drive conducted in MGMG adopted village

of Kambar in Kasaragod district on 18th December 2022. More than 15 villagers were participated in the cleanliness drive as part of Swacchata Pakhwada.



Smt. Shameera Faizal, President of Mogral Puthur panchayat addressing staff members on Swacchata Pakhwada

View of villagers participating in cleanliness drive at Kambar

IMC meeting

Institute Management Committee

has met on 2nd November 2022 and considered various aspects of

progress of activities and utilization of funds at the Institute.

PERSONALIA

Dr. K. Muralidharan took over as Director (Acting) of ICAR-CPCRI

from 1st December, 2022 from Dr. Anitha Karun upon the latter's

retirement from service on 30th November, 2022.

APPOINTMENTS

Name of the staff	Designation	Place	w.e.f.
Dr. Benjamin Mathew	Senior Technical Officer	KVK, Kasaragod	19.10.2022

TRANSFERS

Name of the staff	From (Place)	To (Place)	w.e.f.
Shri. Bhavishya, Scientist	CPCRI, RS, Vittal	CPCRI, Kasaragod	12.12.2022
Shri. Anoop Kumar PP, Technical Assistant	CPCRI, RC, Kidu	CPCRI, Kasaragod	23.12.2022

PROMOTIONS

Name of the staff	From (designation)	To (designation)	w.e.f.
Mrs. Ranjini	Scientist (Level 10)	Scientist (Level 11)	01.01.2021
Mr. Bhavishya	Scientist (Level 10)	Scientist (Level 11)	01.01.2020
Dr Nihad	Senior Scientist (Level 12)	Senior Scientist (Level 13A)	21.05.2021
Dr. Selvamani V.	Senior Scientist (Level 12)	Senior Scientist (Level 13A)	08.01.2020
Dr. Neenu S	Senior Scientist (Level 12)	Senior Scientist (Level 13A)	21.04.2021
Dr. Jeena Mathew	Senior Scientist (Level 12)	Senior Scientist (Level 13A)	15.12.2021
Dr. Nagaraja N.R.	Scientist(Level 11)	Senior Scientist(Level 12)	01.09.2019
Dr. Sudha R.	Senior Scientist (Level 12)	Senior Scientist (Level 13A)	14.09.2020
Dr. Shareefa M.	Senior Scientist (Level 12)	Senior Scientist (Level 13A)	10.02.2021
Dr. Thava Prakash Pandian	Scientist (Level 10)	Scientist (Level 11)	01.01.2020
Dr. Daliyamol	Scientist (Level 10)	Scientist (Level 11)	01.01.2020
Dr Prathibha V.H.	Scientist (Level 11)	Senior Scientist (Level 12)	01.09.2019
Dr. Merin Babu	Senior Scientist (Level 12)	Senior Scientist (Level 13A)	21.04.2021
Dr. Shivaji Hausarao Thube	Scientist (Level 10)	Scientist (Level 11)	01.07.2019
Dr. JiluV.Sajan	Scientist (Level 10)	Scientist (Level 11)	01.01.2020
Dr. Prathibha P.S.	Scientist (Level 11)	Senior Scientist (Level 12)	04.11.2019
Dr. Sujithra M.	Scientist (Level 11)	Senior Scientist (Level 12)	01.09.2019
Dr. Rajkumar	Scientist (Level 11)	Senior Scientist (Level 12)	11.05.2019
Dr. Anes K.M.	Scientist (Level 11)	Senior Scientist (Level 12)	03.05.2020
Dr. Pandiselvam R.	Scientist (Level 10)	Scientist (Level 11)	01.01.2020
Dr. Sandip Shil	Scientist (Level 11)	Senior Scientist (Level 12)	15.12.2019
Shri S.Chennappa	Skilled Support Staff	Technician (T1)	20.10.2022
Shri V. Jathappa Gowda	Skilled Support Staff	Technician (T1)	20.10.2022
Shri Dharmapala	Skilled Support Staff	Technician (T1)	19.10.2022
Shri Mohana	Skilled Support Staff	Technician (T1)	19.10.2022
Shri Kartick Chandra Biswas	Skilled Support Staff	Technician (T1)	20.10.2022

RETIREMENTS

Name of the staff	Designation	Place	Date
Smt. Reetha M.	Asst. Administrative Office	ICAR-CPCRI, Kasaragod	31.10.2022
Shri C.R. Babu	Lower Div. Clerk	ICAR-CPCRI Regional Station, Kayamkulam	31.10.2022
Dr. Anitha Karun	Principal Scientist & Acting Director	ICAR- CPCRI, Kasaragod	30.11.2022



ICAR-CPCRI, Kasaragod

Editorial: By the time this issue is being compiled and published, Dr. K.B. Hebbar has assumed office as the new Director of ICAR-CPCRI, w.e.f. 23rd January, 2023. Since 2010 he has been the Head, Plant Physiology, Biochemistry and Post-Harvest Technology at ICAR-CPCRI. He has extensively worked on the impact and adaptive strategies of field/plantation crops to climate change and in recognition of that he has been awarded Borlaug Fellow for the year 2010 under climate change by the United States Department of Agriculture. He has three patents related to value-added products. Many students have also carried out research work under his guidance. We congratulate him on his new assignment and hope for a better future under his able leadership.



हर कदम, हर उमर
किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद

Agrisearch with a human touch



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