ISLAND AGRICULTURE
ICAR - CIARI NEWSLETTER

भा.कृ.अनु.प.–केन्द्रीय द्वीपीय कृषि अनुसंधान संस्थान
ICAR-CENTRAL ISLAND AGRICULTURAL RESEARCH INSTITUTE
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Andaman and Nicobar Islands, India

Vol. XII. No. 2

April - June, 2020

1. RESEARCH HIGHLIGHTS

a) Technique for round the year planting material production in tejpat

Indian Bay leaf or tejpat *(Cinnamomum tamala)* is an important constituent of Indian cuisines and there is good demand for its planting material among island farmers. Air layering is the only method for its propagation under island condition, which could be practiced mostly during rainy season. Considering this, new technique was developed in which layering was carried out in potted mother plants developed from high yielding trees under poly house conditions with misting facility. Successful rooting (100%) was observed during the dry period also through this technique. It was found that use of coir pith compost as substrate hastened the root induction process than the conventional substrate.

b) Exploiting orchid resources of A&N Islands

An accession of epiphytic orchid *Dendrobium spatella,* (a new record reported during 2016 from Andaman Islands) was collected from a farmer's field in South Andaman growing over arecanut palms and conserved at the Institute using a substrate containing coconut husk, brick pieces, compost and charcoal. Characterization of the accession for floral and morphological traits revealed fragrant, creamy white, small flowers. Flowering was observed twice during April and July. The inflorescence is lateral, 1 or 2-flowered per branch, flowers 1 to 2.8 cm long, creamy white and the foliage is attractive. The accession has potential to be used as a potted plant and used in indoor or balcony gardens for its attractive foliage and fragrant flowers. Another conserved accession of yellow flowered epiphytic orchid, *Dendrobium anceps* was identified as suitable and potential for ornamental purpose to be used in hanging pots considering its attractive foliage and hardiness.

c) Refinement of vegetative propagation

Vegetative propagation methods such as stem cuttings, air layering and modified air layering methods with various combination of rooting hormone treatments attempted for Padauk *(Pterocarpusd albergioides)* and Noni *(Morinda citrifolia)* trees resulted in good success rate. In the modified air

Air layering of Noni and padauk plants

Rooting of air layered Padauk

layering method (with supplemented water, nutrients, and plant hormones), root initiation was observed in the hormone treated plants. Root initiation was observed in growth hormone (IAA, IBA, Boric acid and GA3 in various concentrations) treated stem cuttings of paduak under poly tunnel and open conditions. Around 25% of padauk stem cuttings produced rooting and 99% of air layered branches showed successful rooting. It was observed that air layered noni plants initiated the roots in faster manner when decomposed coir compost was used as substrate.

d) Coir pith compost for air layering rose apple

Fruits of watery rose apple *(Syzygium aqueum)* are generally insipid in taste. A superior collection of watery rose apple with high TSS content of 18° brix was identified from Middle Andaman and maintained in the Institute's germplasm block. To mass multiply this collection for distribution to the farmers, studies on air layering were carried out. Coir pith compost was compared with commonly used soil + farmyard manure substrate. Considering early and better rooting (100%) response, coirpith compost was found to be the better substrate.

e) Establishment of Padauk long term evaluation block

A conservation block of Padauk *(Pterocarpusd albergioides),* an important economic tree of Andaman Islands having ornamental wood value was established at the Institute with seedlings produced from selected plus trees of different accessions for its long-term growth and establishment studies under the DBT project in collaboration with Department of Environment, Forests and Climate Change, Andaman and Nicobar Administration. A total of 520 numbers of selected, quality seedlings obtained from different plus trees identified from South and North and middle Andaman areas were planted. The conservation plot established at Garacharma farm of the Institute in an area of 1750 square metre were planted with the spacing of 3m x 3m.

f) Alternate for plastic nursery containers in horticulture nursery

A technique was standardized to produce leaf cups using coconut leaflets, panadanus leaves and aracnut leaf sheath to be used as container for nursery of horticultural plants. It was found that coconut leaflet plated cups could be suitable for raising vegetable seedlings which could be directly transplanted in the main field without removal of cups after 25 to 30 days. This usage of coconut leaflets has potential to replace plastic portrays hitherto used in nurseries. Through use of coconut leaf cups, eco-friendly quality seedling production could be promoted in addition to promotion of wealth from waste initiatives under organic farming era. The pandanus leaves and arecanut leaf sheath which have more life were found to be suitable for making bigger sized nursery containers suitable for raising other seedlings and saplings which have more nursery duration.

g) Identification of better performing vegetable lines

Among the 30 accessions of okra received from ICAR-NBPGR and evaluated for growth, development, and yield, the accession EC-930080 performed better followed by EC-901970 and IC-506207 in terms of fruit production. Characterization and evaluation carried out on 15 lines of brinjal revealed better performance of IC-99676 followed by IC-379244 and IC-336793 for fruit yield and free from borer infestation. Evaluation of the 32 accessions of *Amaranthus tricolour,* showed better performance of IC-536728 followed by IC-

550145 and IC-551457 for early growth, leaf production. Among the forty-nine lines of *Amaranthushybridus* evaluated and characterized, highest growth and yield were observed in IC-469678 followed by IC588804 and EC-769343. Among the 29 lines of *Amaranthus dubious* evaluated, highest growth and yield was observed in IC-551458 followed by IC-551504 and IC-551457. Evaluation of different accessions of brinjal, amaranthus and chilli revealed that grow bag culture with potting media of coir compost, poultry manure and soil in 1:1:1 ratio is better for growth and yield of the crops irrespective of varieties.

h) Identification of elite Malabar tamarind trees

Garcinia is one of the most important genera in Andaman and Nicobar Islands and wide inter- and intraspecific diversity of *Garcinia* species exists here. Considering this, Malabar tamarind *(Garcinia gummi-gutta)* was introduced in the Islands to explore the possibility for its commercial exploitation. Fruiting trees in the germplasm block showed luxuriant growth and profuse bearing indicating its suitability under island condition. To identify superior germplasm for further exploitation, six seedling progenies in conservation blocks were systematically studied for morphological and physicochemical characters. Of the germplasm studied, a single tree selection GG-05 showed early maturity (starting from mid-May), while other collections came to harvest from mid-June onwards. This character is especially important for island condition wherein sun drying of the produce was possible. Further, longer pedicel of fruits facilitated damage-free harvesting. Rinds of this collection were thinnest and were easy to split using hands, thereby reducing labour and time for processing. Another tree GG-04 showed largest sized fruits (188.8 g), while highest rind recovery (14.74%) was observed in UUF-03, when dried mechanically. All identified GG-04, GG-05 and UUF-03 with above desirable traits were found to be regular bearers. All the three unique lines have been identified as potential for further exploitation.

GG-04

GG-05

UUF-03

i) Baseline information of freshwater fish farms

Comprehensive baseline information of freshwater fish farms (1130nos) has been compiled based on the field surveys. Geo referenced details, farm area, water quality and details of culture activities and management methods were collected and compiled. The information generated into a database form will be helpful in advising better management practices and providing area specific fish culture advisories to the farmers.

j) Identification of new species

A new species of *Argulus sp* (Fish louse) was discovered from South Andaman and the same was identified through conventional taxonomy and molecular characterization. The identification of *Argulus sp* would assist in advising better management practices and health advisories to the fish farmers of the Islands as *Argulus sp* being a fish parasite can cause mortality in fishes.

k) Crosses attempted in wild legume Beachpea *(Vigna marina)*

First time inter-species crosses were attempted between Beachpea (a salt tolerant wild legume

species) with cultivated green gram and black gram during Rabi season to study the crossing compatibility. Total of 143 crosses were made in which only thirteen crosses (F1 seeds) harvested. Low seed set were obtained in both cross combinations such as Black gram x Beachpea (17%) and Green gram x Beachpea (10 %).

l) Seed production of pulses

Under Farmers Participatory Seed Production Programme, a total 3.9q truthfully labelled seed of pulses (Green gram and Black gram) of CIARI varieties were produced. The seed was produced in North and Middle Andaman district during Rabi season (February to April).

m) Seed production of bacterial wilt resistant brinjal varieties

A total of 2.5 kg truthfully labelled seed of bacterial wilt resistant brinjal varieties viz. CARI Brinjal 1 and CARI Brinjal 2 produced at Bloomsdale Research farm CIARI, Port Blair during Rabi season. CARI Brinjal 1 and CARI Brinjal 2 are wilt resistant open pollinated brinjal varieties developed by CIARI, which has green and purple fruits respectively. These varieties are suitable for growing in island conditions during dry season (Oct-April).

n) Baseline survey of Biotech Trainees

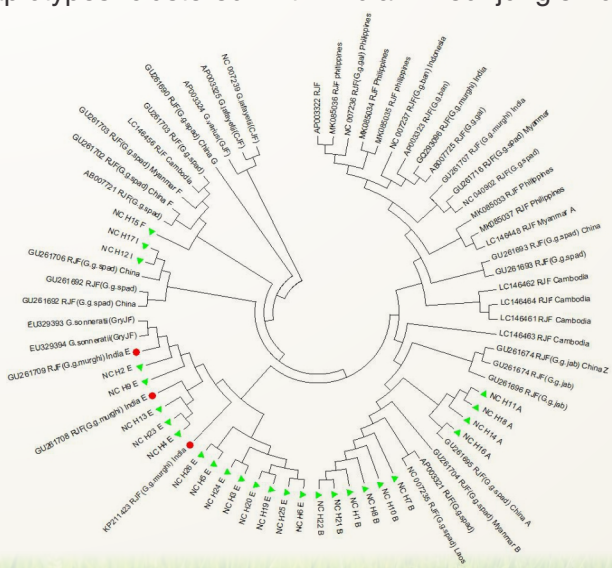
A baseline survey has been conducted among the trainees of one-month Biotech Kisan Fellowship Programme and found that: out of 30 participants representing 9 villages across South Andaman district, 36% are male and 64% are female; among them 17% are graduates and rest have attained various levels of schooling; average age of male trainees is 22 while that of female is 33. Only 10% trainees are already employed; none of the trainees have earlier undergone trainings in poultry and goatery at CIARI/KVK. The main motivation to learn scientific poultry and goatery is ranked in the order of gaining scientific knowledge, self-employment, additional source of income, sharing knowledge with others and to scale up the existing semi-commercial unit; only 40% trainees have experience in poultry.

o) Artificial insemination technique succeeded to first birth of piglets in islands

Artificial insemination in Andaman local pigs was succeeded and is the first report on birth of piglets in these Islands. This technique has several advantages including improvement of genotypes, enhancement of reproductive efficiency and control over sexually transmitted diseases. The female pig gave birth to 4 piglets after completion of 112 days of pregnancy period.

p) An insight on maternal lineage of Nicobari fowl

To explore the ancestry of Nicobari fowl, the complete D-Loop sequences of Nicobari fowls were generated and analyzed with sequences of Jungle fowls of South East Asia. Phylogenetic analysis revealed that the Nicobari fowl grouped with two sub species of Red jungle fowl (G. gallus murghi and G. gallus spadiceus). Through our study we have identified 26 haplotypes of Nicobari fowl. Out of 26 haplotypes identified, 13 haplotypes clustered with Indian Red jungle fowl.



Further we could find that, 60 percent of samples cluster with Indian Red jungle fowl, belonged to haplogroup E, mainly found in the Indian sub-continent. Therefore, we conclude that, Nicobari fowl is a direct descendant of Indian Red jungle fowl (G. gallus murghi). Also we could find genetic diversity within Nicobari fowl which will help to conserve this breed under the impending climate change scenario. This study seems to be the first detailed investigation on genetic characterization of Nicobari fowl based on maternal lineage.

2. CELEBRATION

a) The World Environmental Day was observed at the Institute on 5th June 2020 to create awareness and encourage environmental protection. During the The Heads of Divisions, section In-charges and representative staff from Administration and technical and supporting categories also took part by maintaining social distancing norms and have planted bamboo, jamun, mango, Bixa and some endemic multipurpose tree saplings along with Director, ICAR-CIARI.

b) 43rd Foundation Day of ICAR-CIARI was observed on 23rd June, 2020. Message was delivered to the staff by Dr.A.K.Singh, DDG (Horti.) and Dr.B.A.Jerard, Director, ICAR-CIARI. The staff at HQ and research farm were greeted by the Director on the occasion of foundation day.

3. AWARENESS/TRAINING CONDUCTED

a) Radio Talk

Resource Person	Topic
K. Abirami	Value addition of mango as an additional livelihood option in Andaman and Nicobar Islands on 21st April 2020.
	Phone in live programme on prospects of dragon fruit cultivation in Andaman and Nicobar Islands on 25th June, 2020.
Zachariah George	Advisory for Dairy Farmers of the Islands 22nd May, 2020

b) Advisory issued during the Period

During the lockdown period due to COVID 19 preventive measure, the Institute has issued timely advisories on plantation crops, spices, fruits, vegetables, medicinal plants, flower crops and tuber crops, animals, fisheries etc. The topics were covered by AIR, local news paper and digital media in Andaman and Nicobar Islands. The details for the same is mention below.

Advisory Topic	Resource Person	Date
Observing lockdown regulations along with carrying out agricultural operations in Horticultural crops	B.A.Jerad	03.04.2020
Steps to be taken by farmers of South Andaman region for mitigating the situation arising out of current Covid 19 Pandemic	L.B.Singh	06.04.2020
Advisory to the Lakshadweep farmers on agriculture and allied sector	PME Cell	06.04.2020
Advisory by Central Island Agriculture Research Institute, Port Blair on observing lockdown regulations along with carrying out agricultural and allied sector	PME Cell	10.04.2020
Advisory on coping with the situation arising out of lockdown	B.A.Jerad	11.04.2020
Advisory for poultry farmers of the Islands regarding feed management	A.Kundu	13.04.2020
Advisory for goat rearing during summer months	Jai Sunder	15.04.2020
Advisory on dehydrated vegetables for value addition & minimizing losses in the Islands during the prevailing situation	Subedar Yadav	16.04.2020
Advisory for location specific feed formulation for small scale Poultry of Andaman & Nicobar Islands	T.Sujata	20.04.2020
Advisory on Value addition of mango during the prevailing situation	K.Abirami	21.04.2020

Advisory on pre stocking management of nursery and grow out fish ponds in the present situation arising out of Covid 19 pandemic	Harsha Haridas	22.04.2020
Advisory on Multipurpose fodder trees for Andaman & Nicobar Islands by	I.Jai Shankar	23.04.2020
Advisory on harvesting & proper storage of Spices	Ajit Wamen	24.04.2020
Advisory for preparations for Kharif rice crops	P.K.Singh	27.04.2020
Advisory on Tuber crops	V.Damodaran	28.04.2020
Advisory on buffalo management under the prevailing conditions	Sanjay Kumar Ravi	29.04.2020
Advisory on Management practices in dairy form	P.Perumal	30.04.2020
Advisory on dry flower production	V.Bhaskaran	30.04.2020
Advisory on Noni cultivation in the Islands	Subedar Yadav	04.05.2020
Noni cultivation a way for empowerment of farmers	SubedarYadav	05.05.2020
Advisory on livestock feeding & care in the islands during Covid 19 arena	P.A.Bala	06.05.2020
Advisory for mushroom producers of the Islands during the current situation	P.K.Singh	07.05.2020
Advisory for care & feeding of pets in Covid 19 scenario	P.A.Bala	08.05.2020
Awareness advisory on nutritive vegetables for better health	SubedarYadav	12.05.2020
Advisory on importance of bio security measures and vaccination to sustain rural poultry health in Andaman and Nicobar Islands	T.Sujata	12.05.2020
awareness advisory - boost your immunity: eat more fruits	Pooja Bohra	13.05.2020
Advisory on feeding and health management in home aquariums	K.Saravanan	14.05.2020
Advisory on health care management of goats	Jai Sundar	15.05.2020
Advisory on general management of piglets under farming condition	A.K.De	16.05.2020
Endoparasitic Management in goats	Jai Sundar	17.05.2020
Advisory on Bio security Management in rural poultry	T.Sujata	18.05.2020
Kharif season advisory to famer of Andaman and Nicobar Post Covid -19 Lockdown	S.K.Zamir Ahmed	27.05.2020

MERA GAON MERA GAURAV

- Dr. V. Baskaran, Mr. D. Karunakaran, Dr. Rafeeque Rahman Alyethodi, Ms.Sreepriya Prakasan and Smt. Archana Sharma has organized an Interaction Meeting with 20 farmers of Collinpur on 30.06.2020. The Scientific team deliberated on production technology of vegetables, fruits and spices; animal health management and rearing; and post-harvest utilization and value addition of fish.
- Dr. Debasis Bhattacharya, Dr. P. A. Bala, Dr. Ajit A. Waman, Dr. T. Subramani and Dr. Joshitha Vijayan guided 2 farmers of Dundas Point on High Density Black Pepper Cultivation on Glyricidia on 17.06.2020. One of them purchased 100 black pepper plants for cultivation in 440 m^2 under the improved technology. The team also gave mobile based agro advisories on scientific cultivation of mango ginger and planting material of blood fruit and spices.
- Dr. A. Velmurugan, Dr. I. Jaisankar, Dr. A.K. De, Ms. R.P. Deepitha and Dr. S. Murugesan gave mobile based agro advisories to 175 farmers of Shoal Bay, Kalatang and Govindpuram They distributed e-folder to 25 farmers on moisture conservation during dry period.
- Dr. T.P. Swarnam, Dr. Pooja Bohra, Dr. K. Muniswamy and Mr. Benny Varghese guided a farmer of Caddlegunj on cultivation of native fruits and sold planting material of 14 species of fruits and spices for cultivation in 790 m^2. They also guided DISHA NGO, Caddlegunj about establishment of new plantation of native fruits and spices and sold planting material of 12 species of fruits and spices for cultivation in 670 m^2.

- Dr. Jai Sunder, Mr. Y. Gladston, Ms. S.M. Ajina and Dr. Ani Dath visited Mithakhari village on 26.06.2020 and gave advisory to a farmer on scientific goat farming .They gave mineral mixture for feeding goats and a digital weighing machine. The team also provided mobile-based agro-advisories to 20 farmers twice a week.

Glimpses of MGMG activities during the first quarter of 2020-21

RESEARCH PUBLICATION

- Abirami, K., Baskaran, V., Pooja Kapoor and Jerard, Augustine, B (2020). Value addition in Mango – a livelihood option in Andaman and Nicobar Islands. *Biotica Research Today,* 2(5): 238-240.
- Waman, Ajit Arun and Bohra, Pooja (2020). Assisted regeneration for mass multiplication and conservation of vulnerable *Myristica andamanica* Hook f. from Bay Islands, India. Genetic Resources and Crop Evolution. https://doi.org/10.1007/s10722-020-00963-y.
- Waman, Ajit Arun., Maheswarappa,H.P., Jerard, B.A., Velmurugan, Kumar, Senthil A. S and Chakraborty, Gayatri (2019). Evaluation of Intercrops in Arecanut Gardens of South Andaman Island. *Journal of the Andaman Science Association,* 24(1): 1-4.
- Waman, Ajit Arun (2020). Advisory on Spices quality management during COVID-19. *Andaman Sheekha,* English Daily, Port Blair, April 23, 2020.
- Deesh, Aradhana D., Jokhan, Anjeela D., Joshi , Ravindra C., Khan, Mohammed M.G and Jerard, B. Augustine (2020). Seasonal abundance and host plants of coconut stick insect *(Graeffe acrouanii LeGuillou)* in coconut plantations of Fiji Islands. *Journal of Plantation Crops,* 2020, 48(1):1-10
- Baskaran, V., Abirami, K. and Jerard,Augustine B (2020). Drying of ornamental flowers: and income earning venture. *Biotica Research Today,* 2(5): 283-286.
- Bohra, Pooja and Waman, Ajit Arun (2019). Mangosteen *(Garcinia mangostana L.):* A Potential Crop for Increasing Incomes of Island Farmers. *Journal of the Andaman Science Association,* 24(1): 9-13.
- Bohra, Pooja (2020). Advisory on "Boost your immunity: eat more fruits". *Andaman Sheekha,* English Daily, May 12, 2020.
- Bohra, Pooja and Waman, Ajit Arun (2020). Bringing back the glory of blood fruit: a success story of conservation through cultivation. *The Echo of India,* English Daily, June 28, 2020.
- Jaisankar, I., Jerard, B. Augustine., Velmurugan, A and Swarnam, T.P (2020). Analysis of genetic relationship of *Pandanus tectorius* accessions of Andaman and Nicobar Islands using RAPD and ISSR markers. *Indian J. of Agroforestry,* 22(1): 24-30.
- Pradheep,Kanaka sabhapathi., John, Joseph., kunnel,Kattuk., Iyyappan Jaisankar & Ahlawat, Sudhir Pal (2020). Thirty-nine newly documented plant species of Great Nicobar, India. *The Journal of Threatened Taxa,*12(8), P: 155936–15944, DOI: https://doi.org/10.11609/jott.
- Gautam,R.K., Singh,P.K., Venkatesan,K., Sakthivel, K., Ahmed, Zamir S.K., Swain, S., Devakumar, K. K., Rao, Shyam S., Meena,B.L., Iquebal, M.A and Jaiswal Sarika (2020). Intra-varietal stability performance of popular rice landrace 'C14-8' in the Andaman Islands. *Cereal* Research Communications (Springer) (doi: 10.1007/s42976-019-0003-1).
- Singh, P.K., Gautam,R.K., Sakthivel, K., Ahmed, Zamir S.K., Venkatesan, K and Varadan, Jayakumara R (2020). Augmenting Rice Productivity in Andaman and Nicobar Islands through Improved Varieties and Seed Replacement Rate. *J. Indian Soc. Coastal Agric. Res.* 38(1): 1-10.

Popular article

- Saravanan, K., Kiruba Sankar, R., Praveenraj, J. and Harsha Haridas (2020). ICAR-CIARI advisory on feeding and health management in home aquariums. Andaman Sheekha, 13th May, 2020.

PARTICIPATION IN NATIONAL SEMINARS/ CONFERENCES/ WORKSHOP

a) Meetings

- Dr. B. Augustine Jerard, Director and Dr. V. Damodaran, ACTO has participated in the online Annual Group Meeting of AICRP on Tuber Crops held during 10th -12th June 2020
- Dr Jai Sunder attended the Online AnnuaL Review Meeting of DBT, Biotech Kisan Hub on 29th and 30th April, 2020.
- Dr. V. Baskaran, Pr. Scientist has attended the online QRT review meeting of AICRP (Floriculture) held during 15th -16th May 2020
- Dr.Ajit Arun Waman attended meeting with Director (Agri.), ANI Administration to discuss the estimates for development of commercial scale plant tissue culture laboratory at Sippighat on 28th May, 2020.

b) Webinar's

Sl. No.	Topic	Date	Name of the Participant
1.	Enhancing Agri Trade post - COVID – 19by World Trade Center, Mumbai	12th May, 2020	S.K. Zamir Ahmed and R. Jaya Kumaravaradan
2.	Impact of COVID- 19 on Agri-Business Industry by CCS-NIAM, Jaipur	18th May, 2020	R. Jaya Kumaravaradan
3.	Challenges and Opportunities in Post Covid Era for Human and Shrimp Industry by ICAR-CIFE, Mumbai	20th May 2020	Harsha Haridas Sreepriya Prakasan, K. Saravanan & Deepitha R P
4.	Role of e-NAM in Agricultural Marketing by CCS-NIAM, Jaipur	21st May, 2020	S.K. Zamir Ahmed and R. Jaya Kumaravaradan
5.	Expand the Impact of Your Research Article organized by Research Marketing APAC Wiley Asia-Pacific	27th May 2020	Gladston Y
6.	Biodiversity in Relation to Eco health by AcharyaNarendra Deva University of Agriculture and Techno logy, Ayodhya	28th -30th May	HarshaHaridas
7.	Approaches of Public Funded Research Organizations in Agri-Technology Generation and its Transfer in New Normal Situation by ICAR-NAARM, Hyderabad	28th May, 2020	S.K. Zamir Ahmed and R. Jaya Kumaravaradan
8.	Challenges, Opportunities and the Future of Indian Fisheries Post COVID-19 Era by JAU, Veraval	28th -30th May	K. Saravanan & HarshaHaridas
9.	South Asia Aquaculture Technical Workshop conducted by U.S. Soybean Export Council	3rd June, 2020	K. Saravanan
10.	Brackishwater Aquaculture Scenario in India with focus on shrimp farming during COVID-19: Challenges and Way Forwardby ICAR -CIBA, Chennai.	3rd June, 2020	K. Saravanan
11.	Business Opportunities in Fish Post-HarvestbyICAR-CIPHET, Ludhiana (Punjab)	05th June, 2020	Harsha Haridas
12.	Voice of Youth for Oceans by Kerala University, Thiruvananthapuram	8th June 2020	Ajina S.M
13.	Entrepreneurship Opportunities in Indian Fisheries Sectorby Zonal Technology Management Centre (ZTMC)- Central Institute of Fisheries Technology (ICAR-CIFT)	12th June,2020	Harsha Haridas
14.	How to Accelerate Genetic Gains in Crop Improvement Programmes? by NAHEP (ICAR)- CAAST, IARI, New Delhi	13th June, 2020	K. Venkatesan
15.	Harnessing the potential of indigenous ornamentals post Covid 19 pandemic by ICAR-DFR	18th June, 2020	V. Baskaran
16.	Arising Aquaculture Opportunities in Amidst COVID-19 by World Aquaculture Society – Asian Pacific Chapter	19th June, 2020	K. Saravanan
17.	Indian Agricultural Development in the New Policy Scenario by JSA College of Agriculture and Technology	19th June, 2020	K. Venkatesan
18.	New Trends in Agriculture, Environmental & Biological Sciences for Inclusive Development (NTAEBSID -2020) by Agro Environmental Development Society (AEDS), India	21st -22nd June, 2020	K. Venkatesan, K. Abirami, Ajit Arun Waman and Pooja Bohra
19.	Research Integrity and Publishing Ethics by Research Marketing APAC Wiley Asia-Pacific	30th June 2020	Gladston Y

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