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## From Director's Desk ...

*The fourth quarter of the year 2021 has witnessed very significant achievements and important events. I am happy to present some of the salient achievements made during this period.*

*An improved selection from Andaman Ordinary coconut population was identified as high yielding palm for further exploitation. CIARI Clove-1 accession has been identified for further exploitation in varietal improvement. Our scientists have collected twenty nine accessions of Greater Yam with unique traits and characteristics from Nicobar districts and conserved for further research. Morphology and biochemical diversity of Drynaria quercifolia (L.) J. Sm (a fern) has been studied.*

*Our scientists have successfully bred Siamese fighting fish (Betta splendens), which has very good market potential in aquarium industry. A vertical recirculatory system for mud crab fattening has been standardized at marine hill laboratory of the institute . Semen collection, its extension and Artificial insemination in goat has been standardized. Pigeon pox has been reported and confirmed trough PCR amplification and sequencing of the 4b core protein gene of 578 bp.*

*With an objective to provide quality planting material of different horticulture crops like fruits, vegetables, tubers, flowers, spices, plantation, medicinal plants as well as input material from fisheries, animal husbandry component and their farm products, were made available at Dweep Sale Point at its Garacharma Research Complex and at KVK, South Andaman.*

*Successful demonstration of roof top Horticulture based sustainable production model for nutritional and livelihood security of urban households has been done. Under the Bharat ka Amrut Mahotsav our scientists have conducted number of field days, demonstration, webinar, Doordarsahn interviews, interactive meetings and training on various aspects of agriculture, horticulture, animal husbandry and fisheries sectors for the benefit of the farmers throughout the A & N Islands. A significant number of publications viz. research papers, popular article, extension bulletin, etc have been published from Institute.*

*I am glad to present this quarterly Newsletter of our institutes research development and extension activities and congratulate all the contributors for this documentation. I take this opportunity to thank all the officials of SMD and ICAR Head Quarter for support and all the staff members of our institute for their commendable work and contribution for overall progress and development of the Institute.*

## Research Highlights

### Improved selection from Andaman Ordinary coconut population

A high yielding palm from among the selected Andaman Ordinary Tall

The conserved population of Andaman Ordinary Tall was subjected to population analysis for morphological traits including yield of fruits. The population showed significant variation for leaf morphology, inflorescence traits and fruit production. Based on the performance of desirable and typical traits ( stout and strong stem, circular crown, number of leaves and bunches on the crown, setting, estimated yield of fruits per palm per year, fruit shape, fruit colour, fruit weight and kernel weight), a group of 33 age number of 35 to 42 leaves on the crown, 18 to 21 bunches on crown with fruits/ buttons, 9 to 18 nuts per bunch, oblong fruits, mixture of green and brown fruits, kernel weight over 400g per fruit. The average estimated annual fruit yield of the selection ranged from 110 to 152 with a mean of 126 fruits under rain fed conditions of Andaman. The average estimated copra out turn of the selection was recorded as 27.6kg per palm year with copra content of 219g per fruit.

### Potential of Macaranga leaves as an alternate for plastic plates

This study has been undertaken among *M. Nicobaric*a(IC-626370), *M. tanarius* and *M. indica* to identify the best species suited for commercial plate making. Leaf characteristics with their production pattern were recorded in six branches of each species. The leaves of *M. nicobarica* turned from pale green to dark green while that of *M. indica* and *M. tanarius* turned from pale green to shaded green on maturity. The number of leaf scar per meter stem was 12 in *M. nicobarica* and *M. tanarius*; and 13 in *M. indica*. It took 30 days for a leaf to mature in *M. nicobarica* and *M. indica*, while the leaves of *M. tanarius* mature in 27 days.Leaf length (96.13 cm), leaf width (74.21 cm), mid rib length (75.76 cm), leaf area (5059 cm2), petiole length (55.57 cm), petiole diameter (2.4 cm), leaf fresh weight (158.5 g), and leaf dry weight (93.85 g) were significantly highest in *M. nicobarica* followed by *M. indica*(35.57 cm, 33 cm, 27.07 cm, 954.57 cm2, 27.31 cm, 0.54 cm, 96.53 g and 42.63 g respectively) and *M. tanarius*(24.66 cm, 21.17 cm, 21.51 cm, 511.4 cm2, 12.37 cm, 0.33 cm, 44.09 g and 21.42 g respectively). Owing to their desirable leaf area, fresh weight and colour, fresh leaves of *M. nicobarica* and *M. indica* were found to be best suited for making plates on commercial scale to reduce the usage of plastic plates in these ecologically fragile Islands.

Macaranga species

### Plus trees of Clove

Leaf traits of CIARI Clove-1 plus tree

A group of plus trees were selected based on desirable traits viz., early flowering, regular bearing, bold buds and higher clove yield from Sippighat farm of the institute. Characterization of the selected group of plus trees have revealed broader and darker green leaves, medium canopy volume, higher number of branches, higher number of leaves, more flowers, regular flowering when compared to the general population .The average yield (2007 planted and selected as plus tree) ranged from 1.8kg to 3.85kg dry buds per tree per year (average 2.5kg) when compared to unselected trees under rain fed conditions of South Andaman. The plus trees were selected from a seedling population planted during 2007 (150 trees) which was obtained from three selected trees planted

during 1990. The regular bearing plus trees selection comprising of six trees is named as CIARI Clove-1 and identified for further exploitation in varietal improvement.

### Colocasia variety- Mega Taro-2 for Island conditions

Based on the varietal evaluation from 2012-19 under AICRP on tuber crops, the entry TTr 12-8 (Mega Taro-2) has been recommended for release in Bihar, Jharkhand and A&N Islands during the 19th Annual Group Meeting of AICRP (TC) held at ICAR- CTCRI, Thiruvanathapuram. Accordingly colocasia variety Mega Taro- has been notified and released in the Gazette of India dated 7th April, 2021. It is a Selection from the local collection of Arunachal Pradesh and evaluated and found better under Island conditions.

Megha Taro (TTr-12-8) performance at Port Blair

The plants are erect, green coloured undulated leaf margin with green petiole, round shaped corm and obovoid shaped cormel. High yielding with an average yield of 18.81 t/ha, maturing between 180–220 days, low in calcium oxalate (20-24 mg/100g), high in dry matter (27-30%) and rich in starch content (20-23%). Suitable for leaf, petiole, corm and cormel purposes and it is moderately resistant to leaf blight. It has a long keeping quality (more than 30 days). It stood first position under All India Coordinated trials during 2013-14 to 2018-19 with average yield of 22.77 t/ha at Dholi, 18.74 t/ha at Ranchi and 14.93 t/ha at Port Blair.

### Greater Yam germplasm catalogued

Twenty nine conserved accessions of Greater Yam including the farmers' varieties of Nicobar Greater yam were catalogued for morphological traits of leaves, stem and tubers which is completed for the first time The work revealed the wide genetic variability available within the greater yam collections at the Institute for leaf traits, growth morphology, tuber colour, texture and production of aerial tubers. The catalogue will help the conservation, evaluation and utilization efforts at the Institute as well at national level.


AchinPink Greater Yam of Nicobar

### Morphology and biochemical diversity of *Drynaria quercifolia*(L.) J.Sm.

Rhizomes of *Dryneria quercifolia*

The collections of *D. quercifolia* rhizomes from nine different host plant (habitat) showed significant difference in the morphological characters, the longest rhizome (127.267 cm), fresh weight of rhizome (2290.00 g) and dry weight of rhizome (917.24 g) was recorded in the collection from coconut followed by *Crypteronia paniculata* host (129.00 cm, 1906.00 g and 743.81 g respectively) while the lowest value (89.67 cm, 289.70 g and 94.01 g respectively) was recorded from *Rhizophora mucronataas* host plant. The rhizome was subjected to biochemical analysis by following the standard protocols. The biochemical variability among the collected rhizome and skin showed the significant difference, the highest phenolic content (91.13 mg/100g and 92.87 mg/100g respectively), flavonoids (96.70 mg/100g and 78.43 mg/100g respectively) in rhizome and skin was obtained in the rhizomes collected from *Crypteronia paniculata* host plant. The highest tannin (192.00 mg/100g; 219 mg/100g respectively), saponin (192.50 mg/100g; 183.27 mg/100g respectively) and reducing sugar (384 mg/100g; 379.67 mg/100g respectively) were observed in the fern collected from *Mangifera indica* host plant. The highest carbohydrate (2045.33 mg/100g; 1910.87 mg/100g respectively) and protein

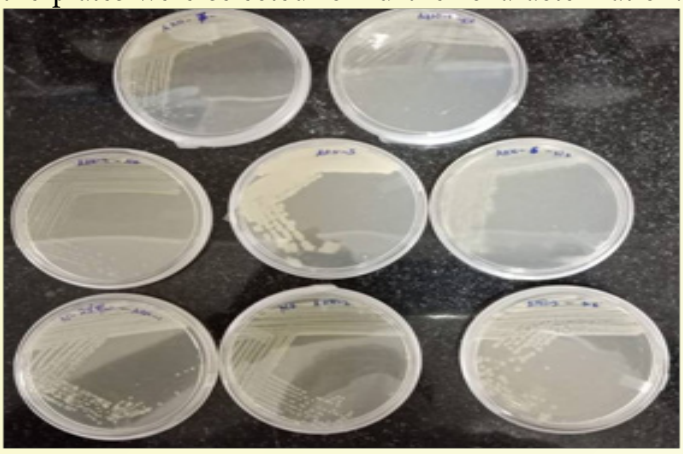
(3.57; 3.70% respectively) was recorded in the fern collected from *Rhizophora mucronata* as a host plant. From this study it can be concluded that there is a wide variability among the habitat of fern morphology and biochemical characters. Hence, the present data may be helpful in further research on *D. quercifolia* and future conservation steps.

### Total biomass estimation of the multipurpose trees under coconut plantation

Destructive sampling was done in the multipurpose tree species (MPT's) planted as an intercrop in coconut plantation. The three years old MPT's highest total green biomass was recorded in *Callophyllum inophyllum* followed by *Pterocarpus dalbergioides* (9.30 kg) and least green biomass was recorded in *Sageraeaelliptica* (1.5 kg). The dry biomass of the MPTs were recorded after two months. The highest total dry biomass was recorded in *Callophyllum inophylum* (16.2 kg) followed by *Pterocarpus dalbergioides* (5.88 kg) and least dry biomass was recorded in *Sageraeaelliptica* (0.58 kg).

### Root nodule bacterial population of *Pterocarpus dalbergioides*

Eight pure isolates were obtained from the root nodules of *Pterocarpus dalbergioides*. Colonies showing different morphological characteristics on the plates were selected for further characterization.



**Morphological characteristics of bacterial strains isolated from root nodule of Pterocarpus dalbergioides on YEMA media**

Out of these eight isolates APRN2, 5, 7, and 8 exhibited high identity with the 16S rRNA gene of *Enterobacter kobei, Bacillus sp., Erwiniasp,* and *Serratia marcescens* respectively. The GenBank accession numbers of 16S rRNA gene sequences of isolates are OK465134, OK465394, OK465396, and OK465133 respectively.

### Susceptibility of *M. sabuana* (syn. *M. indandamanensis*) to BBTV

*Musa sabuana* is an endemic wild banana found distributed in the islands. The species is known to bear fruits with high carotenoids content and fertile seeds. A plant was observed to have morphological symptoms resembling that of Banana Bunchy Top Virus (BBTV). This was further confirmed using BBTV Specific primers thereby indicating susceptibility of the species to the virus.

***M. sabuana* (syn. *M. Indandamanensis*)**

### Pandanus species collection and characterization

Twenty two *Pandanus lerum* accessions were collected from Car Nicobar and Great Nicobar Islands and the morphological observations were recorded. The fruit weight ranged from 7 kg to 22 kg, and the fruit lobs ranged from 40 to 84. A total of 13 each of *Pandanus tectorius* and *Pandanus odorifer* accessions were collected from Great Nicobar Islands.

**L *Pandanus lerum* fruit variability (Collection from Great Nicobar)**

### Successfull breeding of freshwater ornamental Siamese fighting fish, *Bettas plendens*

Siamese fighting fish (*Bettas plendens*) strains namely, Nemo candy, Blue dragon and Half-moon Plakat were successfully bred for the first time on 09th December, 2021. *Betta splendens*, commonly known as Siamese fighting fish belonging to the family Osphronemidae is a commercially important ornamental fish which is well known for its beautiful coloration, finnage and is best suited as an ornamental fish in aquarium tanks. The fish comes in a variety of colour like full white,

Siamese fighting fish *(Betta splendens)*

full red, golden, platinum and other assorted colours. Bettas are the most commonly traded fish in the aquarium trade worldwide with their marketable size range of 2 to 3 inches. The price of the fish varies as per the quality and the strain with range from INR 150 to 25000. Approximately 1000 Nos. of fighting fish fries were produced in the ornamental unit.

## A report on occurrence of polyembryony in Rudraksha (*Elaeocarpus ganitrus)*

During the seed regeneration of five carpelledRudraksha (*Elaeocarpus ganitrus)* for conservation of native ornamentals, a phenomenon called polyembryony was observed in few seeds during seedling emergence. This occurrence of polyembryony is the first report in the species *Elaeocarpus ganitrus*. The number of seedlings germinated perseed ranged from 1 to 5. The polyembryonic seedlings from each seed was found to beequally vigorous.

Ocuurence of poly embryony in Rudraksh

## Leaf petiole propagation in star jasmine (*Jasminum nitidum*)

Star jasmine or shiny jasmine (*Jasminum nitidum*) is an introduced species in the Island and is a potential loose flower which blooms round the year in Island condition, The flowers are very at cuttings showed maximum success (92-95%). However,an alternate propagation method through leaf petioles was also standardized in media composition of coirpith: soil: FYM in 1:2:1 ratio in protrays.

Leaf petiole propagation in star jasmine

The survival rate was 62% and the time taken for rooting is 42.8 days, but shooting is observed only after 214.5 days after planting. Though the time taken for production of saplings is long when compared to stem cuttings, this method can be utilized when there is scarcity of mother plants. The leaves which are pruned can be used for multiplication of saplings for production of large-scale planting material.

## High yielding banana accession identified

A local banana accession was collected and evaluated at experimental farm for past three years and it was found to be high yielding than the other local and commercial varieities grown in the Island. This is suitbale as a table variety due to its taste similar to red banana. The biochemical analysis of the ripe fruits showed high TSS and also rich in flavonoids. The bunch weight varied from 19.2 Kg to 21.8 Kg with 6-7 hands per bunch. The number

High yielding banana accession

of fingers ranged from 16 to 18 per bunch. Finger weight ranged from 165 to 190 g.

**Table1:Biochemical characterization of the banana accession**

| | | | |
|---|---|---|---|
| TSS (oB) | 22.54 | Total Sugar (g/100g) | 21.78 |
| Acidity (%) | 0.89 | Total Starch (g/100g) | 0.70 |
| Moisture content (g/100g) | 72.71 | Total phenol(g/100g) | 77.28 |
| Ash (g/100g) | 1.88 | Total flavonoid (mg/100g) | 62.92 |
| Fat (g/100g) | 0.34 | Reducing sugars (g/100g) | 1.81 |
| Protein (g/100g) | 1.48 | Carotenoids (µg/100g) | 652.77 |

## National Surveillance Programme for Aquatic Animal Diseases (NSPAAD) in Andaman and Nicobar Islands

Bacterial pathogen viz. *Pseudomonas alcaligenes, Aeromonasveronii* and *Bacillus thuringiensis* were isolated from fish samples and identified by using 16S rDNA. Fish and Shellfish parasites such as *Argulus foliaceus, Lernaeacy prinacea, Octolasmis sp* and *Philometra sp* were isolated and amplified by PCR protocol. Mortality and morbidity of *Catlacatla* advanced fries associated with infection from *Aeromonas veronii* and *Achlya sp*.were recorded. *Aphanomyces helicoides* associated with mortality and morbidity is reported for the first time from advanced *Catla catla* fingerlings.

## Demonstration of mud crab fattening set up

A vertical re-circulatory mud crab fattening unit was set up and stocked with 60 number of mud crab (*Scylla serrata*) and 40 number of (*Scylla olivacea*). The water crabs measured from 9.0 cm to3.0 cm (carapacelength) and weighing (0.16 kg to 0.51 kg) and feed with trash fishes three times a day.

Recirculatory structure for mud crab fattening model

## Standardization of value added products from fish

Proximate compositional analysis of 13 commercially important and low value fish species were completed. From the candidate fish species,three value added fishery product 'Fish pickle', 'Fish wafer' and 'Fish Pizza' recipes were standardised. Training and awareness were generated to the women stakeholders for developing entrepreneurship in the Islands.

## All India Network Project on Mariculture

Breeding and brood stock development of *Amphiprion akalopsis*, were done successfully. Fifty numbers of larvae were survived and they are fed with artemia, rotifer and copepods. Live feed culture of *Nannocloropsis sp*, and *Chlorella sp* were maintained at algal lab, MHRL, for larval feeding and rearing of marine ornamental fishes. Seaweed culture were initiated in open sea, 2 bamboo rafts made (3x3m) and stocked with *Turbinaria conoides* and *Sargassum sp* on 19/10/2021 weighing 1.75 kg and 4.76 kg.

## Semen collection and artificial insemination in goat

Artificial insemination in goat

Semen collection in goat has been standardized and artificial insemination was successfully done. Inseminated animals did not expressed oestrus symptoms since 2 months indicated that these animals became pregnant. Thus the semen collection by artificial vagina method, preservation in liquid state with Tris based semen extender, inseminated through trans-cervical method in Andaman local goat and Teressa goat was initiated in ICAR-CIARI, Port Blair, Andaman and Nicobar Islands.

## First Report of Pigeon Pox from Andaman and Nicobar archipelago

*T. Sujatha, Arun Kumar De, Jai Sunder, D. Bhattacharya, P.A. Bala & E.B. Chakurkar*

Avian pox viruses (APV) cause pox in different species of birds. Avian pox viruses infect domestic and wild birds. Large pox viruses are double stranded DNA viruses. The present case of avian pox has been reported in the feral pigeon which are usually spotted in and around human human dwellings. The feral pigeon was found with manifestations of cutaneous form of pox lesions such as nodular and crusty lesions on the combs; corner of the mouth and around the eyelids.To confirm the existence of pox virus in the suspected lesion, nodular lesion was cut deep up to the epithelial tissue and processed for viral DNA extraction using commercial kit. Using specific primers (Forward :5"CAGCAGGRGCTAAACAACAA-3" and Reverse: 5'CGGTAGCTTAACGCCGAAAA-3') partial fragment 4b core protein gene of 578 bp was amplified. Further sequence information was generated and accession number was obtained (OK483026-27). Further sequence information of Andaman isolate was compared with available sequence information of pigeon pox of different geographical origin, avipox virus affecting different

species of birds, fowl pox, quail pox, canary pox, Flamingo pox and penguin pox and phylogenetic tree was drawn based on partial sequence information of 4b core protein (439 bp) and Andaman isolate of pigeon pox sequence (OK483026-27) was completely homologous to pigeon pox reported from other geographical regions, turkey pox and avipox affecting other species of birds. This we claim as first report of pigeon pox from Andaman and Nicobar archipelago.

Pigeon showing clinical signs of Avipox virus (pigeon pox), yellowish crust/nodules on and around the beak, under the eye and on the neck

## Success stories

### Roof top production model for horticultural crops

Demonstration of rooftop garden

ICAR-CIARI in collaboration with NABARD, Port Blair, has implemented the project on "Horticulture based sustainable roof top production model for nutritional and livelihood security of urban households of Andaman Islands" in three public sector units and six households at different places of South Andaman. Various horticulture crops like vegetables, spices, flowers and medicinal plants are grown by the beneficiaries in grow bags using organic media.

### Cultivation of commercial banana varieties for high yield

The planting material of commercial banana varieties like Poovan, Ney Poovan, Red Banana, Monthan and Grand Naine were provided to a beneficiary at Lalpahar, South Andaman along with the local varieties like Katta Champa(Commercial) and CheenaKela. The commercial varieties showed better performance than the local varieties grown with only organic inputs. Maximum bunch weight was recorded in the varieties Grand Naine (28.5 Kg) followed by Monthan (23.5 Kg) as against the lower bunch yield in local varieties Katta Champa (15.6 Kg) and CheenaKela (18.2 Kg)

### Mr. Vikas Lal, a Successful goat entrepreur

***(Jai Sunder, T Sujatha, D Bhattacharya, A.K De, P Perumal & R.R Alyethodi)***

Shri. Vikas Lal, aged 28 years, an enterprising youth from Cofee Bagicha, South Andaman associated with ICAR-CIARI in 2019 and started commercial goat farming. He constructed goat shed in an area of approximately 1000 sq meter with concrete flooring and raised platform by using slatted flooring material. He invested approximately Rs 7.50 lakhs including the cost of shed and goats. He started the goat farming with 16 does and one male (which was provided by ICAR-CIARI for upgradation of the germplasm). Before starting the goat farming he was not havingproper scientific knowledge about the goat farming.

Shri Vikas Lal

Therefore he approached the ICAR-CIARI and underwent training on goat farming.Scientists of the ICAR-CIARI provided all the technical guidance viz. scientific management practices, selection of male and female, breeding management, feeding mineral supplementation and vitamins, management of goat faecal pellets as manure, providing health calendar, recording of the body weight, growth paramters etc. With the technical support of the ICAR-CIARI the flock size has been increased to 69 in two years. He is selling breeding buck @ Rs 1000 per kg and for meat purpose @ Rs 650-850 per kg. Cost of black coloured buck is more due to high demand during festival. So far he has sold 16 bucks and earned Rs 170000/-. He is also selling goat faecal pellets @ Rs

10 per kg and so far already sold for Rs 9000/-. He is very happy with the performance of his farm and technical guidance from the ICAR-CIARI and willing to increase flock to 80-100 numbers.

### Shri R. Raja, a poultry entrepreneur

***(S.K. Zamir Ahmed, R. Jaya Kumaravaradan & D. Karunakaran)***

Shri R. Raja, 37 years old B.A. graduate is the resident of Maccapahad village, South Andaman. Between 2002 and 2010, he participated in various training programmes inclusive of poultry farming conducted by KVK, South Andaman. In 2005, he joined Railway Protection Special Force as Constable, but resigned in 2007 due to family circumstances. Till 2010, he used to collect coconuts and arecanuts in and around his village for merchants on commission basis. In 2010, he started a poultry farm in an abandoned shed at his backyard with 500 Vanaraja birds under the technical guidance of KVK, South Andaman and sold to inter-Island ship caterers. In 2012, he availed a loan of Rs.8.00 lakh from State Bank of India, Garacharma branch based on the project proposal prepared by KVK, South Andaman and started broiler farming with a sales capacity of 1,000 birds per month. Subsequently, he expanded his farm to the present sales capacity of 30,000 to 40,000 birds per month by availing loan from different banks. Initially, he used to purchase chicks from M/s. Shivani Poultry, Dollygunj @ Rs.15/- and then from Chennai. Till 2016, he struggled to penetrate the market which was dominated by a single firm. In 2019, he started M/s. Amman Hatchery with two Incubators of 15,000 egg capacity each by availing a loan of Rs.40.00 lakh from Andaman & Nicobar State Cooperative Bank, Port Blair. This move helped him to reduce the expenditure on buying chicks; and to stabilize the production and marketing. Now, he is purchasing eggs from a firm at Bengaluru. With the moral support of his brother, he overcame the market threats and man aged to establish a network with 38 shops in Port Blair to hold a market share of 20%. He has employed 15 staff for various operations and making a turnover of Rs.52 lakh to Rs.70 lakh per month from the sale of 30,000 to 40,000 birds at the wholesale rate of Rs.175/-. Soaring price of feed comprising soybean and maize, which have to be purchased from mainland is a major constraint faced by him as it shares around 65% of production cost. Even as he aims to start his own parent stock production in the long run to stop his dependence on others for eggs, his short term goal is to increase his market share from 20% to 25% by establishing another incubator of 15,000 egg capacity. He appreciated the fact that, more than being a source of livelihood; this venture has given him social recognition. He inspires the villagers in overcoming their own challenges. He acknowledges the services of CIARI for imparting training, guiding in availing loans and providing technical guidance all through his entrepreneurship development. He perceives huge scope for entrepreneurship in these Islands, and guides at least 5 youth every month on poultry farming. For his achievements, he was honoured by ICAR during the XI National KVK Conference on "Empowering Youth for Technology Led Farming" held at NASC Complex, New Delhi from 28th February to 1st March, 2020. Shri R. Raja's story exemplifies the importance of Institutional support and credit in entrepreneurship development of aspiring youth in the Islands.

Interaction with Shri. Raja

### Shri A. Samsuddin, a multi-dimensional farmer

***(S.K. Zamir Ahmed, Dr. R. Jaya Kumaravaradan and Shri D. Karunakaran)***

Interaction with Shri. A Samuddin

Shri A. Samsuddin, aged 54 is an enterprising farmer of Ograbraj village, South Andaman. He runs a 3,000 bird capacity broiler farm; rears 100 desi poultry; rears 60 goats; collects, processes and supplies coconut to copra units; supplies 10 to 15 tonnes of noni fruits annually to the nearby processing plant from the 1,000 trees grown along the bunds and borders of his farm; raising different varieties of banana as intercrop in arecanut; and cultivates pepper using noni trees

as standard. Since 1995, he is participating in various capacity building programmes of KVK, South Andaman. In 2000, he started a broiler farm with 1,000 bird capacity under the technical guidance of KVK, South Andaman on buy-back agreement with M/s. RSN. Between 2008 and 2017, he discontinued the commercial scale broiler farming due to rate inconsistency with M/s. RSN, but maintained a subsistence stock. In 2017, he established a 3,000 bird capacity poultry farm with 700 birds per batch. While he sources out chicks from different hatcheries viz. M/s. Sai Poultry at Dhanikadi, M/s. RSN and M/s. Amman Hatchary at Maccapahad, he has established a consistent marketing network with shops in the locality and adjacent islands. Upon spending Rs.280 which includes Rs.60 on purchase of chick, Rs.175 on feed, Rs.20 on saw dust flooring and Rs.25 on maintenance, a bird achieves 1.8 kg weight by 45 days. By selling a bird at the wholesale rate of Rs.175 per kg, he earns a profit of Rs.20 per kg which translates into Rs.25,200 per batch of 700 birds in 45 days. Inspired by CIARI's promotion of Noni for marginal lands in the Islands, he has been growing 1,000 trees of Noni var. CIARI Sampada since 2008 on the bunds and borders of his farm. Since past three years, the trees are bearing 10 -15 tonnes of fruits per annum which he sells to the nearby processing plant of M/s. Alberta Agro Pvt. Ltd. at the rate of Rs.20/kg. With an expenditure of Rs.8 over DAP and FYM, he earns a profit of Rs.12/ kg of fruit which translates into Rs.1.2 to 1.8 lakh per annum. He received Best Farmer Award from CIARI during the Island Kisan Mela 2015 and Best Banana Farmer Award from ICAR-NRC for Banana, Tiruchirapalli, Tamil Nadu during its 27th Foundation Day & Kisan Mela held on 21st August 2020. He swears farming the best among all professions both in terms of income it generates and the interesting challenges it poses. In this light, he advocates Integrated Farming System for its effective utilization of farm resources.

## Important events held

### Farmer Education Day

Dr Eaknath B. Chakurkar, Director, ICAR-CIARI gave talk on 3rd December, 2021 in Kisanvani Programme of AIR, Port Blair on "Education in Agriculture and importance of Agriculture and also told about the changes of farming on old times with new times. Advance technology to be adopted; minimum cultivation maximum production by using various agriculture and allied fields.


Dr Eaknath B. Chakurkar at All India Radio on Farmers Education Day

### Farmers-Scientists Connect Meet by DBT Biotech Kisan Hub, ICAR-CIARI, Port Blair

Department of Biotechnology (DBT) has launched a farmer-centric Mission Programme Biotech-KISAN Hub (Biotech-Krishi Innovation Science Application Network), which links India's farmers with Indian and global best in science for India's future. The aim of the programme is to work with small and marginal farmers especially the woman farmers for better agriculture productivity through scientific intervention and evolving best farming practices by linking available science and technology to the farm by first understanding the problem of the local farmer and provide solutions to those problems. A total number of 36 Biotech-KISAN Hubs including ICAR-CIARI, Port Blair have been established so far, all 15 agro-climatic zones in the country and their activities implemented in total 169 districts including 112 Aspirational Districts.

A mega-event "**Farmers-Scientists Connect Meet**" was organized on October 28, 2021 (virtual mode) under the Biotech-KISAN Hub at ICAR-KVK, Port Blair and Car Nicobar and the programme was connected to the rest of the hubs, leading scientists and other beneficiaries farmers associated with Biotech-KISAN Hub at ICAR-IARI, New Delhi. The meet was live streamed in which Hon'ble Minister of States for S&T, Dr. Jitendra Singh addressed that DBT hub has the potential to upgrade and transform the agriculture sector for betterment. It's a science meet which is enabling 75 districts and a total of 75000 farmers to interact and showcase their innovation and success. A total of 90 farmers, SHG members, officials participated in the event at Port Blair and Car Nicobar.

## Awards/ honours

- Dr. Ajit A. Waman has been appointed as Subject Editor (Biodiversity, Conservation, Medicinal & Aromatic Plants) for the journal 'Vegetos-An International Journal of Plant Research and Biotechnology' published by Society for Plant

Research and Springer-Nature

- Dr. Pooja Bohra served as resource person during National Online Training Programme on "Conservation, Management and Utilization of Horticultural Genetic Resources" organized by ICAR-IIHR, Bengaluru during November 22-26, 2021.

## Trainings/Demonstration/Awareness/Distribution / Interaction conducted

### Trainings

### Cultivation and value addition of cut flowers for entrepreneurship development in Andaman & Nicobar Islands

ICAR-CIARI in collaboration with NABARD, Port Blair organized three days training on "Cultivation and value addition of cut flowers for entrepreneurship development in A & N Islands" at Namunagar Panchayat hall for the SHG beneficiaries of Surabi NGO during 9 -11 November, 2021. A total of 35 participants were attended the training.

Training on value addition of cut flowers

### Management Techniques on Andaman Padauk for the executive staff of Department of Environment and Forest

Trainees from Department of environment and Forest

ICAR - CIARI has conducted one day training programme for the executive staff of Department of Environment and Forest on 08.10.2021 at its Garacharma Research Campus under Department of Biotechnology project. A total of 18 executive staff attended the training.

### Cultivation of High Yielding Rice Varieties in South Andaman

One day training cum-awareness programme on "Cultivation of High Yielding Rice Varieties in South Andaman" was organised at Shoal Bay-19, Ferrargunj, South Andaman on 7th October 2021 for the benefit of rice farmers. A total of 30 (7 male and 22 female) farmers were benefited from the programme.

### Management practices in rice seed production at Diglipur

A training-cum-awareness on "Management practices in rice seed production" was organized at Madhupur village of Diglipur on 19th October 2021 for the benefit of rice farmers under AICRP seed (Crop) in collaboration with ICAR-CIARIKVK, Nimbudera. A total of 55 (35 male and 20 female) farmers got benefited from the programme.

Awareness on management of rice cultivation

## Demonstration

### Training cum demonstration on "Roof top production model

Training cum demonstration on "Roof top production model"

A training cum demonstration on "Roof top production model for self-sufficiency" delivered

to housewives of Department of Defence, Brichgunj at Defence Auditorium, Likapalika. 200 women participated in the training.

### Demonstration on Kitchen gardening in Urban and Peri-urban Spaces

A demonstration on "Kitchen gardening in Urban and Peri-urban Spaces for Nutritional Security"was organized at ICAR-CIARI, Port Blair under NABARD- Urban Horticulture project on 6th December, 2021.Anganwadi workers from 28 centres along with their supervisor Ms. Kamlesh Kumari attended the programme

Anganwadi workers attending the awareness programme

## Interaction

### Interaction with Custodian Farmers of Karen Community at Webi


Interaction with Karen community at Middle Andaman

Interaction with Custodian Farmers of Karen Community was conducted at Karen Welfare Community hall, Webi on 20th October 2021, wherein a total of 22 members (15 male and 7 female) participated. REV. Saw Saytha on behalf of Karen community briefed about the efforts taken by the CIARI in projecting Karen rice landraces at National level which has brought lot of fame to the community.

### CIARI on social media

In this age of internet, knowledge can be shared quickly and people are able to access information quicker and easier than ever before. ICAR-CIARI is using social media like Twitter, Facebook, YouTube and through Institute's website to disseminate Institute's activities, research findings, advisories, technologies etc. to stakeholders and farmers. Institute's Twitter (https://twitter.com/CIARIPortblair) has earned 13,100 impressions, Facebook (https://www.facebook.com/ICARCIARI/) 7,158 reach, YouTube 1964 views, and Institute's website 12,313 visitors during the period from October to December 2021.

## Awareness programme

### Awareness Programme on National Surveillance Programme for Aquatic Animal Diseases

An awareness programme was organized under National Surveillance Programme for Aquatic Animal Diseases (NSPAAD) by Fisheries Science Division on 6th November, 2021in Burmanallah, Port Blair. A total 17 participants attended the awareness programme.

### Awareness programme on mud crab fattening

ICAR-Central Island Agricultural Research Institute (CIARI) conducted an awareness programme on "Mud crab fattening" on 25th October, 2021 at ICAR-CIARI, Marine Research Laboratory, Marine Hill. Dr. Eaknath B. Chakurkar, Director, ICAR-CIARI emphasized the importance of mud crab fattening to


Training on mud crab fattening

harness the brackishwater resources and to promote livelihood, employment and entrepreneurship development in the Islands in which a total of 28 farmers have participated and benefitted.

### Awareness programme on Fish Nutrition and feeding management in Island Aquaculture

Awareness programme on Fish Nutrition and feeding management in Island Aquaculture.was organized by Fisheries Science Division in Marine Hill, NABARD, Port Blair & KVK, South Andamanon 8th Nov, 2021. A total 27 participants attended the awareness programme.

## Awareness programme on horticultural diversity for nutrition and livelihood

Eighty members of the women self-help groups from Tushnabad and Ferrargunj visited ICAR-CIARI through Surabhi, NGO on 25th November, 2021. In order to promote cultivation of island suitable spices and underutilized fruits among the farm women, creation of awareness is important. Horticultural Plants Propagation Unit of the ICAR-CIARI, Port Blair is a dedicated nursery to promote the cultivation of endemic, native and potential horticultural crops of the islands. This nursery also serves as a source of information to the visitors and thereby encouragingthem to take up the cultivation.

Trainees at Horticulture Plant Propagation unit

## Awareness programme on diversified value-added fishery products

ICAR-Central Island Agricultural Research Institute, Port Blair conducted an awareness programmeon "Scope of Diversified Value-added Fishery Products in Islands" on 25 th November, 2021 at Kanyapuram Village, South Andaman. A total of 26 women stakeholders have participated and benefitted from the programme.

Trainees of value added fish products

## Awareness Programme on Scientific Backyard Farming

An awareness programme on Scientific backyard farming was conducted at the Panchayat Hall of Wimberlygunj under the Mera Gaon Mera Gourav programme on 20th November, 2021. A number of improved technologies related to horticulture and animal husbandry have been developed at ICAR-CIARI for the benefit of islands farmers and to disseminate those, creation of awareness is a key step. A total of 23 farmers/ farm women and entrepreneurs

Farmers attending the awareness programme

## Awareness Programme on Scientific Management of Kitchen Gardens

An awareness programme on "Scientific Management of Kitchen Gardens for Health and Nutrition" was conducted at ICAR-Central Island Agricultural Research Institute, Port Blair on 10th December, 2021. Anganwadis play a vital role in the development of younger generations. Establishment and maintenance of kitchen gardens is one of the prime activities in this regard. A programme was conducted with the objective to impart knowledge to the participants on various aspects of kitchen gardening with special emphasis on immunity boosting plants. The programme had 21 participants from 19 Anganwadi centres of South Andaman, including 2 Mukhya Sevikas.

Learning by doing in the experimental field by trainees

## Students visit

On 20.11.2021, 30 school children visited the Horticulture Farm and KVK at Sippighat organized by Air Force Wives Welfare Organization, Prothrapur.

They were exposed to different multi-tier cropping system along with World Coconut Germplasm Centre.

## Publications

### Research Papers


Rajesh, M.K., Gangurde,S.S., Pandey, M.K.,Niral, V., Sudha, R., Jerard, B.A., Kadke, G.N., Sabana, A.A.,Muralikrishna,K.S.,Samsudeen,K., Karun,A., & Prasad, T.S.K.(2021). Insights on Genetic Diversity, Population Structure, and Linkage Disequilibrium in Globally Diverse Coconut Accessions Using Genotyping-by-Sequencing. OMICS: A Journal of Integrative Biology, 25 (12): Published Online:8 Dec 2021, https://doi.org/10.1089/omi.2021.0159.

Jaisankar, I., Jerard, B.A., Velmurugan, A., Varadan, J.K.R., & Raj iv Arvind (2021). Cluster Fruit Bearing Noni Identified in Andaman & Nicobar Islands. Journal of the Andaman Science Association, 26(1):55

Ajina, S.M.,Gladston,Y., SriHari,M.,Kiruba-Sankar,R., Pavan, K.A., Roy, S.D., & Jaiswar,A.K., (2021). New Distributional Record of Blacklashscorpionfish, PontinusnigerimumEschmeyer, 1983 from Andaman Waters, Eastern Indian Ocean. Thalassas: An International Journal of Marine Sciences, pp.1-5 (IF: 0.78)

Roy, D.S., Saravanan, K., Kiruba-Sankar, R., Praveenraj, J., and Varghese, B.,(2021). Insights of Inland Aquaculture in Andaman and Nicobar, India. Journal of the Andaman Science Association, 26(1): 39-43.

Gladston, Y., Ajina, S.M., Nesnas E.A., Sri,Hari, M., M.,Varghese.B.,,Deepitha. R.P., & Kiruba-Sankar, (2021). First record of small ariomma, Ariommabrevimanum (Klunzinger, 1884) (Perciformes: Ariommatidae) from Andaman Islands. Journal of Andaman Science Associaton, pp.58-62.

Jaisankar, I., Jerard, B.A.,Velmurugan, A., Jaya Kumaravaradan, R. & Raj ivArvind (2021). Cluster Fruit Bearing Noni Identified in Andaman & Nicobar Islands. Journal of the Andaman Science Association, 26(1):55.

Jaisankar, I., Jerard, B.A., Ganguly, N., Manasseh, M., Venkadesaperumal,G. & Meyappan,V. (2021). GeneBank accession numbers of 16S rRNA gene sequences of root nodule microbial isolates of Andaman Padauk (Ptercarpusdalbergioides) (OK465134, OK465394, OK465396 and OK465133) were published in NCBI on 17.10.2021.

Jerard, B.A., Niral, V., & Rajesh, M. K., (2021). Breeding strategies. In: M. K. Rajesh et al. (eds.), The Coconut Genome, Compendium of Plant Genomes, https://doi.org/10.1007/978-3-030-76649-8_4, Springer Nature Switzerland AG 2021. 47-76pp.

KirubaSankar, R., Saravanan, K., Haridas, H, Praveenraj, J., Biswas, U, Sarkar, R (2021) Policy framework and development strategy for freshwater aquaculture sector in the light of COVID-19 impact in Andaman and Nicobar archipelago. Aquaculture (IF: 4.22).

Patil, S.S., Velankar, A., Shivaranjini, C., Sunder, J., Suresh, K.P., Hiremath, J., Hemadri, D. (2021). Seroprevalence of Infectious Bovine Rhinotracheitis (IBR) in the Andaman and Nicobar islands, India. Exploratory Animal and Medical Research, 11 (1) - 110-114. (NAAS-5.85).

Niral, V., Jerard, B.A., and Rajesh, M. K. (2021). Germplasm Resources: Diversity and Conservation. In: M. K. Rajesh et al. (eds.), The Coconut Genome, Compendium of Plant Genomes, https://doi.org/10.1007/978-3-030-76649-8_3, Springer Nature Switzerland AG 2021. 27-46pp.

Velmurugan, A., Swarnam,T. P. Jaisankar, I., Swain, S., & Subramani, T., (2021). Vegetation–soil–microbial diversity influences ecosystem multifunctionality across different tropical coastal ecosystem types. Tropical Ecology. https://doi.org/10.1007/s42965-021-00209-7


### Abstracts


Jerard, B.A., Damodaran, V., and Jaisankar, I. (2021) Utilization of trait specific coconut germplasm for climate resilience and product diversification in Andaman and Nicobar Islands. Book of abstracts - 2nd International Agrobiodiversity Congress, held virtually 15-18 November 2021.

Jerard, B.A., Jaisankar I, Damodaran V., and Zahir, S., 2021. Diversity for morphological and biochemical traits in *Drynaria quercifolia* (L.) J.Sm. in Andaman and Nicobar Islands, India. Abstract presented and published at International Conference on Vegetable Research and Innovations for Nutrition, Entrepreneurship and Environment (ICVEG-21), 14-16th December 2021, Indian Society of Vegetable Science, ICAR-IIVR, Varanasi.

Rajesh M.K., Gangurde, S.,Pandey, M.K., Niral V, Sudha. R., Jerard, B.A., , Ganesh, N.K., Sabana, A.A., Muralikrishna, K.S., Samsudeen K, Karun,A., & Prasad.K., 2021. Us of genotyping-by- sequencing to determine the genetic structure in coconut and to identify SNP-loci associated with height and fruit colour by genome-wide association mapping. In: Book of Abstracts of XXIV PLACROSYM –Coping with pandemic and

beyond: Research and innovations in plantation sector held from 14-16th December 2021, Kochi, hosted by ICRI, Spices Board, Kochi. Abstract No. GGPC O7: 12p.

Niral, V., Samsudeen, K., B. A. Jerard, Nair,R.V., & Hebbar, K.B., (2021). Development of multi-purpose coconut variety 'Kalpa Ratna'. In: Book of Abstracts of XXIV PLACROSYM –Coping with pandemic and beyond: Research and innovations in plantation sector held from 14-16th December 2021, Kochi, hosted by ICRI, Spices Board, Kochi. Abstract No. GGPC P35: 59p.

Jaisankar, I., B. A. Jerard., Pradheep, K., and Joseph, K., John. (2021). Potential of Macaranga leaves asan alternate for plastic plates inthe ecologically fragile Andaman and Nicobar Islands India. In: Souvenir and compendium of abstracts on National Conference on "Value addition and marketing of NTFPs" held on 16th December 2021 on virtual mode, Tropical Forest Research Institute, Jabalpur, India, OP-17: 85p.

Baskaran, V., Abirami K, B. A. Jerard., Venkatesan, K., and Singh, D.R. ,(2021). Evaluation of heliconia genotypes for commercial exploitation in humid tropics of Andaman Island. Presented and published in book of abstracts at 9th Horticulture Congress, Chandra Sekhar Azad University Agricultue and Technology, Kanpur, Uttar Pradesh, 18-21 Nov 2021.

Abirami, K, Baskaran V, B. A. Jerard, Venkatesan, K., & Singh, P.K., (2021). Effect of artificial pollination in fruiting of dragon fruit( Hylocereus sp.) under tropical Island condition. Presented and published in book of abstracts at 9th Horticulture Congress, Chandra Sekhar Azad University Agricultue and Technology, Kanpur, Uttar Pradesh, 18-21 Nov 2021.

Jaisankar,I., B. A. Jerard, Pradheep,K., & Joseph John,K., (2021). Potential of Macarangaleaves as an alternate for plastic plates in the ecologically fragile Andaman and Nicobar Islands, India. In: Souvenir and Compendium of Abstracts, National Conference (virtual mode) on "Value addition and Marketing of NTFPs" Tropical Forest Research Institute, Jabalpur, Madhya pradesh, P. 85.

Jerard, B.A., Jaisankar, I., Damodaran,V., and Shakiba Zakir (2021).Diversity for morphological and biochemical traits in Drynariaquercifolia (L.) J.Sm. in Andaman and Nicobar Islands, India presented in "International Conference on Vegetable Research and Innovations for Nutrition, Entrepreneurship and Environment (ICVEG-21)" held at ICAR-IIVR, Varanasi, UP during 14-16th December 2021 (Virtual).

Pradheep, K., Joseph, J.K., and Jaisankar, I., (2021). Wild Relatives of mango in India: Taxonomy, germplasm collection and conservation. In: Book of abstracts of the International Conference on Future Challenges & Prospects in Plant Breeding (FCPPB 2021), 6-7th October 2021, Centre for Plant Breeding and Genetics, Tamil Nadu Agricultural University, Coimbatore, Editors. Geetha, S., P. Jayamani, S. Rajeswari,S. Manonmani and N. Manivannan.2021. P.44.

### CD-ROM

Ahmed, S.K.Z., Varadan, R.J.K., George, S.,, Karunakaran, D & B. A. Jerard. 2021. Outreach programme of CIAR-AIR for Island farmers under Covid-10 arena. CD-ROM compilation of 71 radio talks broadcast between 16th July to 14th November 2020 through All India Radio, Port Blair.

### Registration of germplasm

Kumar, N., Singh, P.K., Gautam, R.K.,Kumar, K.,Birah, A.,Sakthivel, K., Ahmed, S.K.Z.,, Venkatesan, K., & B. A. Jerar, 2021. CIARI Brinjal 2 of Brinjal(INGR21153) registered by Plant Germplasm Registration Committee (PGRC) of ICAR on Sept 21, 2021.

### Gen bank number

- Jaisankar,I., Jerard,B.A., Ganguly, N., Manasseh, M., Venkadesaperumal,G. and Meyappan,V. (2021). GenBank accession numbers of 16S rRNA gene sequences of root nodule microbial isolates of Andaman Padauk (P*tercarpus dalbergioides*) (OK465134, OK465394, OK465396 and OK465133) were published in NCBI on 17.10.2021.

### IC number

- Jerard, B.A., S.K. Zamir Ahmed, I. Jaisankar,L. B. Singh, V. Damodaran and R. Jaya Kumaravardan (2021). ICAR-NBPGR IC number IC-0641086 for Passion Fruit (*Passiflora edulis*).
- Jaisankar, I., Jerard,B.A., D. R. Singh and Shrawan Singh (2021). ICAR-NBPGR IC number IC-0641340 for cluster bearing noni (*Morinda citrifolia*).
- Jerard, B.A., and I. Jaisankar (2021). ICAR-NBPGR IC number IC-0641112 for *Dryneria quercifolia*.
- Jaisankar, I., Jerard, B.A., A. SoundraPandiyan & M. Rajkumar (2021). ICAR-NBPGR IC number IC- 0641425 for Buglam an endemic timber tree (*Intsia bijuga*).

## Conference presentations

- Pooja Bohra (2021). Horticultural genetic diversity in Andaman and Nicobar Islands, In: Rajashekaran P.E. et al. (Eds.), E-Compendium of invited lectures and abstracts. National Online Training Programme on "Conservation, Management and Utilization of Horticultural Genetic Resources for Livelihood and Nutritional Security", November, 22-26, 2021.Published by Director, ICAR-IIHR, Bengaluru, p. 22.
- Ajit Arun Waman and Pooja Bohra (2021), Promoting cultivation of underutilized horticultural species through a dedicated nursery: a success story from Andaman and Nicobar Islands, India. In: Rajashekaran P.E. et al. (Eds.), E-Compendium of invited lectures and abstracts. National Online Training Programme on "Conservation, Management and Utilization of Horticultural Genetic Resources for Livelihood and Nutritional Security", November, 22-26, 2021. Published by Director, ICAR-IIHR, Bengaluru, p. 93.

## TOT including radio talks/TV programmes broadcast/Newspapers:-

- Dr. V. Baskaran & Team – Doordharshan programme telecasted on "Success story of roof top production model for horticulture crops established in South Andaman" on 28th December, 2022

## Technologies published in The Daily Telegrams under Farmers Corner:-

In order to disseminate the knowledge about technological backstopping in agriculture and allied activities for a wider audience, a column has been dedicated by the Andaman Administration for ICAR-CIARI in the Daily Telegrams (English) newspaper under the caption "Farmers' Corner – A knowledge hub". Launched on 08.09.2021, 80 technologies have been published on daily basis till date covering 11 on Animal Sciences, 2 on Natural Resource Management, 6 on spices, 5 on field crops, 9 on fisheries, 12 on floriculture, 22 on horticulture and 13 on coconut. During the reporting period, 62 technologies have been published.

| Sl No. | Title | Expert | Date |
|---|---|---|---|
| 1 | The Nicobarese Mangosteen (*Garcinia celebica*) for nutrition and aesthetics | Dr. Pooja Bohra | 01/10/2021 |
| 2 | *Kydia mangosteen*: a rare flavourful fruit | Dr. Pooja Bohra | 04/10/2021 |
| 3 | *Cheena Kela* – a local banana cultivar | Dr. K. Abirami | 06/10/2021 |
| 4 | *Khattachampa* – a local banana cultivar | Dr. K. Abirami | 07/10/2021 |
| 5 | *Korangi Banana* for nutritional security | Dr. Pooja Bohra | 08/10/2021 |
| 6 | *Mangifera andamanica*-an endemic wild mango species of conservation interest | Dr. K. Abirami | 09/10/2021 |
| 7 | *Mangifera griffithi*- an endemic wild mango species of conservation interest | Dr. K. Abirami | 10/10/2021 |
| 8 | *Mitta Champa* - a local banana cultivar | Dr. K. Abirami | 11/10/2021 |
| 9 | *Mangifera nicobarica* - an endemic wild mango species of Nicobar | Dr. K. Abirami | 12/10/2021 |
| 10 | *Passion Fruit*: nutritious easy fruit crop for Island cropping systems | Dr. B. A. Jerard | 13/10/2021 |
| 11 | *Neil mango* (Blue mango)- a custodian farmer variety | Dr. K. Abirami | 14/10/2021 |
| 12 | *Bread fruit* - a versatile crop for Bay Islands | Dr. B. A. Jerard | 15/10/2021 |
| 13 | Island spices - Bush Pepper production at home | Dr. B. A. Jerard | 16/10/2021 |
| 14 | *Dweep Haritha* - A promising dwarf coconut variety | Dr. B. A. Jerard | 17/10/2021 |
| 15 | *Dweep Sona* - A promising dwarf coconut variety | Dr. B. A. Jerard | 18/10/2021 |
| 16 | Carambola (*Averrhoa carambola*): a suitable fruit crop for the islands | Dr. Pooja Bohra | 19/10/2021 |
| 17 | Andaman Orange Dwarf - A Promising dwarf coconut cultivar | Dr. B. A. Jerard | 20/10/2021 |
| 18 | Red ginger (*Alpinia purpurata)* - best intercrop in plantation | Dr. V. Baskaran | 21/10/2021 |
| 19 | Maranda(*Calathea crotalifera*):a new introduction to cut flower trade | Dr. V. Baskaran | 24/10/2021 |
| 20 | Spider orchid ( *Arachnis flosaeris* ) - a potential cut flower | Dr. V. Baskaran | 25/10/2021 |
| 21 | Star jasmine (*Jasminum nitidum*)- a potential loose flower | Dr. V. Baskaran | 26/10/2021 |
| 22 | *Heliconia wagneriana* commonly known as Easter Heliconia | Dr. V. Baskaran | 27/10/2021 |
| 23 | Amphistomiasis immature, a leaf worm cause of havoc mortality in organized goat herd | Dr. T. Sujatha | 28/10/2021 |
| 24 | Torch ginger (*Etlingera elatior*) - a new addition to flower basket | Dr. V. Baskaran | 29/10/2021 |
| 25 | *Heliconia latispatha* commonly known as Expanded Lobster claw | Dr. V. Baskaran | 30/10/2021 |
| 26 | *Heliconia* commonly known as Flamingo | Dr. V. Baskaran | 01/11/2021 |
| 27 | *Heliconia psittacorum* commonly known as parrot flower | Dr. V. Baskaran | 02/11/2021 |
| 28 | *Heliconia stricta* commonly known as Red Lobster claw | Dr. V. Baskaran | 07/11/2021 |

| | | | |
|---|---|---|---|
| 29 | A knowledge hub for Andaman Local goat | Dr. Jai Sunder | 08/11/2021 |
| 30 | FAMACHA to control blood sucking helminthes and anthelmintic resistance in goats | Dr. Jai Sunder | 09/11/2021 |
| 31 | Safe use of fruits and vegetables to avoid chemical residues | Dr. S. N. Sangma | 10/11/2021 |
| 32 | Teressa goat - First goat breed registered from A&N Islands | Dr. Jai Sunder | 13/11/2021 |
| 33 | *Heliconia longissima* commonly known as Red Wings | Dr. V. Baskaran | 16/11/2021 |
| 34 | Nicobari fowl of A&N Islands: A hidden treasure under impending climate change scenario | Dr. T. Sujatha | 17/11/2021 |
| 35 | Andaman local pig | Dr. A.K. De | 19/11/2021 |
| 36 | Siamese fighting fish, *Betta splendens* a freshwater ornamental fish successfully bred in the Islands by ICAR- CIARI | Dr. R. Kirubasankar | 20/11/2021 |
| 37 | Trinket cattle, A Danish colonial leftover | Dr. A. K. De | 20/11/2021 |
| 38 | Nicobari Pig, The pride of Nicobar | Dr. A.K. De | 21/11/2021 |
| 39 | Quail production Techniques in Andaman Nicobar Islands | Dr. R. R. Alyethodi | 22/11/2021 |
| 40 | Mitigation of iron deficiency anaemia (IDA) in piglets | Dr. A. K. De | 23/11/2021 |
| 41 | Mini incubator for small women farmers holdings in A&N Islands | Dr. T. Sujatha | 24/11/2021 |
| 42 | Dweep - Carp Grower Feed | Dr. Saravanan | 25/11/2021 |
| 43 | Live bearer ornamental fish culture | Dr. J. Praveen Raj | 26/11/2021 |
| 44 | Trimodel Therapy Module (CIARI-Gau Maa Rakshak) to Treat Humpsore in cattle | Dr. P. Perumal | 27/11/2021 |
| 45 | Torch ginger (*Etlingeraelatior*)- a new addition to flower basket | Dr. V. Baskaran | 28/11/2021 |
| 46 | Mud Crab fattening | Mrs. S. M. Ajina | 30/11/2021 |
| 47 | Rain water harvesting through lined pond | Dr. T. Subramani | 02/12/2021 |
| 48 | Captive rearing and breeding technology of anemone fishes | Dr. Y. Gladston | 03/12/2021 |
| 49 | Small-scale aquaponic model for fish and plant production | Dr. R. Kirubasankar | 05/12/2021 |
| 50 | Rain water harvesting through lined pond | Dr. T. Subramani | 06/12/2021 |
| 51 | Fertilizer from fish waste | Dr. A. K.O. Ratheesh | 07/12/2021 |
| 52 | Indoor biofloc system for freshwater aquaculture | Dr. R. Kirubasankar | 08/12/2021 |
| 53 | Breeding and seed production of Betta fish (Siamese fighting fish) | Dr. J. Praveenraj | 09/12/2021 |
| 54 | Value added fishery by-products | Dr. R.P. Deepitha | 12/12/2021 |
| 55 | Dweep CIARI Brinjal 1 | Dr. P.K. Singh | 14/12/2021 |
| 56 | Dweep CIARI Mung 1 | Dr. K. Venkatesan | 15/12/2021 |
| 57 | Dweep CIARI Dhan 5 | Dr. P.K. Singh | 16/12/2021 |
| 58 | Dweep CIARI Urd 1 | Dr. K. Venkatesan | 18/12/2021 |
| 59 | Quality Seed | Dr. P.K. Singh | 19/12/2021 |
| 60 | Captive rearing and breeding technology of anemone fishes | Dr. Y. Gladston | 21/12/2021 |
| 61 | Mud crab fattening | Dr. S. M. Ajina | 22/12/2021 |
| 62 | Malabar tamarind (*Garcinia gummi-gutta*):A potential commercial crop for the islands | Dr. Pooja Bohra | 28/12/2021 |
| 63 | Resolving the mystery of Cinnamon | Dr. Ajit Arun Waman | 02/01/2022 |
| 64 | Spice it up with Mango ginger! | Dr. Ajit Arun Waman | 03/01/2022 |
| 65 | Blood fruit: a potential fruit cum natural colourant | Dr. Pooja Bohra | 06/01/2022 |

## Mera Goan-Mera Gaurav

An awareness programme on Scientific Backyard Farming was conducted at Wimberlygunj on 20.11.2021 in collaboration with AICRP on Palms and AICRP on Pig with 23 participants (14 male, 9 female) by the team comprising of Dr.AjitArunWaman, Dr. P.A. Bala and Dr. D. Bhattacharya.

## Bharat ka Amrut Mahotsav

## Field Day

- Seed Production of CIARI Rice Varieties for its upscaling to stakeholders was organised at Bloomsdale Research Farm, ICAR-CIARI, Chouldarion 13thOctober 2021 for the knowledge and benefit of rice farmers. A total of 30 (19 male and 11 female) farmers got benefited from the programme.
- Eighty members of the women self-help groups from Tushnabad and Ferrargunj visited ICAR-CIARI through Surabhi on 25th November, 2021 under Azadi Ka Amrit Mahotsav. In order to promote cultivation of island suitable spices and underutilized fruits among the farm women, creation of awareness is important. Horticultural Plants Propagation Unit of the ICAR-CIARI, Port Blair is a dedicated nursery to promote the cultivation of endemic, native and potential horticultural crops of the islands. This nursery also

serves as a source of information to the visitors and thereby encouraging them to take up the cultivation.

- Field day on "Roof top production technology" was organized on 20th December, 2021, wherein 20 college students and 15 house wives were participated.
- Field day on Mini feed mill for preparation of low cost balanced feed for rural poultry in Livestock farm complex, ICAR-CIARI / NABARD on 17.07.2021. A total 13 farm women and unemployed youth were participated.

### Kisan Gosthi

- Interaction with Custodian Farmers of Karen Community was conducted at Karen Welfare Community hall, Webi on 20th October 2021, wherein a total of 22 members (15 male and 7 female) participated.
- Farmers' outreach for Hon'ble Prime Minister live programme on 'Natural Farming' - Pre Vibrant Gujarat Summit 2021 Anandtelecasted on 16th December, 2021, wherein 225 farmers, 78 officials and staff were participated.

### Training /Demonstration

- One day training cum-awareness programme on "Cultivation of High Yielding Rice Varieties in South Andaman" was organised at Shoal Bay-19, Ferrargunj, SouthAndaman on 07th October 2021 for the benefit of rice farmers. A total of 30 (7 males and 22 females) farmers were benefited from the programme.
- One day training programme for the executive staff of Department of Environment and Forest on 08th October, 2021. This orientation was with an objective to disseminate the technology on scientific nursery and plantation management in Andaman Padauk of the most important endemic ornamental tree of Andaman and Nicobar Islands, wherein a total of 18 executive staff attended the training.
- Training-cum-awareness programme on Management practices in rice seed production at Madhupur, Diglipur on 19th October, 2021. Total of 55 farmers were participated (35 Male and 20 Female)
- An awareness programme on mud crab fattening was conducted at marine research laboratory on 25th October, 2021 wherein 28 farmers actively participated and were sensitized on the aspects of crab fattening.
- On farm training on "Humpsore treatment to improve reproduction and production performances in cattle at Indiara Nagar, Wandoor village from 6th to 11th November 2021, wherein 25 farmers attended.
- Cultivation and value addition of cut flowers for entrepreneurship development in A & N Islands" at NamunagarPanchayat hall for the SHG beneficiaries of Surabi NGO during 9th -11th November, 2021. A total of 41 SHG members attended the training. The trainees were given hands on training for preparation of different value-added products like bouquet making, flower arrangements, dry flower card making and use of flower petals for preparation of herbal tea.
- Training-cum-awareness programme on Management practices in rice seed production at Madhupur, Diglipur, North & Middle Andaman conducted on 19th October, 2021 for the benefit of rice farmers under AICRP seed (Crop) in collaboration with ICAR-CIARI KVK, Nimbudera. Total of 55 farmers were participated (35 Male and 20 Female).
- An awareness programme on "Scientific backyard farming" was conducted at the Panchayat Hall of Wimberlygunj on 20th November, 2021. A number of improved technologies related to horticulture and animal husbandry have been developed at ICAR-CIARI for the benefit of islands farmers and to disseminate those, creation of awareness is a key step. A total of 23 farmers/ farm women and entrepreneurs participated in the event.
- Demonstration cum Training programme on Quail farming at Biotech Kisan Hub, ICAR-CIARI from 22nd to 24th November, 2021, wherein 15 farmers attended.
- An awareness programme on "Scope of Diversified Value-added Fishery Products in Islands" on 25thNovember, 2021 at Kanyapuram Village, South Andaman. Different aspects of fish processing, good management practices, candidate species for value addition, and the scope of diversified value-added fishery products were sensitized. Further, different value-added fishery products prepared were displayed to the participants. A total of 26 women stakeholders have participated and benefitted from the programme.
- A demonstration programme on "Kitchen gardening in Urban and Peri-urban Spaces for Nutritional Security" was organized at ICAR-CIARI, Port Blair as a part of "Azadi ka Amrut Mahotsav" celebrations under NABARD- on 6th December, 2021.Anganwadi workers from 28 centres along with their supervisor attended the

programme.

- Three days hands on training programme on Entrepreneurship development of Tribal farming community through value added poultry products was organized in commemoration of Azadi ka Amrut Mahotsav- India@75 from 6th -8th December, 2021. A total of 16 Nicobari youth including 12 girls from Dollygunj and Vikas Nagar participated.
- An awareness programme on "Scientific Management of Kitchen Gardens for Health and Nutrition" was conducted at ICAR-Central Island Agricultural Research Institute, Port Blair on December 10, 2021 under "Azadi ka Amrut Mahotsav". Anganwadis play a vital role in the development of younger generations. Establishment and maintenance of kitchen gardens is one of the prime activities in this regard. The programme was conducted with the objective to impart knowledge to the participants on various aspects of kitchen gardening with special emphasis on immunity boosting plants. The programme had 21 participants from 19 Anganwadi centres of South Andaman, including 2 Mukhya Sevikas.
- Application of biotechnological tools in goat and rural poultry in DBT-biotech kisan hub, ICAR-CIARI/ DBT on 31.08.2021 to 04.0932021. A total 62 farm women and unemployed youth were participated.
- Quail farming was conducted in Livestock farm complex, ICAR-CIARI / DBT on 22-24, November 2021. A total 13 farm women and unemployed youth were participated.

**Training under Schedule Tribe Component**

| Title | Place | Nos. | Date |
|---|---|---|---|
| Awareness programme on zoonotic diseases and covid-19 of urban tribals | Division of Animal Science, ICAR-CIARI, Port Blair | 10 | 30th Oct, 2021 |
| Hands on training programme on Entrepreneurship Development of tribal farming community through value added poultry products | Division of Animal Science, ICAR-CIARI, Port Blair | 14 | 6th -8th Dec,, 2021 |
| Training programme on value added fishery products | Division of Fisheries Science, ICAR-CIARI, Port Blair | 20 | 01st – 03rd December, 2021 |

Training programme on "Value Added Poultry Products"

## Participation in national webinar/ conferences/ workshop/training/ group meeting

### Webinar/Conference attended

- Dr. B. Augustine Jerard, Principal Scientist has participated in the National Webinar on "Jackfruit and Banana: Potential crops for food and livelihood security" organized by ICAR-DCR, Puttur on 16th October 2021.
- Dr Augustine Jerard Bosco has participated in the2ndInternational Agrobiodiversity Congress, held virtually 15-18 November 2021.
- Dr. B. Augustine Jerard, Principal Scientist has participated in the virtual National Conference on Fruits and Vegetables for Health and Nutrition (FVHN 2021) held from November 08 – 10, 2021 hosted by KSTA in association with Vigyan Prasar, New Delhi, University of Horticultural Sciences, Bagalkot and ICAR- IIHR Bengaluru.
- Dr. B. Augustine Jerard, Principal Scientist has participated in the National Consultation on 'Plant-based Local Food Systems for Health and Nutrition' held on October 22, 2021 organized by Alliance of Bioversity International and CIAT, India Office, New Delhi, in collaboration with International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and Trust for Advancement of Agricultural Sciences (TAAS) through Indian Society of Plant Genetic Resources, ICAR-National Bureau of Plant Genetic Resources, New Delhi.
- Dr. B. Augustine Jerard, Principal Scientist has participated in the 30th Annual Group Meeting of All India Coordinated Research Project on Palms conducted during 22nd& 23rd November, 2021 through Virtual Mode and served as Chairman/ Panel Expert for the Technical Session on "Crop Production" and guided finalizing the Technical Programme for 2021-22.
- V. Baskaran and Abirami - Attended the 9th

Indian Horticulture Congress-Horticulture for health, livelihoods and economy held at CSAU of Agriculture and Technology, Kanpur, UP, India from 18-21, November, 2021 organized by Indian Academy of Horticultural Sciences (IAHS)

- K. Abirami -Participated in the national online training programme on "Conservation, management and utilization of horticultural genetic resources for livelihood and nutritional security" during 22-26 November, 2021 conducted by IAR-IIHR in collaboration with NBPGR, New Delhi
- K. Abirami -Attended the training programme on "Statistical designs and analytical methods for multi-factor experiments" organized by ICAR-CMFRI, Cochin from 8-17 December, 2021
- Dr. Ajit A. Waman and Dr.Pooja Bohra attended 2nd International Agrobiodiversity Congress (virtual) held at Rome, Italy during 15/12/2021 to 18/12/2021 and presented posters.
- Dr. Ajit A. Waman attended National Conference on 'Advances in Agriculture and Environment', organized by Loyola College, Vijayawada, Andhra Pradesh (03/12/2021-04/12/2021) and gave Oral Presentation.
- Dr. Ajit A. Waman attended Annual Group Meeting of the ICAR- All India Coordinated Research Project on Palms through virtual mode (November 22-24, 2021).
- Dr. I. Jaisankar, Senior Scientist, attended one day (01.10.2021) training on Germplasm registration in Horticultural crops conducted by ICAR-IIHR, bengaluru by virtual mode.
- Dr. I. Jaisankar, Senior Scientist delivered an invited lecture on role of bioshield for coastal protection and species suitability for coastal afforestation and restoration to the Kerala forest department officials on 09.10.2021 in Coastal restoration and conservation meeting conducted by Social Forestry Division of Kerala Forest Department.
- Dr. I. Jaisankar, Senior Scientist, participated virtual Regional Expert Consultation on Agroforestry for Environmental Resilience and Sustainable Livelihoods of Farmers in Asia-Pacific on 13th to 14th October 2021conducted by CIFOR and World Agroforestry (ICRAF, Nairobi).
- Dr. I. Jaisankar, Senior Scientist, participated three day Virtual National Conference on Fruits and Vegetables for Health and Nutrition on 8th to 10th November 2021 conducted by Karnataka Science and Technology Academy, Bengaluru.
- Dr. I. Jaisankar, Senior Scientist, participated and presented work plan of "Bio prospecting of Pandanus sp. (Kewda) of Andaman and Nicobar Islands for its medicinal properties" under NMPB fund, Ministry of Ayush, New Delhi project in the Research Advisory Committee meeting conducted by Department of Environment and Forests, Vansadan, Port Blair on 25.11.2021.
- Dr. I. Jaisankar, Senior Scientist, participated and presented Diversity for morphological and biochemical traits in Drynariaquercifolia (L.) J.Sm. in Andaman and Nicobar Islands, India in "International Conference on Vegetable Research and Innovations for Nutrition, Entrepreneurship and Environment (ICVEG-21)" held at ICAR-IIVR, Varanasi, UP during 14-16th December 2021 (Virtual).
- Dr. I. Jaisankar, Senior Scientist, participated National Conference (virtual mode) on "Value addition and Marketing of NTFPs" 0n 16.12.2021 conducted by Tropical Forest Research Institute, Jabalpur, Madhya pradesh and presented Potential of Macarangaleaves as an alternate for plastic plates in the ecologically fragile Andaman and Nicobar Islands, India.
- Dr. I. Jaisankar, Senior Scientist, participated 4th Webinar on implementation and use of ARMS conducted by IT Unit, ICAR-IASRI, New Delhi on 02.12.2021 (Virtual)
- Dr. Gladston .Y, Scientist attended the Webinar on "Use of Histological tools in fish biology" & "Estuarine health" By rainbow analytics in the month of November, 2021.
- Dr. Gladston .Y, Scientist attended the Webinar on "Natural Aquarium and vertical garden' by Rainbow analytics in the month of October, 2021.
- Dr. Gladston .Y, Scientist attended the Webinar on "How to be a more valuable scientist" in the month of October, 2021.
- Dr.Gladston, Y. attended webinar on economic impact of COVID-19 on fisheries and allied sectors on 2nd October 2021 organized by KUFOS, Kochi.
- Dr.Gladston,Y. attended webinar on development and implementation of vaccination of farmed fish on 9thOctober 2021 conducted by Rainbow analytics
- Dr. I. Jaisankar, Senior Scientist delivered an invited lecture on role of bioshield for coastal protection and species suitability for coastal afforestation and restoration to the Kerala forest department officials on 09.10.2021 in Coastal restoration and conservation meeting conducted by Social Forestry Division of Kerala Forest

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- Dr. B. A. Jerard, Principal Scientist has participated in the 2nd International Agro-biodiversity Congress held online from 15th to 18th November 2021.
- Dr. I. Jaisankar, Senior Scientist participated National Conference (virtual mode) on "Value addition and Marketing of NTFPs" on 16th December, 2021 conducted by Tropical Forest Research Institute, Jabalpur, Madhya pradesh and presented Potential of Macaranga leaves as an alternate for plastic plates in the ecologically fragile Andaman and Nicobar Islands, India (Virtual).

## Training

- Dr. Ajit A. Waman attended National Online Training Programme on"Conservation, Management and Utilization of Horticultural Genetic Resources" organized by ICAR-IIHR, Bengaluru during November 22-26, 2021.
- Dr. I. Jaisankar, Senior Scientist, attended one day trainingonGermplasmregistrationinHorticultural crops on 01st October,2021conducted by ICAR-IIHR, bengaluru by virtual mode.
- Dr Jai Sunder, Pr Scientist & Vigilance Officer, ICAR-CIARI attended online training programme on "Training workshop for Vigilance Officer of ICAR Institutes" organised by ICAR-NAARM from 16-18 August 2021.
- Dr. Jai Sunder, Pr Scientist & I/c PME Cell attended online training programme on "MDP on PME" organised by ICAR-NAARM from 25 to 30 October, 2021.
- Dr. Jai Sunder, Pr Scientist & I/c PME Cell attended "Workshop on DRIVER software" organised by ICAR-NAARM on 24 November, 2021.

## Meeting

- Dr. Deepitha R attended a virtual meeting organized by NIFTEM Thanjavur on 16th November, 2021 as part of the capacity building component under PMFME scheme, regarding the discussion on the status and way forward for District Level Trainers (DLTs) under PMFME component.
- All the scientists'along with Director of the Institute attended the interactive meeting between DG, ICAR and the young scientists on 08th December, 2021.
- Dr. Jai Sunder, Pr Scientist & PI, AICRP on ADMAS attended "Annual Review meeting of AICRP on ADMAS" organised by ICAR-NIVEDI on 24 November, 2021.

## Celebration

### Vigilance awareness week- 2021


Vigilance awareness week celebration

Vigilance awareness week was celebrated in ICAR CIARI 26th October, 2021 to 1st November, 2021 on the theme "Independent India @75: Self Reliance with Integrity in which Essay Writing Competition, Awareness Programme on Ill-effects of Corruption, Painting Competition, Seminar on Policies / Procedures of the organization and preventive vigilance measures and Awareness Rally on Vigilance was conducted, A total 150 (staff and students) were participated.

## ICAR-KVK-CIARI celebrates Constitution day, holds Technology demonstration

ICAR-KVK-CIARI celebrates Constitution day to commemorate the adoption of constitution on 26th November, 2021 in Krishi Vigyan Kendra, South Andaman. In the event many scientists were spoke on the genesis of Constitution day, importance of Constitution in shaping the overall development of the country and also spoke on the role of CIARI/ KVK in Agricultural technology development in the island. A total 35 students were participated


Observance of Constitution day

## New projects/initiatives

- V. Baskaran, K. Abirami, Augustine B. Jerard, T. Subramani and Zamir Ahmed organized a" Field Day cum launching of NABARD project on "Horticulture based roof top production model for nutritional and sustainable livelihood in urban households of South Andaman" at 3 govt and PSUs and five households in different places of South Andaman on 7th October, 2021.
- Two noni germplasms registration proposals were prepared viz., HD-6 and TRA-1 and submitted to ICAR- NBPGR, New Delhi for their registration on 10.12.2021.
- A freshwater ornamental fish unit was developed at the ICAR-CIARI wherein different varieties of guppies, fighting fishes. Gold fishes, koi carps, sword tails and gouramies were maintained. For the first time, Siamese fighting fish (Bettasplendens) was bred successfully with seed production protocols standardized. Package of practices on breeding and seed production of guppies were standardized during the period.
- To develop a policy road map or brackish water aquaculture sector of Andaman and Nicobar Islands, farmers practicing brackish water aquaculture were identified from the South Andaman district through field surveys and snowball sampling approach. Farmers practicing crab culture, shrimp farming and fish culture were identified and data on their farming practices, gaps and operational constraints were identifiedthrough a questionnaire.

## Infrastructure development

### Dweep sale point at ICAR-CIARI

With an objective to provide Quality Planting material of different horticulture crops like fruits, vegetables, tubers, flowers, spices, plantation, medicinal plants along with agriculture, fisheries, animal husbandry component and their farm products, ICAR-CIARI has

Inauguration of Dweep sale point

started Dweep Sale Point at its Garacharma Research Complex.

### Farm produce sale point at Krishi Vigyan Kendra, South Andaman

Farm produce Sale Point of KVK, Sippighat inaugurated by Director, CIARI at Sippighat, South Andaman, Port Blair with an objective to provide quality planting material of different horticultural crops on 17th November, 2021.


Inauguration of Farm produce Sale Point

## Appointment/Promotion/Transfer/Superannuation /Obituary

### Promotion

- Smti. Gyanam,TSM to Skilled supporting staff on 24/12/2021
- Shri. R. Dharma Rao, TSM to Skilled supporting staff on 24/12/2021

- Shri. Krishna Roy, TSM to Skilled supporting staff on 24/12/2021
- Shri. C.H. Sampat Rao,TSM to Skilled supporting staff on 24/12/2021
- Shri. Deep Kumar Mukherjee, Skilled supporting staff to Technician on 24/12/2021
- Smti. Champa Rani Das, Skilled supporting staff to Technician on 24/12/2021
- Shri. R. Simachalam, Skilled supporting staff to Technician on 24/12/2021
- Shri. Ali Akbar, Skilled supporting staff to Technician on 24/12/2021

**Transferred**

- Shri. Sushil Kumar Singh, SAO to ICAR-Indian Institute of Wheat and Barley Research, Karnal 132001 Haryana on 05/10/2021.
- Dr. D. Basantia, SMS to Eastern Regional Station, Kalyani. The Eastern Regional Station (ERS) of National Dairy Research Institute (NDRI), Kalyani, West Bengal on 30/12/2021.

**Superannuation**

- Dr. L. B. Singh, SMS, KVK, South Andaman on 31/12/2021


भाकृअनुप
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