ISLAND AGRICULTURE

ICAR-CIARI NEWSLETTER

ICAR-CENTRAL ISLAND AGRICULTURAL RESEARCH INSTITUTE
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Andaman and Nicobar Islands, India

Vol. XIII. No.4 **October to December, 2020**

From Director's Desk

Our Institute has done exceedingly well during the quarterly period from October to December 2020. The period has seen remarkable progress in research, training programmes, celebration of events for the farmers/stakeholders.

Our scientists have identified a unique red ginger variety which produces six multiple spikelets, a unique dwarf areacanut accession, characterized an accession of dragon fruit for phytochemical properties, developed improved structure for broad dhania and collected genetic resources of bread fruit and nut. A unique process has been developed to save the circulated water in the laboratory and named it as CIARI Aquasaver. Occurrence of spiralling whitefly in coconut was also noticed and subsequently effective management practices were suggested to farmers and line department. Studies on the assessment of soil and nutrient losses from agricultural land uses revealed the need for conservation agriculture or modification of existing agricultural practices. Climate resilience of improved paddy varieties showed that Gayathri variety withstands prolonged submergence during incessant rains. Morphometric and phenotypic characterization of Andaman local duck (ALD) was done. For the first time in India our scientists have done the molecular characterization of Sarcoptes scabiei and studied the host parasite interaction in pig. Successful treatment package has been developed and named as Gau Maa Raksha to treat Hump sore in cattle. Three new fish species have been discovered and valuable information added on the bio diverse nature of Andaman and Nicobar Islands.

During the period a number of National webinar series were organized for entrepreurship development in the field of agriculture and allied sector. A workshop cum stakeholders meeting was organized to interact with the small, medium and large agri entrepreneurs of these Islands. Along with rest of the country, we celebrated the Vigilance awareness week, Gandhi jayanti, Swachh Bharat activities, Rashtriya Ekta Diwas, Rashrtriya Kisandi was and World Soil Day by following strict social distancing or through online mode. The Institute has switched over to BSNL connectivity to improve the Internet facilities. I take this opportunity to thank all the staff members of our institute for their dedication and hard work for overall development of the institute.

Research Highlights

Characterization of Dragon fruit

Dragon fruit accession 'DGF 5' collected from Kerala fruited two years after planting in the main field. The proximate composition and phytochemical composition of fruits were assessed and documented. The Flavonoids (mg rutin/100g) and DPPH (mg BHT/100g) content was found to be 198.3 and 211.4 respectively. Total Soluble Solid (TSS) and vitamin C was 11.5 ^{o}B and 3.3 mg/100g respectively. The colour of the peel is attractive red with contrasting green bracts and the pulp colour is white with pink tinge.

Fruits of dragon fruit accession DGF 5

Unique Red Ginger Identified

Red ginger (*Alpinia purpurata*) accession was found to produce six multiple spikelets of florets from single spike. This is one of the unique accession observed among the red ginger types and may be further exploited for crop improvement considering the ease of propagation and beauty of flowers.

Unique Arecanut Dwarf Developed

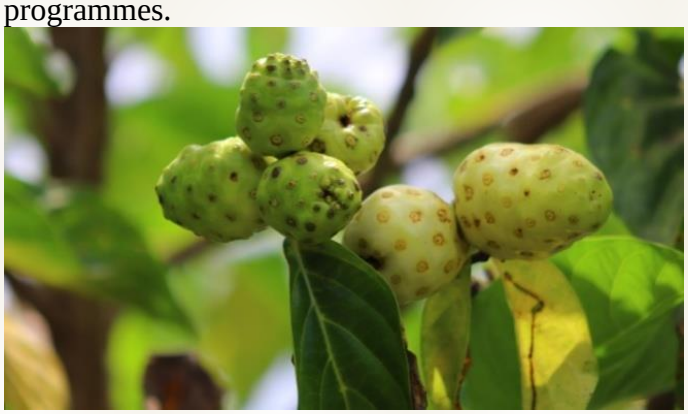
Arecanut palm is the predominantly grown crop in Andaman and Nicobar Islands next to Coconut palm which gives much remuneration to farmers. Characterization of a dwarf arecanut which was collected and conserved at ICAR- CIARI for palm morphology revealed that the dwarf type has noticeably short internodes, dense crown with closely arranged leaves and short inflorescences producing bolder nuts. Observations on seedling parameters revealed that more than 80% of the progenies of these dwarf type palms are found to be uniform for seedling traits such as germination, seedling height, number of leaves and collar girth of seedlings. The unique arecanut dwarf accession has immense potential for utilization in breeding for dwarfness in arecanut and has great opportunity to use for ornamental planting owing to the beautiful appearance of foliage and bunches at incredibly low height. The palms observed to produce bunches within 60 cm of height with closely arranged leaf scars. Other unique features such as compact canopy with shorter, dark green leaves, shorter inflorescences, and highly fragrant flowers make this dwarf type distinct from the common tall cultivars. The estimated chali yield of the dwarf arecanut palms ranged from 1.8 kg to 2.8 kg/palm/year. Comparison of 30 years old tall and this dwarf type palms revealed that the dwarf palms reached a height of 3 to 5.3 m whereas the tall type palms reached over 15 to 20m height.

A compact block of this dwarf arecanut is established at Sipighat farm of ICAR-CIARI. The seed nuts of this unique type were deposited with National Active Germplasm Site for arecanut, ICAR-CPCRI,

Kasaragod for conservation at National Gene Bank.

Unique cluster bearing noni (*Morinda citrifolia*) accession

A unique, cluster fruit bearing tree was identified among the seedling progenies of noni at its Garacharma Research Farm wherein a cluster of 4 to 5 obovate elongate fruits are borne at each of the alternate nodes. In normal types, one or two fruits are recorded whereas, in the identified unique tree, it ranges from four to five. The large sized fruits weighing 307 g each attain a maximum length of 11.70 cm and width 5.9 cm. The yellowish green fruits exhibit a smooth texture with green floral eye rings. This cluster bearing type is considered unique owing to the higher yield potential in terms of number of fruits per tree, weight of fruits per tree, regular bearing and uniform sized fruits makes them suitable for processing. The identified tree is propagated through stem cuttings to ensure the perpetuation of cluster fruit bearing character in vegetatively propagated progenies. The unique noni type has potential to be used in breeding programmes.



Improved structures for Broad Dhania

A new multi-tier pro-tray cultivation system for commercial cultivation of Broad Dhania or Burmese coriander in urban and peri-urban areas was developed. In this vertical type of system, Burmese coriander is grown in pro-trays which are arranged in vertical racks of variable size.

Another simple, hanging model vertical structure was developed and tested to meet the household requirement of Burmese coriander production. The model is fabricated in such a way to accommodate 40-75 plants at a time. Due to the simple hanging nature, it required very less space and could be easily hung in the balconies/ terraces for effective production of the herb.

Prototype of water saving system for laboratories

Various processes are employed in laboratories for which cold water is required to be circulated throughout the extraction process, which may last for hours. To save this circulated water, a system was developed and named as *CIARI Aquasaver*

Bread fruit and Bread Nut accessions for promotion as future food crop

Bread fruit (*Artocarpus altilis*) and Breadnut (*Artocarpus camansi*) are important food crops in several Island nations around the world and is sporadically grown in Andaman and Nicobar Islands also. Bearing in mind, the potential for promotion of

Bread Fruit

Bread Nut

this important food crops a survey was conducted in different parts of South Andaman and ten accessions of Bread fruit (*Artocarpus altilis*) and one accession of Breadnut (*Artocarpus camansi*) were collected. Trees were also marked to collect suckers/ cuttings for propagation, and fruits for analyses. Further, 100 seedlings of bread nut were raised and 35 suckers of bread fruit separated out from the mother trees for evaluation.

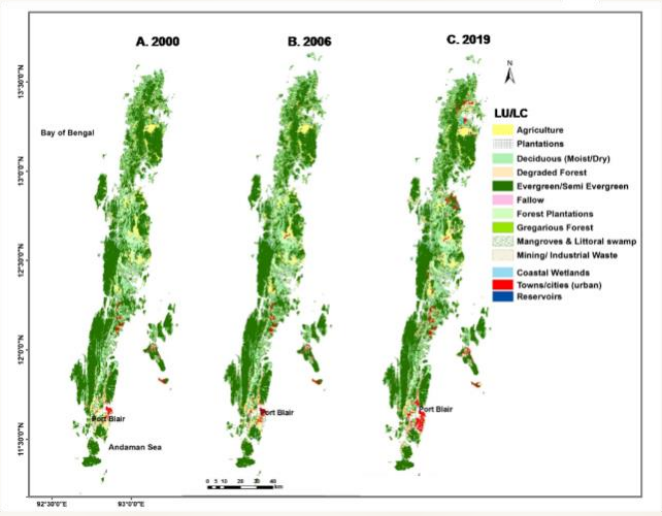
Occurrence of spiralling whitefly in coconut

Occurrence of four different species of whitefly population was noticed and recorded in coconut especially dwarf palms in South Andaman *viz*., rugose spiralling whitefly (*Aleurodicus rugioperculatus), spiralling whitefly (Aleurodicus disperses) and* nesting whitefly (*Paraleyro desminei).* The incidence of rugose spiralling whitefly which is considered serious in mainland was noticed in several parts of South Andaman mostly on Andaman Yellow and Orange Dwarf palms whereas Andaman Ordinary Tall had lesser incidence. Similar observation was noticed for nesting whitefly. Eco-friendly management is suggested to manage the pest *viz.*Installation of yellow sticky traps @ 5 /acre is recommended, in severe cases, spray only neem oil 0.5% or neem seed kernel extract (NSKE) 5%. Spraying any form of insecticides is to be avoided. Water spray by jet propulsion is effective in dislodging the insect colonies.

Land use / cover change and land degradation

Accurately mapping land use and land cover is the key step in change detection, which can be spatially linked to analyze land degradation. In a study three set of time period composite satellite data (2000, 2006 and 2019) was used to detect changes with overall accuracies of 86.5% for 2000, 87.3% for 2006 and 90.6% for 2019. The results showed substantial change in the land use of the Andaman Islands. Forest was the dominant land cover, accounting for 85.72, 85.11 and 81.35% of the total geographical area (6400 km2) during 2000, 2006 and 2019, respectively. However, drastic changes in LULC were observed during the 2006-2019 period. Forests accounted for the maximum decrease in area (4.37%) due to the conversion of land into plantations, mines, and degraded land.

With respect to cultivation activities, the annual crop area decreased by 27 km^2 during 2006-2019, while the plantation crops area increased by 29 km^2. In general, anthropogenic activities such as the expansion of agriculture into forest fringe areas, intensive cultivation of disordered land, conversion of agricultural land into urban land use, sand mining, quarrying, land leveling, urban and infrastructure development, deforestation, and abandonment of agricultural lands due to increased natural hazards contributed to the LULC change during 2006-2019.

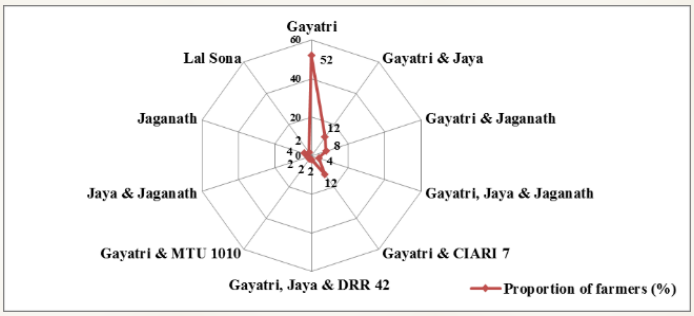


Assessment of soil and nutrient losses from agricultural land uses

Agricultural activities in Andaman and Nicobar Islands expose surface soils to rainfall, which carry away a huge amount of top fine soil particles along with macro, major and micro nutrients to the Sea through low lying streams/nallahs. Therefore, to study behavior of runoff, soil and nutrient losses to various rainfall events, runoff plot experiments are conducted in different agricultural land use practices in South Andaman in plantation and plantations based inter cropping systems Runoff, soil and nutrient losses were quantified for different erosive storm events in the established plots. This study revealed the need for conservation agriculture or modification of existing agricultural practices of Island farmers based on quantified soil and nutrient losses information.

Climate resilience of improved paddy varieties

The climate resilience of improved paddy varieties promoted/developed by CIARI was studied in Diglipur Tehsil of North & Middle Andaman district and found that 52% cultivate only Gayatri variety of paddy. 72% of farmers perceived that Gayatri withstands prolonged submergence during incessant rains, 64% felt that it has no lodging tendency thanks to strong stem (16%) and dwarfness (15%) which result in higher yield (42%). 38%, 24% and 10% of farmers felt that the variety attracts comparatively less pest, disease and weed incidence respectively, its late maturity helps to escape the untimely rains during the harvest season in September-October (35%). While the variety demands no fertilizer (12%), it produces long tillers (8%).



A comparative economic analysis between improved and traditional paddy varieties shows that, Gayatri earns a net income of Rs.28,725/ha with B-C ratio of 1.48, while Jaya earns only Rs.8,580/ha with B-C ratio of 1.14 due to increased expenditure on one hand and reduced yield on the other.

Characterization of Andaman Local Duck (ALD)

The physical characters *viz*., plumage colour and pattern, colour of bill, shank, skin and eye of both were studied.

Drakes: The plumage colour and pattern depicted that drakes have dark greenish head with white band on neck. They have brownish feathers on the breast and belly are light grey, dorsal side light grey feathers.

Ducks : Breast and belly of ducks are white. Their feathers are black and brown in colour.

Bills of both sexes are spoon shaped yellowish with presence or absence of black tip. Their skin colour of the body is a black. The shank colour is yellow /

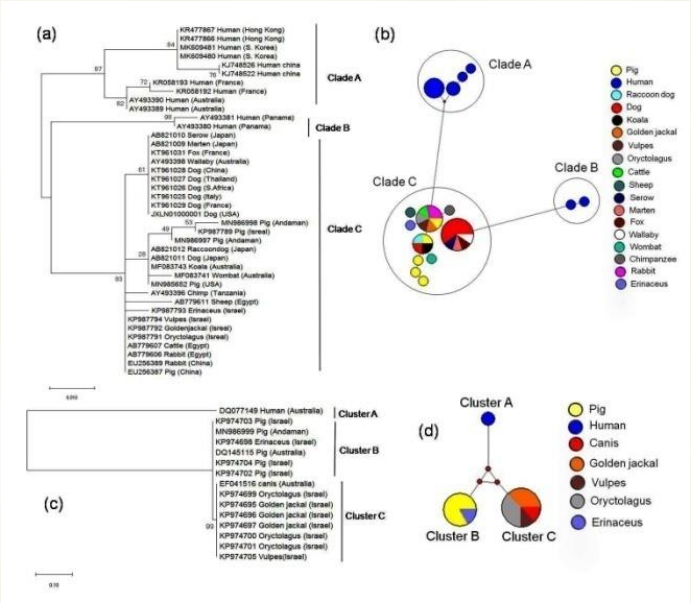
brownish /black. They have black coloured eyes, webbed and yellow coloured feet.

The annual egg production is ranged from 240 to 290 numbers with clutch size from 25 to 80 days and clutch interval of 15 to 65 days. The mean egg weight is from 41 to 56 g.

The reproduction performance in terms of fertility and hatchability is extremely good. The mean body weight at day old and age (6 months) of sexual maturity were 42.13 ± 2.10 and1179.05 ± 20.32. The average adult (12 months) body weight ranges from 1194 to 1770 gms.

First molecular characterization of *Sarcoptes scabiei* from India

Scabies or mange caused by *Sarcoptes scabiei* causes severe itching to the host. It has a wide host range including human, farm animals, companion animals and wild animals. It is an emerging /re-emerging disease with high prevalence in underdeveloped and developing countries. The disease has zoonotic importance and is of significant public health concern as cross-transmission or species jumping is very common. We characterized *S. scabiei* in Nicobari pigs. For molecular confirmation, one mitochondrial gene (COX1) and one nuclear gene (VSSC) were amplified using *Sarcoptes* specific primers and sequence information was generated. COX1 based phylogenetic tree indicated three distinct clades; two for human isolates (Clade A and B) and one for animal isolates (Clade C). From the phylogenetic tree, it was evident that the Andaman isolates were phylogenetically close to pig isolate of Israel. Phylogenetic tree based on VSSC sequences showed three host specific distinct clusters, one for human isolate (Cluster A) and other two for animal isolates. Pig isolates of Andaman belonged to Cluster B with pig isolates from Israel, Australia and erinaceus isolate from Israel.



Innovative Trimodel therapy (*Gau Maa Raksha*) to treat Humpsore

Hump sore caused by a filarial worm is a common problem of cattle in Andaman and Nicobar islands. This disease is chronic in nature and causes loss of milk production. To control the disease, scientists of Animal Science Division, ICAR-CIARI have developed a treatment schedule.

Before treatment

After treatment

Humpsore is cleaned with a mild liquid soap to remove the dirt and crusts.Un-ripened papaya mist is applied on the wound for about 20-30 min for first three days to digest the dead tissues. Antiseptic and fly repellent ointment is applied daily to check bacterial and fungal infections for 30 days. Injection

of Ivermectin (200µg/kg body weight) or Doramectin (300µg/kg body weight) is done by subcutaneous or deep intramuscular route, respectively at fortnight interval for a month. Diethylcarbamazine citrate 6 mg/ kg body weight is administered orally in morning daily for 30 days. In place of commercial ointment, one can prepare a paste which is made up of 100 ml neem oil or coconut oil + 5 camphor + 50 g turmeric powder + 1 lemon.

This treatment methodology is economic, effective, less recurrence, sensitive and specific as well for cattle and buffaloes. The methodology has improved milk yield (25-30%) and fertility rate (30-40%). It reduced the stress level and nuisance due to humpsore (decreased malondialdehyde: 15-20% and cortisol: 20-25% and increased total antioxidant capacity: 5-10%, superoxide dismutase: 20-30%, catalase: 12-30%).The methodology has also reduced the inter-calving interval and improved estrus induction rate and growth rate in heifers.

New discovery of aquatic biodiversity

A species of rice fish *Oryzias* sp was collected from the streams of South Andaman and Great Nicobar and DNA barcodes were developed for molecular and conventional taxonomic description.

The Analysis revealed the *Oryzias* sp as new species and this is the first description of species from genus *Oryzias* in Andaman and Nicobar Islands. The identity of the species was further validated using the partial cytochrome c oxidase subunit I gene. Further exploratory studies on the marine biodiversity has led to the discovery of the new distributional records of Blacklash scorpion fish, *Pontinus nigerimum*

Eschmeyer, 1983 and Small eye ariomma, *Ariomma brevimanum* (Klunzinger, 1884) from Andaman and Nicobar Islands. The species identification was confirmed through conventional and molecular taxonomy. These reports have added valuable information on the bio diverse nature of Andaman and Nicobar Islands.

Oryzias sp

Pontinus nigerimum

Ariomma brevimanum

Enhancing tribal farmers' income : a case study from Car Nicobar, Andaman & Nicobar Islands

The Krishi Vigyan Kendra, Nicobar District has adopted a Nicobari tribal farmer in 2016-17 who was practicing traditional *tuhet* system of subsistence farming and guided him with technological know-how and do-how of vegetable cultivation. In a span of 4 years, the farmer has brought 4,550 m^2 of his hitherto fallow land of 2 ha under vegetable cultivation. By incorporating 8 to 15 vegetable crops, the diversification index of the farm increased from 0.58 to 0.77. Even as the acreage under high value vegetables increased, he simultaneously accommodated other crops in minor proportions to tide over production and marketing risks. Thus, through area expansion, technological adoption, diversified cropping pattern, efficient resource

management and tactical marketing, the farmer's gross income has increased 5.5 times from Rs.93,561 to Rs.5,15,935 while the net income has increased almost 12 times from Rs.36,711 to Rs.4,28,872.

Success story

Unconventional approach to treat probable case of mycotoxicosis/toxicosis of feed origin

A farmer at Port Blair who rears average of 500 birds faced 20% mortality over a period of 12 days. The scientists team from the Institute inspected the condition.

Based on the post mortem finding and ineffectiveness of antibacterial, anticoccidial and anti-mycoplasma compounds, the scientific team suspected the cause of death as non-infectious origin. The farmer was advised the following treatment/suggestion:

1. Withdrawal of existing feed and feeding of crushed maize with incorporation of 0.5 g copper sulphate per kg of feed.

2. Sugarcane molasses @ 10g per litre of water continuously for five days.

3. Curd @ 10g per litre of water once daily for five days.

4. Protinex, a commercial health drink powder was added @ 10 g per litre of water twice daily as a source of energy, carbohydrate, protein, iron, calcium, phosphorus and sugar.

5. Twenty four hour after the treatment the mortality reduced to zero, which indicated that, toxicosis was of feed origin and this treatment regime is of high value since the same has reduced the mortality.

Awareness/Training conducted

Biotechnological tools under BIOTECH KISAN-HUB

A five days hand on training was conducted from 30th Sept., to 14th October, 2020 on biotechnological tools such as vaccination in rural poultry and application of FAMACHA for detection of anaemic goats. Farmer fellows were trained how to use the FAMACHA card for scoring the anaemic goats and tagging for animal identification. Blood samples of goats and poultry were collected for testing the immunity and blood profile and faecal samples have been taken for testing worm loads. Besides, Ranikhet disease vaccination in poultry was demonstrated for the farmer fellow ambassadors. A total of 500 birds were vaccinated and 40 goats were tagged and dewormed. A total of 30 farmers were given practical awareness through this mass vaccination and deworming in villages *viz*., Wandoor, Hasmatabad and Manpur.

To combat malnutrition and boost-up immunity during COVID-19 pandemic

Institute conducted "One day special programme to combat malnutrition and boost-up immunity to fight COVID-19 for tribal children and mother" on 7th October, 2020 at Institute premises. The main objective of programme to aware participants about immunity. Lectures were delivered on balanced nutrition for children under 6 years, pregnant women

nutrition and care, iron deficiency and use of locally available vegetables and fruits for nutrition and immunity boosting. Immunity boosting kit (fruits, nutria-mixture/drinks, honey etc.) were also distributed during the occasion among participants.

Dairy Farming as an alternate livelihood option

Three days training programme on "Dairy Farming as an alternate Livelihood option" was conducted for rural youth at Karmatang from 07th to 10th October, 2020 by KVK, N&M Andaman. The KVK experts delivered lectures on different aspect of dairy farming such as selection of dairy cattle, housing management, clean milk production, balancing of dairy ration, improved feeding practices involving local feed resources, value addition of milk and other livestock products, routine farm operations, record keeping and economics of small holder dairy farm. A film show on modern dairy farming was also arranged for the participants. A total of twenty three participants were benefitted from this program.

Training programme cum front line demonstration on humpsore treatment

Five days training programme on "Front Line demonstration on humpsore treatment" was organized jointly by Institute, KVK South Andaman and NABARD, wherein a total 16 progressive farmers from different villages of South Andaman participated. The training objective is to control and manage the disease and spread awareness and brought knowledge for humpsore management. The experts delivered their talks in various aspects of humpsore starting from prevalence to treatment and control and its economic impact on dairy farms.

Pulses cultivation and seed distribution for cluster frontline demonstration

On the occasion of National Kisan Diwas, one day training-cum-awareness on cultivation of pulses in rice fallow lands of Andaman and Nicobar Islands was organised at KVK, Sippighat on 23rd December, 2020 and high yielding CIARI pulse varieties (green gram and black gram) distributed under cluster frontline demonstration (CFLD) program of KVK, Port Blair. A total of 18 farmers (4 Male and 14 Female) were participated and benefited in the program.

Workshop cum stakeholders meeting

ITMU, CIARI and Dept. Agriculture, Animal Husbandry and Veterinary Services, A&N Administration jointly organized one day workshop cum stakeholders meeting on 28th October, 2020. The Secretary, Dept.Agri.AHVS, Ms. V.Reddy, IAS was the Chief Guest. The General Manager, NABARD, Shri.V.Mashar was the Guest of Honour and Shri BishnuPada Ray, Hon'ble Ex MP was the Special Guest for the meeting. The meeting was organized to interact with the small, medium and large agri

entrepreneurs of these Islands. A total of 20 different categories of farming entrepreneurs gathered during the meeting and deliberated on island agriculture.

MEDP on floriculture and value addition

Institute facilitated a NABARD sponsored training programme held at Andaman and Nicobar Cooperative Union, Port Blair from 10th to 25th November 2020. The thirteen days MEDP cum training programme on "floriculture and value addition" covered the opportunities for commercial floriculture including information on cut flower production, speciality flowers, bouquet making & dry flower technologies. A total of fifty SHG members got benefitted during the programme.

Entrepreneurship development in feed based aquaculture

A training programme on "entrepreneurship development in feed based aquaculture" was organized for the Island farmers from 23rd – 27th November, 2020 at its Garacharma complex. with the financial support from NABARD, Port Blair. During the programme, farmers were exposed to various facets of feed based aquaculture such as candidate species for culture, selection of feed ingredients, familiarization with feed mill & machineries, hands-on training on carp grower and starter feed preparation, types of feeding methods, storage of fish feed & ingredients, record keeping & harvest of fish. Besides, farmers were taken for field visit to a model fish farm at Bimblitan. The prepared feeds were distributed to the farmers during the programme. A total of 18 farmers from different parts of South Andaman have participated.

Eco –friendly bamboo straw making

Deen Dayal Antodaya Yojna –National Urban Mission, Port Blair Municipal Council (DAY-NULM, PBMC), Dairy farm in collaboration with ICAR-KrishiVigyan Kendra, CIARI, Port Blair organized a five days skill training programme on bamboo straw making for urban women at Sippighat. Bamboo straws offer a great alternative by transforming a single–use harmful plastic straw into a completely natural, organic and eco-friendly straw. Bamboo straws are biodegradable and don't require any high – energy processes for its preparation.

Health and nutritional awareness for prevention of malnutrition in women and children

KVK, N & M Andaman organised three days training programme on "health and nutritional awareness for prevention of malnutrition in women and children" for extension functionaries of North& Middle Andaman, at Gram Panchayat Hall, Rangat from 22nd to 24th December 2020. The objective of the training is to aware participants about significance of low cost locally available nutrient dense food in combating malnutrition among vulnerable sections of the society. The training also included demonstration of various low-cost nutritious recipes prepared from the locally available produce/ingredients.

Rural horticulture work experience programme (RHWEP)

CIARI has implemented the rural horticulture work experience programme (RHWEP)of Mr. Adit Kumar Yadav, final year B.Sc.(Hons.) Horticulture student of Dr. Y.S.R. Horticultural University, Andhra Pradesh at South Andaman district for a period of 4 months from September to December 2020, in view of COVID-19 pandemic. During the programme, a scientific team chaired by Dr. B.A. Jerard, Director and coordinated by L.B. Singh (Crop Production), Dr. V.K. Pandey (Plant Protection), Dr. R. Jaya Kumaravaradan (Rural Economics), Dr. S.K. Zamir Ahmed (Extension Programme) and Dr. Jai Sunder (Research Station Activities) monitored the 20 credit work plan of the student under the host farmer Smt. KamachiChellammal of Rangachang village.

Celebrations

Mahilakisan divas

Mahilakisan divas was celebrated at ICAR-CIARI-KVKs in three districts with great zeal & enthusiasm along with rest of the nation on 15th October 2020, wherein a total of 135 farm women participated. On this occasion various programmes like cookery competitions on traditional recipes, Kisan gosthis, debate, essay and drawing competition were organized. The exhibitions on display of handicraft items, value added food products and farm produce were also displayed by the farmwomen.

World Soil Day

World Soil Day – 2020 celebrated at ICAR-CIARI-KVK, Sippighat with the theme of "Keep Soil Alive, Protect Soil Biodiversity". The programme was started with a rally by the participating farmers , farm women and officials at around the Sippighat for creating awareness among the public through holding banners, placards and slogans on importance of soil and its conservation, pollution control for maintaining soil health followed by an awareness programme and open quiz. A total of 50 farmers, officers and staffs have participated.

150th birth anniversary of Mahatma Gandhi

150th birth anniversary of Mahatma Gandhi was celebrated at ICAR-CIARI. During the weeklong programmes various events were conducted *viz*.

planting of trees, cleanliness drive, mass awareness on cleanliness, painting competition etc. A special lecture on "Marine pollution and health hazards" was organized in collaboration with NIOT. In addition to this, poem / short story/share short documentary was filmedon "Gandhi – the guiding spirit".

Vigilance Awareness Week

The institute has observed the vigilance awareness week during 27th October to 2nd November 2020. Pledge was administered to the staff of CIARI by the Director. Various competition and lectures were conducted on the theme "Satark Bharat, Samridh Bharat (Vigilant India Prosperous India).

Rastriya ekta diwas

National Unity Day Pledge were administered to the officers and staff of CIARI and was celebrated in commemoration with the birth anniversary of Shri. Sardar Vallabhbhai Patel.

National webinar series on entrepreneurship development in agriculture

National webinar series was organized on "Agricultural Production and Entrepreneurship Development in Andaman Islands in COVID Scenario" through Technological Interventions from 1st -23rd, October 2020 under Institute Technology Management Unit (ITMU) & Priority setting Monitoring & Evaluation Cell (PME Cell). A total of 23 Scientists of ICAR-CIARI, Port Blair were the speakers and they briefed various practices/technologies for development in agriculture and allied sector. A total of 35 participants including researchers, academicians, entrepreneurs and students attended the webinar series from all over the country and actively interacted with the speakers on every day. Depending on the topics the participants ranged from 25 to 75 on all the 23 days.

National Webinar on enhancing livestock productivity

Institute Technology Management Unit (ITMU)has organized a series of webinar lecture series on controlled breeding programmes in Livestock species from 16-23rd November, 2020, bioinformatics and statistical tools in livestock research from 16-23rd November 2020 and strategies to improve pig production at present arena from 26th November 2020 to 7th December 2020.

National webinar on urban and peri-urban horticulture

National webinar on urban and peri-urban horticulture was organized in collaboration with National Bank for Agriculture and Rural Development (NABARD), A&N Regional Office, Port Blair on 25th November, 2020 to create awareness among the city dwellers about scientific management practices for their gardens in urban and suburban areas. The webinar imparted scientific knowledge about cultivation of important immunity boosting species. Participants from seventeen states/ UTs of the country including Andaman and Nicobar Islands registered for the event and actively participated.

Institute Research Committee meeting

XIII Institute Research Committee (IRC) meeting for the year 2020 was held from 7 to 9th December 2020 under the Chairmanship of Director, ICAR-CIARI. Presentation was given by all the Scientist/PIs and detailed discussions were held on the progress report of the respective ongoing/concluding projects. Dr. B. Augustine Jerard, Director, ICAR-CIARI as Chairman (IRC) has reviewed the ongoing projects. Dr. Jai Sunder, Pr.

Scientist & I/c PME& Member Secretary IRC organized the IRC meeting.

OTHER TRAINING PROGRAMME

Training details	Date	Venue	No. of participants
Nutritional security through maize and vegetable cultivation	04th - 6th Oct., 2020	Big Lapathy Village, Car Nicobar	27
Dairy Farming as an alternate livelihood option	07thto 09th Oct.,2020	Karmatang, North & Middle Andaman	23
Scope and use of plastics in farming practices	12th to 15th Oct., 2020	Prafullyanagar, North & Middle Andaman	15
Scientific cultivation of maize through inter cropping system	13th - 15th Oct., 2020	Kinyuka Village, Car Nicobar	26
Scientific goat farming	16th - 19th Oct., 2020	Kinyuka Village, Car Nicobar	42
Balanced diet for rural women and children	19th to 21st Oct., 2020	Tugapur, North & Middle Andaman	24
Enhancing farm income through value addition of livestock products	21stto 23rd Oct., 2020	Basantipur, North & Middle Andaman	23
Scientific tuber crop cultivation	27th to 28th Oct., 2020	Shantipur, North & Middle Andaman	23
Integrated farming system for rural prosperity	09th - 11th Nov., 2020	Perka Village, Car Nicobar	25
Mushroom cultivation	20th to 21st Nov., 2020	Diglipur, North & Middle Andaman	26
Scientific bee keeping practices	20th to 21st Nov., 2020	Diglipur, North & Middle Andaman	16
Backyard pig farming for enhanced livelihood security	23rd to 25th Nov., 2021	Jaipur, North & Middle Andaman	27
Entrepreneurship development in feed based aquaculture	23rd to 27th Nov., 2020.	CIARI, Port Blair	18
Scope of organic farming in middle andaman	2ndto 4th Dec., 2020	Betapur, North & Middle Andaman	24
Scientific pig farming	17th - 19th Dec., 2020	Tapoiming Village, Car Nicobar	37
Scope of commercial floriculture under island cultivation	22nd to 26th Dec., 2020	Basantipur, North & Middle Andaman	24
Health and nutritional awareness for prevention of malnutrition in women and children	22nd to 26th Dec., 2020	Rangat, North & Middle Andaman	22

Participation in National Seminars/ Symposia/ Conference/Workshop /Webniar

Topic	Date	Venue	Organizer	Name of the participants
Training on "Agricultural Production and Entrepreneurship Development in Andaman Islands in COVID Scenario through Technological Interventions"	01st -23rd Oct., 2020	CIARI	CIARI & NABARD	All Scientists, Sanjay Kumar Pandey and Zachariah George
Meeting with the Hon'ble Agriculture Minister, New Delhi with all KVKs with regards to FPOs, Farmers' bills and MSP on crops	3rd Oct., 2020	Online	Ministry of Agriculture and Farmers Welfare	Sanjay Kumar Pandey and Zachariah George
Global summit on responsible AI for social Empowerment (RAISE-2020).	5th Oct, 2020	Online		B.A.Jerard& All HoDs
Workshop on Natural Dyes	06 Oct.,2020	Online	Forest College and Research Institute, TNAU, Mettupalayam	I. Jaisankar
International webinar on DUS testing data management/Automation/Image analysis	6th – 7th Oct., 2020	Online	PPV&FRA, New Delhi	I. Jaisankar
An outreach program for KVK Farmers on Farm Act by the Hon'ble Minister of States for Agriculture, New Delhi	7th Oct., 2020	Online	Ministry of Agriculture and Farmers Welfare	Sanjay Kumar Pandey and Zachariah George
Regional committee meeting –II with ICAR, New Delhi	8th Oct, 2020	Online	ICAR, New Delhi	B.A.Jerard&Jai sunder
Recent development in buffalo research	8th Oct., 2020	Online	-	K. Muniswamy
Egg : A natural immunity booster	9th Oct., 2020	Online	-	K. Muniswamy
International webinar on "Looks Vs. Soundness: The Stallion Breeding Jigsaw Puzzle"	10th Oct., 2020	Online	-	S.K. Pandey
Virtual programme on World Food Day and 75th Anniversary of Food & Agriculture Organization.	16th Oct, 2020	Online	ICAR, New Delhi	B. Augustine Jerard, Jai Sunder, Dr. S. K. Zamir Ahmed
National webinar on hydroinformatics for smart water management organized by	20th Oct, 2020	Online	Dr.Rajendra Prasad Central Agricultural University, Pusa, Bihar	Dr. T. Subramani, Dr SirishaAdamala
e-workshop of Nodal Officers of National extension programme of IARI, New Delhi	20th Oct, 2020	Online	ICAR-IARI	S.K. Zamir Ahmed, PI and Dr. R. Jaya Kumaravaradan
Preliminary meeting of EFC/SFC of schemes of horticulture science division with DDG (HS), ICAR.	22nd to 23rd Oct, 2020	Online	SMD, Horticultural Science, New Delhi	B.A.Jerard, Dr.Jai Sunder
Consultative workshop on "Aspects and prospects of research and development for perishable agri-produce being processed by microenterprises	22nd Oct, 2020	Online	PMFME	S.K. Zamir Ahmed, Nodal Officer and Dr. R. Jaya Kumaravaradan
Geospatial applications for disaster risk management' jointly offered by United Nations Office for Outer Space Affairs (UNOOSA)	21st to 30th Oct, 2020	Online	Centre for Space Science and Technology Education in Asia	SirishaAdamala

			and the Pacific (CSSTEAP), and Indian Institute of Remote Sensing (IIRS)	
Training on "Advances in equine health management"	26th Oct - 1st Nov., 2020	Online	-	P.A. Bala
International webinar on "Harnessing the potential of tropical tuber crops under changing climate"	27th Oct., 2020	Online	ICAR-CTCRI, Trivandrum	I. Jaisankar and V. Damodaran
Recent advances and status of wildlife forensics	3rd to 5th Nov., 2020	Online	-	K. Muniswamy
Entrepreneurial opportunity in rural poultry	3rd to 6th Nov., 2020	Online	-	K. Muniswamy
Foundation day lecture on "Next generation technological interventions to boost horticulture sector in india towards self-sufficiency" by Dr. T. Mohapatra, DG, ICAR & Secretary DARE	6thNov.,2020	Online	IAHS, New Delhi	All scientists
Annual review meeting of AICRP on foot and mouth disease	6-7th Nov, 2020	Online	ICAR-DFMD, Mukteswar	Jai Sunder
Analysis of experimental data using SAS	9th to 14th Nov., 2020	Online	-	T. Subramani, KiranKrthik Raj
Annual review meeting of ICAR-AICRP on animal disease monitoring and surveillance	9-10th Nov, 2020	Online	ICAR-NIVEDI, Bengaluru	Jai sunder
Strategies to improve pig production at present arena	12th Nov., 2020	Online	-	P.A. Bala
Bio-informatics and statistical tool in livestock research	16th to 25rd Nov., 2020			Rafeeqye R. Alyethodi
EDP training for master trainers	17th to 21st Nov., 2020.	Online	NIFTEM	SreepriyaPrakasan
National virtual conference on "Current trends and challenges in plant biochemistry and biotechnology"	20th - 21st Nov., 2020	Online	BITS, Goa and SPBB, New Delhi	AjitArunWaman and PoojaBohra
International E-Conference on "Advances and future outlook in biotechnology and crop improvement for sustainable productivity"	24th to 27th Nov., 2020.	Online	UHS, GKVK Campus, Bengaluru	AjitArunWaman and PoojaBohra
National webinar on "Urban and peri-urban horticulture for health and nutrition"	25th Nov., 2020	Online	CIARI & NABARD, Port Blair	AjitArunWaman, PoojaBohra&A.K. Tripathi
Meeting of high level sensitization programme for implementation of farming acts	26th Nov, 2020	Dept of Industries, A & N Administration	Dept of Industries, A & N Administration	B.A.Jerard
International seminar on "Agricultural sustainability for doubling income in changing climate scenario and market challenges during COVID 19"	28th to 29th Nov., 2020	Online	-	Sanjay Kumar Pandey
Workshop on animal husbandry	28th Nov., 2020	Online	ICAR-ATARI, Pune	Zachariah George
Introductory meeting on rapid soil testing kit	2nd Dec, 2020	Online	M/s. Skylo Technologies.	S.K. Zamir Ahmed and R. Jaya Kumaravaradan

Directors conference	5th Dec, 2020	Online	ICAR, New Ddelhi	B.A.Jerard
Online training program on 'Climate change: challenges and response'	14th to 18thDece, 2020	Online	Centre for Disaster Management (CDM), LalBahadurShastri National Academy of Administration, Mussoorie on 14th - 18th December 2020	SirishaAdamala
Webinar on " Current perspective of swine diseases in india and its management practices''	11th Dec., 2020	Online	-	Perumal P.
Webcasting of Hon'ble PM addressing the farmers and releasing PM Kisan money to farmers – PM KisanSammanNidhi Programme	25th Dec, 2020	Online	ICAR, New Delhi	B. Augustine Jerard, Director, CIARI; All HoDs; SAO; FAO; AAOs; All event registered staff of ICAR-CIARI; farmers
Webinar on "Prospective, priorities and preparedness of sustainable agriculture development in india" organized by	28th- 29th Dec., 2020	Online	DRASS, Uttar Pradesh	AjitArunWaman

Schedule Tribe Component (STC)

Physical Output

Description	Unit	Achievements
Training for farmers in horticulture crop production	No. of Training	04
	No. of Farmers	112
Distribution of planting material/seed of horticulture crops	(A)No. of plants/cuttings (saplings/	1469
	No. of beneficiaries	1469
	(B)Seed	73
	(C)Seed Tubers	-
	(D)Poultry/ Piglets (Day old	115
Distributions of agricultural inputs like pesticides, fungicides, fertilizers, traps and small farm implements, etc.	No. of beneficiaries 1.Pheromone Traps 2.Immunity boosting kit	 38 10
	No. of beneficiaries 1.Pheromone Traps 2.Immunity boosting kit	 19 families 10
Demonstration of technologies in horticulture	(A)Terrace Farming -2	04
	(B)Protected cultivation of horticultural crops – 2Nos	
Promotion of kitchen garden	Number	02
Development of demonstration block	Number	01
Nursery development	Number	02
	No. of beneficiaries	1000

Infrastructure Development

A polyhouse of size 23x7m and a miniclonal chamber of size 10x3m were constructed to strengthen plant propagation studies in Padauk.

Publications

Research articles

- Adamala, S. & Velmurugan, A. (2020). Trend analysis of rainfall and air temperature in Port Blair, Andaman and Nicobar Islands, India. *Journal of Indian Society of Coastal Agricultural Research*, 38(2):95-103.

- De, A.K., George, Z., Mondal, S., Ponraj, P., Muniswamy, K., Kundu, A.K., Sunder, J., Muthian, R., Ahmed, Z., Chakraborty, G., Sujatha, T. & Bhattacharya, D. (2020). Tracing the genetic root of Trinket cattle: an endangered cattle population of a small isolated island of Nicobar group of islands. *Journal of Genetics* 99(1), DOI: 10.1007/s12041-020-1178-y.

- De, A.K., Sawhney, S., Mondal, S., Ponraj, P., Ravi, S.K., Sarkar, G., Banik, S., Malakar, D., Muniswamy, K., Kumar, A., Tripathy, A.K., Bera, A. & Bhattacharya, D. (2020). H ost-Parasite Interaction in Sarcoptesscabiei Infestation in Porcine Model with a Preliminary Note on Its Genetic Lineage from India. *Animals* 2020, 10(12), 2312; https://doi.org/10.3390/ ani10122312.

- Deesh, A., Joshi, D., Ravindra C., Jokhan, Anjeela D., Khan, Mohammed M. G. and Jerard, B. Augustine (2020). Biological studies on the natural enemies in suppression of coconut stick insect, *Graeffea crouanii* (Le Guillou) in Fiji. *Asia Pacific Journal of Sustainable Agriculture Food and Energy* (ISSN: 2338 -1345), 8(1&2): 1-14, https://ojs.bakrie.ac.id/index.php/APJSAFE.

- Gladston Y., Ajina, S.M., Praveenraj, J., Kiruba-Sankar, R., Bineesh, K.K. & Roy, S.D. (2020). First record of African sailfin flying fish Parexo coetusmento (Valenciennes, 1847) from the waters off Andaman Islands, India (2020). *Journal of Threatened Taxa* 12(14): 17032-17035.

- Joseph J. K., Pradheep, K, Jaisankar., I., Muhammed Nissar, V.A. & Jerard, B.A. (2020). Logistics planning for plant genetic resources collecting from Nicobar Islands of India. *Indian Journal of Plant Genetic Resources*, 33(2): 132–145 (2020). DOI 10.5958/0976-1926.2020.00021.2.

- Lal. S.V., Kapoor, P., Laxmi, P.A. &Jerard, B.A. (2021). Backyard poultry production and its importance. *Acta Scientific Veterinary Sciences* 3.1:23-28.

- Preethi. P., Shafeeq Rahman., S. Naganeeswaran., A. A. Sabana., K. P. Gangaraj., B. A. Jerard., V. Niral and M. K. Rajesh (2020). Development of EST-SSR markers for genetic diversity analysis in coconut (*Cocosnucifera* L.).*Molecular Biology Reports*, 47: 9385–9397, https://doi.org/10.1007/s11033-020-05981-8.

- Swarnam, T.P., Velmurugan, A., Lakshmi, N.V. &Kavitha, G. (2020). Foliar Application of Seaweed Extract on Yield and Quality of Okra (Abelmoschusesculentus L.) Grown in a Tropical Acid Soil. *Trends in Biosciences 13(6), 01-00.*

- Waman. A. A., Bohra, P. &Karthika Devi, R. (2020). Performance of improved varieties of true Cinnamon (*Cinnamomum verum* J. Presl.) in Andaman Islands, India. *Pantnagar Journal of Research*, 18(3): 243-248.

Popular articles

- Waman, A.A. &Bohra, P. (2020). CIARI-Pro Dhaniya: A technology for pro-tray cultivation of Burmese coriander to promote urban farming. *The Echo of India*, English Daily, Port Blair, October 28, 2020.

- Waman, A.A. & Bohra, P. (2020). Essential oils from spices: potential way to diversify income avenues for island farmers". *Spice India*, 33(10):10-13.

Technical bulletin

- Jaisankar, I., Jerard. B.A., Ganguly. N., Velmurugan. A., Varadan, J.K., Rajkumar. M., Moses, E.M. &Simhachalam, P. (2020). Improved elite planting material production techniques for Andaman Padauk (*Pterocarpus dalbergioides* Roxb.), Nursery manual No. CIARI/CW/2020/68, ICAR-CIARI, Port Blair, India: pp 48.

Policy Brief

- Concept of Climate Resilient Rural Poultry Seed Production units: A self-sustainable entrepreneurship in A&N Islands. Published by ICAR-CIARI, Port Blair. T.Sujatha, Jai Sunder, ShardulVikramLal, D. Bhattacharya, A.Kundu. (2020).

Awards/Honours

- Dr. Ajit A. Waman received SPBB-Springer Young Investigator Award for Excellence in Plant Biology (2020) jointly by Society for Plant Biochemistry and Biotechnology, New Delhi and Springer-Nature, India.
- Dr. Pooja Bohra received Best Oral Presentation Award during International E-Conference on "Advances and Future Outlook in Biotechnology and Crop Improvement for Sustainable Productivity" organized by UHS, GKVK at Campus, Bengaluru .
- Dr. Ajit A. Wamanreceived Best Oral Presentation Award during the National Webinar on "Prospective, Priorities and Preparedness of Sustainable Agriculture Development in India".

RETIREMENTS/NEWENTRANTS/TRANSFER/PROMOTION

Transfer

- Shri Krupasindhu Pradhan, Technician (T-1) transferred from ICAR-KVK, South Andaman to ICAR-KVK, Shantpur, NRRI ,Cuttack.
- Shri R. Kataria (T-1) transferred from ICAR-KVK, Nimbudera, CIARI to ICAR-KVK, Shikhopur, Gurugram, IARI, New Delhi.

Obituary

Milred Tirkey, SSS on 1st November, 2020

HabilMinj, TSM on 24th November, 2020 .

CIARI ICAR तमसो मा ज्योतिर्गम

Published by	:	Dr. B. Augustine Jerard, Director (Acting)
Compiled & Edited by	:	Dr. B. Augustine Jerard, Dr. Jai Sunder, Mr. Amit Srivastava & D. Karunakaran
Typesetting	:	Mrs. Rina Saha
Designing	:	Mrs. Asma Bibi, Mr. G. Suresh
Photo	:	Mr. K. Ali Akbar
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