

# ICAR-CIARI NEWSLETTER

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

AgriSearch with a human touch

## IN THIS ISSUE

### RESEARCH HIGHLIGHTS

- Estimation of piperine and oleoresin content in *Piper sarmentosum*
- Opportunities and challenges of sustaining agriculture: Behavioural perspective
- Exploration of fishery, biology and market potential of tuna resources of Minicoy
- Hydrological Response for Soil and Water Conservation in Island Ecosystem

### MAJOR EVENTS

- 46<sup>th</sup> Foundation Day of ICAR-CIARI celebrated
- ASA and ICAR-CIARI organizes Workshop on Agro-Ecotourism
- ICAR-CIARI conducted Two days' workshop and 9th International Yoga Day
- Splendid Performance by ICAR-CIARI in ICAR Zonal Sports Tournament

## From Director Desk ....

The A & N Islands are a destination for both domestic and international tourists due to their natural beauty, which includes lush green forests, beaches, and exceptional local flora and fauna. Agro-ecotourism is a new field that can enhance farm income, stimulate and diversify the rural economy, preserve the island ecology, and strengthen connections between islanders and mainlanders. Agro-ecotourism provides immense employment opportunities through exploring various scientific outcome. It is a symbiotic association of the farming sector, tourism industry, and farm businesses for sustainable production with three key concepts: something to see, something to do, and something to buy and sell. In order to maintain growth, the newer agro-ecotourism sector in these islands requires attention, scientific support, and interaction among stakeholders. To promote the concept of agro-eco-tourism in these islands, a workshop was conducted with the theme “Sustainable Agro-Eco Tourism for A&N Islands: Opportunities and Challenges” to develop and boost entrepreneurship from May 22 to 23, 2023, at ICAR-CIARI, Port Blair. There are various challenges to agro-ecotourism in the A&N Islands, viz., solid waste management, limited carrying capacity, water scarcity, infrastructure and related challenges, exposure to vulnerabilities, the energy supply crisis, and limitations in skilled personnel. There is a need for responsible, participative, and decentralised tourism development models.



The value addition of locally available spices and agricultural and horticultural products has bright scope for additional income from agro-ecotourism activities. Andaman branding can be used to promote local produce such as woody pepper, mango ginger, Andaman Kau Phal, blood fruit, etc. that are native to the A&N Islands. It is important to incorporate traditional and cultural activities into agro-ecotourism. Medico-tourism with medicinal herb gardens will be the most powerful aspect of agro-ecotourism. CIARI, ZSI, BSI, and other research organisations have potential hotspots that could be improved and opened for the benefit of the public as part of agro-eco-tourism. To promote agro-eco-tourism, it is necessary to conduct training and workshops for tourist operators and line departments. It is necessary to identify and display agro-eco-tourism hot spots on the tourism map and website of the tourism department. ICAR-CIARI itself will be the best in-house incubation centre for the development of agro-eco-tourism, where spice and horticultural nursery units, medicinal plant gardens, indigenous livestock and poultry, and aquatourism may be developed as components of the agro-eco-tourism model. It is recommended that all A&N Islands line departments and research organisations collaborate to establish successful 'agro-ecotourism' in the A&N Islands.

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## Research highlights

### Estimation of piperine and oleoresin content in *Piper sarmentosum*

Ajit Arun Waman and Pooja Bohra

Fruits of six collections of *P. sarmentosum*, which were collected from different parts of the islands were dehydrated mechanically and used for analysis. The oleoresin content, which is an important quality parameter, was estimated using acetone as a solvent. The content varied between 3.426% and 10.045% among the collections. Further, significant variations were also observed in piperine content, which was determined using ASTA Method 12.1.

### Variations in drying time and essential oil content in cinnamon leaves

Ajit Arun Waman and Pooja Bohra

Leaves of cinnamon are a significant source of industrially important essential oils and phytochemicals. In order to study the variations in the drying time as influenced by the genotypes, a study was carried out using 24 collections. Results suggested that the duration of drying ranged between 5.00 h to 7.00 h among the collections, while the grand mean time for drying of the leaves in different collections was 6.55 h. The moisture loss at hourly interval showed highly significant (1% level of significance) variations among the collections. A mean of 15.20% moisture was lost after 1 h of drying, while the leaves lost a mean of 51.55% moisture after 5 hours of drying. Essential oil content (dry weight basis) in the leaves varied between 0.84% and 2.80%.

### Production of quality planting material

Ajit Arun Waman and Pooja Bohra

Planting material of bush pepper (500 nos.), *Piper longum* (536 nos.), *P. sarmentosum* (633 nos.) and various herbal spices (327 nos.) was produced besides planting of rhizomatous spices in 0.15 ha area for production of quality planting material. Twenty-eight farmers visited to procure the planting material of spices. For enriching Horticulture Research Farm, Sippighat of the Institute, 460 slips of lemon grass, 75 plants of clove and 25 rooted cuttings of woody pepper were provided, while 100 rooted cuttings of black pepper and 1000 slips of lemon grass were provided for development of agro-tourism blocks of the Institute. For promotion of cinnamon cultivation in the islands, 300 plants of cinnamon were provided to a stakeholder from Humfrygunj, South Andaman. Planting material of passion fruit (250 nos.), West Indian cherry (1300 nos.), Malabar tamarind (848 nos.) and *Kydia mangosteen* (37 nos.) was produced for sale and distribution to the island stakeholders.

### Studies in *Flacourtia montana*

Pooja Bohra and Ajit Arun Waman

Morphological and biochemical characterization of fruits of *Flacourtia montana* was carried out at different maturity stages. Consistent variations were recorded in total soluble solids, total anthocyanins and titratable acidity content. Effect of seven seed pretreatments was studied in comparison with untreated control. Results suggested superiority of GA<sub>3</sub> (500 mg/L) in improving the germination (75.5%) when compared with control (42.5%).





## Opportunities and challenges of sustaining agriculture : A Behavioural perspective

S.K. Zamir Ahmed, R. Jaya Kumaravaradan, D. Karunakaran, Gladston. Y & Y. Ramakrishna

Among the 99 youth and 86 farmers surveyed across ANI, the result in youth reflected the majority at the age between 25-40, with secondary education, unemployed, and unmarried. Professional aspiration was medicine and allied (32.32%), whereas occupational was government (44.44%). Factors mostly influencing aspiration were parental (93.94%). Have a high perception level towards economic, technological, and other dimensions (68.69%), 44.4% had a favourable attitude towards better education facilities (90.91%), better income (74.75%) was a pull factor, and friends or relatives also migrated to the city (65.66%) was a push factor. Suggestions to overcome migration were the availability of avenues for entrepreneurial packages/models in the village, followed by the provision of incentives and reward systems for innovative farming and associated ventures, high speed Internet facilities, watershed management/irrigation facilities, and better hospital facilities, respectively. In the case of farmers, the majority were of more than 40 years old, had a middle level of education, were full-time farmers, had experience up to 30 years with a nuclear family, had marginal

farm size, and had an annual income of Rs 50,000/- to 1,50,000/- possessed a low level of social participation, extension contact, and information-seeking behaviour. had a high level of economic motivation (69.96%), Risk orientation (55.62%), and Scientific orientation (75.39%). 51.8% of farmers exhibited a strong attitude towards farming. Reasons for fading interest in agriculture were lack of labour and input, high production costs, age factor, and lower productivity. The suggestions to adopt farming were promotion of agro-ecotourism, area specific crop insurance, knowledge of farming should be compulsory at school level, input costs should be subsidised, and implementation of practical and employability skills. higher agricultural education



Plate 1: Conducting survey

## National Extension Programme

S.K. Zamir Ahmed, R. Jaya Kumaravaradan, B.A Jerard & P.K.Singh

A total of 11 village clusters in South Andaman were covered for Kharif 2022–2023. Twenty-seven demonstrations spread over 1.236 ha with two crops, namely Bhendi var. A5 and Palak var. Pusa Bharati and All Green, were conducted. The benefit-cost ratio was 3.22 for palak var. Pusa All Green, followed by 2.33 for var. Pusa Bharti, against a local

check of 2.07. In the case of Bhendi var. A5, the B:C ratio was 6.90 against 5.15 with a local check. Palak var. Pusa All Green and Bhendi var. A5 were preferred over other varieties by the farmers due to their greater acceptance in the market by consumers. A total of three village clusters in South Andaman were covered for Rabi 2023–2024.

Seventeen demonstrations spread over 0.4 ha with crops namely Bhendi var. A5 and Bottle Gourd var. Pusa Samrudhi and Brinjal var. Pusa Vaibhav were conducted.

### Report on the nesting site of Olive ridley turtle

**R Kiruba Sankar, D Karunakaran, J Praveenraj, K Saravanan, Sirisha Adamala, Y Ramakrishna**

Based on the citizen-science initiative in Car Nicobar Island, a new nesting site of Olive Ridley turtles, *Lepidochelys olivacea*, on the Teetop village in Car Nicobar Island was recorded. Two nests were made on a sandy beach that was located within a distance of less than 5m. The nesting and hatchlings were observed during the month of April 2023. The turtles were identified as olive ridley turtles based on the number of costal scutes (more than 5). The report on olive ridley nesting information could assist the decision-makers in marine spatial planning and coastal zone land use planning. The information was also communicated with the details of coordinates of the turtle nests to the local governing administration for incorporation in land use planning of Car Nicobar. Further attempts would be to promote the conservation of sea turtle hatchlings through the engagement of local indigenous people that could benefit their communities who depend on marine resources for their food security and livelihood on a long-term basis.

### National Surveillance Programme for Aquatic Animal Diseases

**K. Saravanan, J. Praveenraj, R. Kiruba Sankar**

Altogether, nine number of disease cases have been reported due to bacterial (*Aeromonas hydrophila*, *Aeromonas caviae* and *Pseudomonas alcaligenes*), parasitic infestations (*Ichthyophthirius* sp., *Piscinoodinium* sp., *Camallanus* sp. and *Lernaea* sp.) and water quality issues in freshwater fishes of North and Middle Andaman and South Andaman districts. Baseline data has been collected with geo-reference details from a total of 15 freshwater fish farms located at Port Mout and Chouldari villages of South Andaman. A total of 53 number of baseline data of fish farms collected from North and Middle Andaman and South Andaman districts were submitted in National Database on Aquatic Animal Diseases. Successfully completed the inter-laboratory comparison of the molecular detection of finfish and shrimp pathogens and the submitted results are in accordance as intimated by the coordinating agency, i.e. ICAR-NBFGR, Lucknow.

### Parasites infesting commercial marine and freshwater fishes

**J. Praveenraj, K. Saravanan, R. Kiruba Sankar**

During a routine parasitological examination, the parasitic nematode *Camallanus* sp. was recorded from the gut of *Anabas testudineus* with a mean intensity of  $6 \pm 1.2$  per host. Also *Piscinoodinium* sp. infection was recorded in the larvae of yellow fancy betta fishes, with an average mean intensity of  $66 \pm 3.5$  per host. The two records of parasites from the freshwater fishes constitute new report to the Andaman and Nicobar Islands. The *Piscinoodinium* sp. recorded in the study is significant pathogen causing mortality and morbidity in the finfish hatcheries.



## Exploration of fishery, biology and market potential of tuna resources of Minicoy

Y. Gladston, S.M. Ajina, S.K.Zamir Ahmed

The live bait fishery on Minicoy Island was surveyed and documented. The gear details and measurements of live bait catching gear “Hondalidau” and “Gambhadau” were surveyed and recorded. The operational range of bait fisheries, species composition, and bycatch were studied. The bait storage cages (Labari) were surveyed, and measurements were recorded in the survey books. The traditional knowledge on pole and line fishing operations was collected from the older population of Minicoy using PRA tools. The species composition in the bait fishery during the monsoon season was recorded from the bait fishing vessels,

and only a few vessels were operating the gear during the season. The small pelagic *Spratelloides delicatus* (Hondali) and *S. gracilis* (Rehi) are two dominant species. In the biological analysis of two tuna species, i.e., skipjack and yellow fin tuna, about 88 samples were dissected. The ichthyofaunal diversity surveys were conducted in the Salt Lake at Tundi and the reef area of Viringili islets and identified 27 species of fish and 3 species of shellfish. The socio-economic surveys were conducted on Androth and Kalpeni Islands through a structured interview schedule.

## Integrated farming systems for enhancing sustainable livelihood of rural tribal community of Minicoy

S.M.Ajina and Gladston, Y.

A new pond was excavated for rainwater storage and fish culture in the IFS system of regional station Minicoy. The monthly growth data of Konkan Kanyal goats, Sasso chickens, and Chara Chemballi ducks were recorded. The villages of Minicoy surveyed and recorded the diversity of freshwater ornamental fish and identified Arapaima, Arowana, Crocodile Gar, Malabar Snake Head, Gold Fish, and Koi Carp from household and community ponds. The roof-top garden of Mrs. Aneesa Hinavage was visited, and advisories on rainwater harvest and agricultural management during the monsoon season were given. The performance of local marigold species was evaluated. The new Amarathus variety

Vlathankaracheera was brought to the farm and tested for performance. A new variety of snake gourd collected from the farmer’s field was tested on the demonstration farm. Conventional fruit crops on the Minicoy Islands were surveyed and identified as five types of native fruits: lime berry, golden berry, Pandanus, wild melon, and wild passion fruit. A cost-effective poultry feed preparation trial is initiated to overcome the excessive feed cost. The growth of fodder (Sorghum) was evaluated and studied in the sandy soils of the Lakshadweep islands. The performance evaluation of brinjal varieties “Haritha” and Vengeri was done at the demonstration field.



## Indigenous and regional fruit crops of Minicoy

Gladston Y, Ajina S.M, Sharefuddeen Hassan Kararngothi, Arif M.I & S.K Zamir Ahmed

### ***Triphasia trifolia***

Limeberry, (*Triphasia trifolia*), locally known as Thalalanboa, is a shrub plant with paired spines in the leaf nodes that belongs to the family Rutaceae. It is a perennial fruit that ranges in size from ovoid to globe and has a diameter of 1.2 to 1.5 cm. The fruit rind of the fruit is covered with many oil glands, and the fruit colour turns from orange to red once it is ripe. Commonly, the fruits are consumed raw in Minicoy.

### ***Passiflora foetida***

Pop vine (*Passiflora foetida*), in Mahl, is known as Jumuhurimeava, a wild plant belonging to the family Passifloraceae. It is an herbaceous vine with trilobed leaves. Each node bears tendrils. The fruits are covered with highly pinnate bracts and bracteoles. Fruits are berry-type with oval shapes, yellow colour once they are ripe. Fruits are edible when eaten raw.

### ***Pandanus odorifer***

Screw pine fruit (*Pandanus odorifer*), locally known as Maakashikeyo, is one of the large screw pines that belong to the family Pandanaceae. It is a large, branched woody shrub with spirally arranged long leaves. The nut of the fruit is edible and consumed raw in Minicoy.

### ***Muntingia calabura***

Singapore cherry (*Muntingia calabura*), locally known as Cherry, is a small tree that belongs to the family Elaeocarpaceae. The leaves are lanceolate in shape with serrations on the margins. Fruits are berry-type, with a 1 to 1.5 cm size and an orange-red colour. Many small seeds are present in the pulp. Fruits consumed raw

### ***Cucumis melo***

Wild watermelon (*Cucumis melo*), locally known as Kekkuri, is a small sized cucumber species belonging to the family Cucurbitaceae. The leaves are trilobed, with tendrils on each node. The fruits are oval to globe-shaped, with a size of 3 to 5 cm in diameter. The greenish fruit with white striation turns yellowish green once it is ripe.

### ***Physalis peruviana***

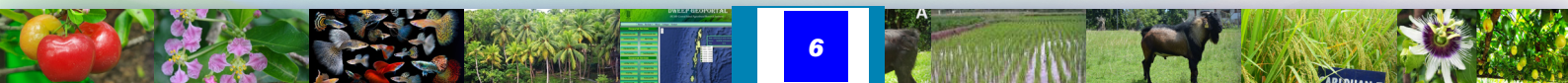
Golden berry (*Physalis peruviana*), locally known as Murakki, is a small herb that belongs to the family Solanaceae. The perennial plants found in the agricultural fields and kitchen gardens of Minicoy Fruits are berry-type, of 1.2 to 1.7 cm diameter; the greenish fruit turns yellow once it is ripe.

## Sequential cropping system

I.Jaisankar, T.P. Swarnam & T Subramani

Under a *Pterocarpus dalbergioides*- based sequential cropping system, tapioca tubers were harvested and the setts planted to study the performance of tapioca in the next

season. A better performance (2.2 kg/10 m<sup>2</sup>) of vegetable cowpea was also observed under the system. Hibiscus and radish were sown in the system for its evaluation.





## Plant exploratory survey

I. Jaisankar

A plant exploration survey was conducted from April 4, 2023, to April 18, 2023, at Nancowrie and Kamorta Islands and collected six accessions of *Pandanus lerum* and one coconut accession, which were conserved in the Institute gene garden. Besides collecting five *Pandanus tectorius* accessions and one *Champeria manillana*

accession from South Andaman District, seeds were sown in the nursery for further study. Vegetative growth was observed in the conserved *Dioscorea piscatorum* (New to India), a thorny *Dioscorea* tuber crop collected from Galathea forest on the Garacharma farm.

## Chemical composition of underutilized leafy vegetables

I. Jaisankar

Three underutilised leafy vegetables from Andaman and Nicobar Islands, India, were analysed for proximate nutritional, antinutritional, physicochemical, micronutrient, and antioxidant profiles. The tender leaves, matured leaves, and twigs of *Champeria manillana*, *Hibiscus acetosella*, and *Ipomoea batatas* were analysed. The moisture content in the three plant parts analysed ranged from 47.38% to

63.77%. Maximum ash content and crude lipid were recorded in tender leaves of *C. manillana*, crude protein in matured leaves of *I. batatas*, and total fibre in the twigs of *C. manillana*. Carbohydrate content was maximum in twigs of *C. manillana*, protein content was maximum in matured leaves of *H. acetosella*, and vitamin C was maximum in matured leaves of *H. acetosella*.

## Characterization of Pandanus species

I. Jaisankar

A physiological characterization of six accessions of *Pandanus lerum* fruits collected from Nancowrie and Kamorta Islands was done. The average fruit size ranged from 10.20 kg to 15.95 kg, and the keys ranged from 82 to 117. The TSS of the fruit pulp was also analysed for raw and cooked pulp; the mean TSS of raw pulp was 1.6° Brix and cooked pulp had 1.4° Brix. *P. lerum* collected from different geographical

areas of the Andaman and Nicobar Islands had excellent and diverse phytochemical properties with added benefits where the pulp had high carbohydrates (77.90%), ascorbic acid (0.52%), as well as tannins (14.19%), saponins (1.64%), flavonoids (16.60%), oxalate (0.18%), and TSS (5.66° Brix) content added with splendid DPPH (70.81 µg/mL) and hydroxyl RSA (72.31 µg/mL).

## Hydrological Response for Soil and Water Conservation in Island Ecosystem

Sirisha Adamala

In this study, potential areas suitable for water conservation practises and soil conservation measures were mapped in the Andaman Islands based on various

thematic information like land topography (digital elevation model), slope (%), land use, land cover, soil texture, runoff, stream order, drainage density, and road proximity.

The potential number of water conservation practises (farm ponds and check dams) and suitable area for conservation measures such as terraces, contour or graded bunds, and broad bed furrows in hilly, medium, and low land areas, respectively, was mapped and determined for the Andaman Islands based on prioritised erosion risk areas. The mapping results show that about 5.2% of the geographical area of the Andaman Islands, i.e., 26,420 ha, is prone to severe and very severe soil erosion, and it should be prioritised for suitable conservation practises. It is found that about 25% and 20% of agriculture and barren lands have potential for practising soil (contour/graded

bunding, terracing, and broad bed and furrow) and water (farm ponds and check dams) conservation practises, respectively, in the Islands. It is inferred that about 20% of the area is potentially suitable to develop water conservation practises in the Andaman Islands. The water conservation practises were underdeveloped (13% in the islands), and there is scope for 87% more development in terms of farm ponds and check dams. The soil conservation mapping revealed that about 25% of agricultural area has potential for practising soil conservation practises like contour/graded bunding, terracing, and broad bed and furrow.

### Moisture stress management in Cowpea

T.Subramani

A field experiment was conducted to study the effect of moisture stress management practises on growth, yield attributes, and yield of Cowpea (bush type) during dry periods (Feb-May) of 2023. Among the treatments, drip irrigation with plastic mulching recorded the highest yield (421 g/plant, 6.6 t/ha), followed by sub-surface drip irrigation. Application of hydrogel + K + Ca foliar spray recorded a higher yield

(397 g/plant, 6.2 t/ha) and was at par with hydrogel + K spray. Higher water use efficiency (311 kg/ha) was observed in drip irrigation with plastic mulch. Hence, it can be concluded that drip irrigation plus mulching, application of hydrogel, and foliar spray of K and Ca are the best options to mitigate the moisture stress in cowpea under island conditions.



Surface irrigation +residue mulch



Drip + plastic mulching

Plate 2: Moisture stress management in Cowpea



## Placement of *Rhipicephalus microplus*, Andaman isolate through DNA barcoding *vis-à-vis* a first Indian comparative study

Arun Kumar De, D. Bhattacharya, T. Sujatha, Perumal P., Jai Sunder and E.B. Chakurkar

*Rhipicephalus microplus* is a serious animal pest and responsible for direct and indirect losses. This species is prevalent throughout the world which includes Southeast Asian countries, Central and South America, Australia, Africa, Madagascar, the Mascarene Islands, New Caledonia, and French Polynesia. Global scenario suggests that, *R. microplus* complex is having five different clades [*R. australis*, *R. annulatus*, *R. microplus* clade A sensu Burger et al. (2014), *R. microplus* clade B sensu Burger et al. (2014), and *R. microplus* clade C sensu Low et al. (2015)] which has been done based on sequence information of cytochrome oxidase I (cox1). Geographical provenances of clades A, B and C depicts that, clade A originated in Asia and is now found in South America, Southeast Asia, and various African nations. clade B is only known from China, but clade C is found in Malaysia, Southern China, and the Indian subcontinent. For having a clear-cut picture on phylogenetic signaling of Andaman isolates of the parasite and details pictorial depiction of Indian scenario, both on-bench and in silico studies were undertaken. For characterization of this ectoparasite, 225 ticks were collected from three districts (South Andaman, North and Middle Andaman and Nicobar) of Andaman and Nicobar Islands (ANI) and identified morphologically as *R. microplus*. After extraction of genomic DNA from ticks, DNA template was amplified using specific primer and finally sequence information was

generated from the amplicons. Sequence information generated was deposited in centralized repositories of public database and accession numbers MT985465–MT985476 were assigned. In the current dataset, a total of eight haplotypes (Hap 1–Hap 8) were detected with haplotype diversity ( $Hd \pm SD$ ) of  $0.909 \pm 0.065$  (Fig.1). For comparative phylogenetic signaling, sequence information was retrieved from NCBI nucleotide dataset on *cox1* sequences of five clades of *R. microplus* complex and available sequence information of from Northern, Southern, North-eastern states of India. Nicobar isolates belonged to clade A whereas, Andaman isolates belonged to clade C of *R. microplus* complex. All the other Indian sequences retrieved from GenBank belonged to clade C of *R. microplus* complex. *R. microplus* isolates from the Andaman Islands that belonged to clade C were phylogenetically distinct from Indian isolates, indicating independent speciation on a geographically isolated island. No host-specific or geographic location-specific sub-clustering was found in Indian isolates, indicating the species jumping phenomenon. This study thus shown the existence of two distinct genetic profiles of the *R. microplus* complex in two Andaman and Nicobar archipelago regions that are geographically isolated from one another. This suggests that there are two distinct founding tick populations: one in the southern and northern portions of the Andaman Islands, and another on Nicobar Island.

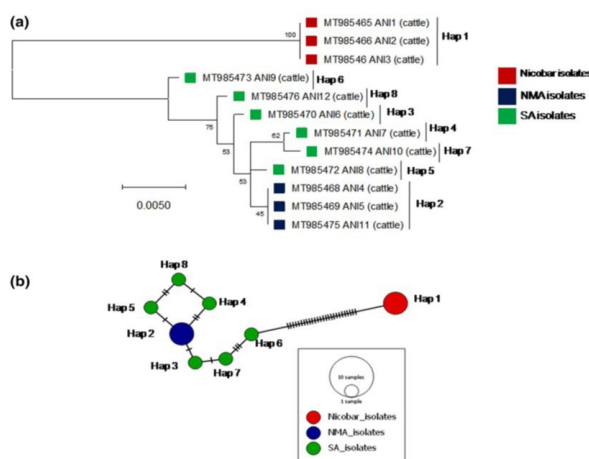


Fig. 1. Evolutionary relationship of the detected haplotypes of *R. microplus* of ANI. (a) Phylogenetic tree, (b) network map. Phylogenetic tree was drawn using the neighbour-joining method using Tamura–Nei model as implemented in MEGAX following 1000 bootstrap replications and network map was constructed in PopART v. 1.7 (Leigh and Bryant 2015) with default settings.

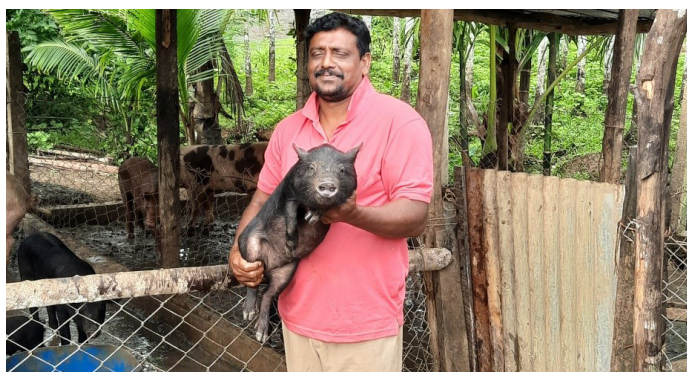
## Success Stories/case report

### Control of iron deficiency anaemia (IDA) in piglets: A game changer in pig farming

**Facilitator: Arun Kumar De, Perumal Ponraj, Jai Sunder and Debasis Bhattacharya**

Mr. Sunil Joydhar, from Chouldari village, South Andaman, is a 53-year-old farmer. His major source of income is pig farming. He has 76 pigs, including adults, growers, and piglets, on his farm. Recently, his pig farm was witnessing huge piglet mortality. Piglet mortality ranged from 15 to 50 percent, causing him huge financial losses. The symptoms in piglets were pallor and wrinkled skin, absence of pink snout and ears, rough hair coat, listlessness, and poor growth rate. After 10–15 days post-birth, the condition of the piglets got worse, and the piglets experienced spasmodic respiration, which finally led to their deaths. The piglets, which could also survive, had a very poor growth rate. Then he approached the Animal Science Division of ICAR-Central Island Agricultural Research Institute (ICAR-CIARI). The symptoms of the piglets indicated that they were suffering from piglet anaemia. To further confirm, a pen-site diagnosis with estimation of haemoglobin concentration was done, and it was found that the haemoglobin concentration in piglets ranged from 3 g/dL to 6 g/dL,

indicative of a severe form of iron deficiency anaemia (IDA). To control IDA, an oral iron supplementation regime (through the 2-7-10-15 module) developed by ICAR-CIARI was recommended. A demonstration of the technology was done on his pig farm. In this regime, iron supplementation is given orally to piglets on the 2nd, 7th, 10th, and 15th days post birth @30 mg/kg body weight. Adaptation of the technology decreased piglet mortality drastically; piglet mortality was reduced to 5-8%, which is considered normal. Moreover, haemoglobin levels of the supplemented piglets were found to be normal (10 g/dL to 13 g/dL), and a significant improvement in the growth rate of the piglets was recorded. He has successfully controlled IDA in piglets on his farm, and he earns an income of Rs. 80,000 to Rs. 100,000 per month by selling piglets and dressed pork. Therefore, oral iron supplementation @ of 30 mg/kg body weight on days 2–7, 10–15 post-birth is highly recommended for control of iron deficiency anaemia and improvement of iron status in piglets.



**Plate 3: Healthy pigs at Sunil's farm**



## Metaphylaxis of clinical coccidiosis in goats

**Facilitator: Arun Kumar De, Perumal Ponraj, Jai Sunder and Debasis Bhattacharya**

Mr. Armugam of Indiranagar is a 45-year-old livestock farmer. He is rearing dairy cattle, goats, and backyard poultry. He had 45 goats on his farm. Over the last 6 months, his goats, mainly the growers and kids, were suffering from diarrhoea, reduced feed intake, weakness, and anaemia. Diarrhoea was watery and contained mucous and blackish-coloured blood. The mortality of the kids was also high (15–20%). He approached the Animal Science Division of ICAR-Central Island Agricultural Research Institute. The symptoms of the goats indicated that they were suffering from clinical coccidiosis. Confirmation of coccidiosis was done by faecal examination, in which oocysts per gram of faeces (OPG) were 3–4 lakh. Four species of *Eimeria* were detected; *E. arloingi*, *E. faurei*, *E. pallida*, and *E. parva*, and among them, *E. arloingi* has been reported to be associated with clinical coccidiosis in goats. For metaphylaxis, amprolium-soluble powder (20% w/w) was recommended as anti-coccidial therapy. The animals were

treated with ammonium-soluble powder @ 50 mg/kg body weight for 5 consecutive days. OPG was monitored at regular intervals up to 25 days posttreatment. It was found that the oocyst count in treated goats decreased significantly; at 25 days post-treatment, the oocyst count ranged from 200–500 per gram of faeces. The problem of diarrhoea was resolved, there was a significant improvement in body weight (10–15%), and mortality was checked totally. Therefore, amprolium at 50 mg/kg body weight is recommended for the treatment of clinical coccidiosis in goats.



**Plate 4: Mr. Armugam in front of his goat farm**

## Important events held

### Splendid Performance by ICAR-CIARI in ICAR Zonal Sports Tournament

ICAR-Central Island Agricultural Research Institute, Port Blair, participated in the ICAR Zonal Sports Tournament (Eastern Zone)-2022 held at ICAR-IVRI, Izatnagar, from April 24<sup>th</sup> to April 27<sup>th</sup>, 2023. The zonal sports tournament was attended by participants from 21 ICAR Research Institutes in the Eastern Zone. The team ICAR-CIARI was represented in the tournament with the coordination of Mrs. G.V. Kantam as Chief-De-Mission and Mrs. Champa Rani Das as Team Manager. The sports contingent of

ICAR-CIARI secured the winner's position in table tennis (doubles) and the runner-up position in badminton (doubles) events by Mrs. G.V. Kantam and Mrs. Champa Rani Das. In addition, Mrs. Champa Rani Das secured the runner-up position in carroms and the second position in Javelin throw events. Dr. Eaknath B. Chakurkar, Director, ICAR-CIARI, along with Dr. Jai Sunder, Chairman, Sports Committee, and Dr. K. Saravanan, Member Secretary, Sports Committee of ICAR-CIARI, congratulated



and felicitated the participants at the ICAR-CIARI campus for their excellent performance and sportsmanship spirit shown in the ICAR zonal sports tournament.



Plate 5: ICAR-CIARI in ICAR Zonal Sports Tournament

### ITMU conducted Awareness Programme on Intellectual Property

The Institute Technology Management Unit, ICAR-CIARI, Port Blair, conducted an awareness programme on intellectual property on the occasion of World Intellectual Property Day. Creativity and Innovation are celebrated by the World Intellectual Property Organisation on April 26 as World Intellectual Property Day. The theme of this year was Women and IP: Accelerating Innovation and Creativity to tap out the innovative potential of women groups for the widest possible range of talents needed to solve the pressing problems facing humanity. During the programme, the experience on “Can do” attitude of women inventors was shared by five experts. Dr. Smitha, G.R., Sr. Scientist, ICAR-IIHR, Bengaluru shared her experience on utilisation of flower waste into Agarbatthi, biofuels, bio ethanol, pigments; dyes; poly hydroxylbutyrate-co-hydroxyvalerate production, biosurfactants production and sugar syrup. Dr. Laly, S.J., Sr. Scientist, ICAR-CIFT, Cochin spoke about Identification of formalin in fish and fish products wherein consumers can check the fish for adulteration using rapid detection kit “CIF Test”. Dr. T.P. Swarnam, Pr. Scientist, ICAR-CIARI, Port Blair spoke about systematic efforts

to develop intellectual property. Dr. Rajeshwari Shome, Pr. Scientist, ICAR-NIVEDI spoke about systematic thought process that lead to development of ELISA based IPR and commercialization to control brucellosis at national level. Dr. Pooja Bohra, Scientist, ICAR-CIARI, Port Blair detailed her experiences about processing and value addition of underutilised horticultural crops particularly *Garcinia dhanikariensis*, *G.andamanica*, mango ginger paste, blood fruit and woody pepper. These efforts have given an avenue for the commercialization of these IPs and the conservation of underutilised crops in these islands. Commercialization is the process of bringing Intellectual Property to the market so that the patented or IPR product can be exploited in return for business profits and growth. The programme was chaired by Dr. E.B. Chakurkar, Director, ICAR-CIARI, who addressed the gathering that there is always gender equality in possession and exploration of IPs, but the number of women scientists is lower, which will definitely increase in due course of time. The programme was organised by Dr. T. Sujatha, Sr. Scientist, and ITMU i/c. The total number of participants was 63.



## ICAR-CIARI, Port Blair, celebrates World Veterinary Day 2023

ICAR-CIARI, Port Blair, organised a one-day workshop on “Scientist-Farmers Interaction to Promote Entrepreneurship in Animal Husbandry Activities” on the eve of “World Veterinary Day 2023” on April 28, 2023, under the *azadi ka amrit mahotsav*. World Veterinary Day is an annual event celebrated on the last Saturday of April to raise awareness about the importance of veterinarians and their contributions to animal health, welfare, and public health. The theme for this year is “Promoting diversity, equity, and inclusiveness in the veterinary profession”, to advocate for the fairness and equity of the efforts of veterinarians, veterinary associations, and others.

Dr. S.D. Kannan, IFS, Chief Conservator of Forests, A&N Administration, was the chief guest. Dr. K.A. Naveen, Director, DAH & VS, A&N Administration, and Smti Archana Singh, GM, NABARD, Port Blair, were the guests of honour, while Dr. Eaknath B. Chakurkar, Director, ICAR-CIARI, Port Blair, presided over the function. A total of 93 participants, including senior veterinary officers from DAHVS, scientists, SMS from KVK, farmers, and stakeholders, attended the programme.

Speaking on the occasion, Dr. S. D. Kannan congratulated the Director of CIARI for organising such an important workshop

in the present context. He stressed that the contribution of veterinarians to the country’s GDP is enormous. We are number one in milk production and number three in egg production in the world. The role of veterinarians is very important in maintaining the continuous production of milk, meat, and eggs to cater to the needs of a huge population. He appreciated the role of ICAR-CIARI in the characterization and registration of important breeds, *viz.*, the Nicobari pig, the Nicobari fowl, and the Teressa goat. He wished all the veterinarians and other stakeholders related to the profession who are working for the welfare of livestock sustainable production.

Dr. K. A. Naveen highlighted the progress of the veterinary profession and animal husbandry activities, particularly in the last three decades. Smti. Archana Singh highlighted the role of NABARD in promoting farmers through various subsidy schemes, grants, capacity-building programmes, the formation of FPOs, etc. Dr. Eaknath B. Chakurkar, in his address, signifies the role of veterinarians in almost every field of activity. He highlighted that the island is rich in forest cover, and there is a lot of potential for tree fodder to meet the green fodder requirement. In addition, the island is also rich in medicinal plant diversity, so the scope of ethno-veterinary practises



Plate 6: Celebration of World Veterinary Day 2023

and medicine is enormous. He suggested that the inter-plantation areas between the coconuts could be exploited to grow fodder. He also stressed that to get optimum productivity from livestock and poultry, scientific management practises should be adopted. A special lead lecture was presented by Dr. V. Ranganathan, Professor and Head, Department of Pharmacology and Toxicology, TANUVAS, Tamil Nadu,

on “Application of farmer-friendly Ethno-Veterinary practises.” On this occasion, eleven successful livestock and poultry farmers were felicitated for their significant achievements. Four technical bulletins were also released on this occasion. Dr. Jai Sunder, Head, Division of Animal Science, gave the welcome address, while Dr. A.K. De, Senior Scientist, proposed a vote of thanks.

### ASA and ICAR-CIARI organizes Workshop on Agro-Ecotourism

A two-days workshop on “Sustainable Agro-Ecotourism for A & N Islands: Opportunities and Challenges” was organised to commemorate International Bio-diversity Day organised by the Andaman Science Association (ASA), ICAR-Central Island Agricultural Research Institute, in collaboration with the Zoological Survey of India (ZSI), Botanical Survey of India (BSI), Anthropological Survey of India (ASI), National Institute of Ocean Technology (NIOT), Fishery Survey of India (FSI), Department of Ocean Studies and Marine Biology Department of Tourism A&N Administration, with financial support by NABARD, Port Blair on May 22, 2023 at ICAR-CIARI. Speaking on the occasion, the Chief Guest, Dr. Jatinder Sohal, DANICS, Director (IP&T), A&N Administration, welcomed the initiatives of the Institute in conducting such an important workshop for the stakeholders. He informed that

the A&N Islands have evolved as the best destination not only at the national but also International level.

The Guest of Honours, Smti. Archana Singh, General Manager, NABARD, Port Blair, informed that ANI has become the choicest place to visit and we have to capitalise on it. The sensitivity of the local inhabitants towards cleanliness is the USP of ANI. She advocated that NABARD can facilitate the launch of “My District, My Project” to promote agro-eco-tourism in a team mode. Dr. P. Abdul Salam, Asst. Professor, JNRM College, Port Blair, informed that stakeholders should have a wider and more comprehensive understanding, so that agro eco-tourism can be promoted both nationally and internationally, thus creating job opportunities and adding to the national exchequer. Mr. Ankit Kumar Tripathi, Member Secretary, Tourist Vehicle Owners Association, Port Blair, stressed the



Plate 7: ASA and ICAR-CIARI organizes workshop on Agro-Ecotourism





need to highlight the resources of the Island (Flora and Fauna), followed by noting them by the A & N Administration and promoting

them by tour operators so that the young mind can opt for entrepreneurship in agro-eco-tourism.

## Interface Meet on documenting AnGR of A & N Islands & Conservation Unit of Teresa Goat

The 15th Interface Meet on Characterization and Documentation of AnGR of A and N (UT) under the Mission towards Zero Non-Descript was organised jointly by ICAR-NBAGR, Karnal, and ICAR-CIARI, Port Blair. On the occasion, Dr. B.N. Tripathi, Hon'ble DDG (AS), ICAR, New Delhi, inaugurated the first conservation unit of the Indian goat breed, i.e., the Teresa goat, at ICAR-CIARI in the presence of Dr. P.K. Rout, ADG (AP&B), ICAR, New Delhi; Dr. B.P. Mishra, Hon'ble Director, ICAR-NBAGR; Dr. E.B. Chakurkar, Hon'ble Director, ICAR-CIARI; Dr. Jai Sunder, HOD, Animal Science Division of ICAR-CIARI; and other learned faculty members of ICAR-NBAGR and ICAR-CIARI. Director, ICAR-CIARI also showcased the modern, eco-friendly, and less labour-intensive goat shed, which is a state-of-the-art facility established at ICAR-CIARI and useful for raising goats under an impending climate change scenario with minimum medication. During the presidential address, Dr. B. N. Tripathi, Hon'ble DDG (AS), ICAR, New Delhi, made a clarion call to transform the A&N Islands into a disease-free island for the production of export-quality animals and further characterization of animals with

the aid of contemporary *omics* tools. Dr. P.K. Rout, ADG (AP&B), ICAR, New Delhi, discussed the need for identification of genetic disorder traits and selection of other productive and reproductive tools (known as economic traits) through the use of modern technologies. Dr. B.P. Mishra, Hon'ble Director, ICAR-NBAGR, was enlightened about indigenous animal genetic resources, which are a hidden treasure of India and are used by resource poor farmers for energy budgeting, production and can thrive under an impending climate change scenario. Dr. K.A. Naveen, Director, DAHVS, A&N Islands, narrated the endemic animals, which demand attention for characterization and conservation as well. The interface meeting was also graced by a galaxy of scientists from ICAR-NBAGR, namely Dr. S.K. Niranjana, Dr. H.K. Narula, Dr. Monika Sodhi, Dr. Bina Mishra, PC KVK, South Andaman, and state veterinary officers. The team of ICAR-NBAGR also visited other livestock and poultry sheds, which were appreciated by the visitors as an altar for the maintenance of endemic breeds of the A&N archipelago that are reared in the villages by the settlers and indigenes of the Islands.



**Plate 8: Interface Meet on documenting AnGR of A & N Islands & Conservation Unit of Teresa Goat**

## ICAR-CIARI conducted Two days' workshop and 9<sup>th</sup> International Yoga Day

ICAR- CIARI, Port Blair, conducted a two-day workshop on Common Yoga Protocols from June 19, 2023, to June 20, 2023, followed by the celebration of the 9th Yoga International Day on June 21, 2023, at its main campus at Port Blair and at Regional Station, Minicoy. At the outset, Shri. K. Shyam Sundar Rao, Coordinator, welcomed the Chief Guest, Shri. A. Perumal, Yoga teacher, Patanjali Yoga Training Centre, Bharat Swabhimana Trust and Director, ICAR-CIARI, and all the participants. Dr. Eaknath B. Chakurkar, Director, ICAR-CIARI in his address appealed to all the participants to take maximum benefit of the workshop for a healthy, enjoyable, and prosperous

life. A total of 33 participants attended the workshop and practiced the Common Yoga Protocol with the instructions given by Shri. A. Perumal, Shri. Hemant Kumar Yadav and Shri. Bikash Chandra Mondal, Yoga demonstrators, Patanjali Yoga Training Centre, Port Blair. The Regional Station, Minicoy, also celebrated International Yoga Day. The programme was inaugurated by Shri. Attakoya, In-charge, R.T.O., Kavarathi. On the inaugural occasion, the Chief guest explained the importance of yoga in day-to-day life and the role of Yoga in the family. Special lectures were delivered on topics like 'Yoga provides a holistic approach to health and well-being and a healthy life for youth.



**Plate 9: Celebration of International Yoga Day at ICAR-CIARI**

## XVI Institute Research Council meeting

The XVI Institute Research Council of ICAR-Central Island Agricultural Research Institute, Port Blair, was held from May 31 to June 2, 2023, under the chairmanship of Dr. E. B. Chakurkar, Director, ICAR-CIARI, Port Blair. All the scientists of the institute attended the meeting and presented the progress of ongoing projects. A total of 31 ongoing projects and 5 new institute-funded projects were discussed and reviewed during the meeting. The monitoring of externally funded projects was also conducted on

June 2, 2023. Speaking on the occasion, the chairman emphasized that each co-PI has to contribute in a quantifiable manner and has to present his contributions. He also informed that a field IRC will be conducted within 3 months. The technical programme of the research projects should clearly highlight the location of the project, the area, etc. At the end, the member Secretary, IRC thanked the Chairman and all the scientists for their valuable suggestion, remarks and active participation





## 46<sup>th</sup> Foundation Day of ICAR-CIARI celebrated

ICAR-Central Island Agricultural Research Institute, Port Blair, celebrated its 46<sup>th</sup> Foundation Day on June 23, 2023, with great pomp and ceremony. Ms. Nandini Paliwal, IAS, Commissioner-cum-Secretary, A&N Administration, was the Chief Guest. Dr. C. Sivaperuman, Officer in Charge, ZSI, Port Blair, and Smt. Archana Singh, General Manager, NABARD, Port Blair, were present as guest of honour. Dr T.V.R.S. Sharma, ex-PS, CIARI, and ex-GB member ICAR, delivered the Foundation Day lecture on “My experience at CIARI and its development for the benefit of the Andaman and Nicobar Farming Community”.

The Chief Guest, Ms. Nandini Paliwal, IAS, Commissioner-cum-Secretary, A&N Admn, appreciated and congratulated all the awardees, especially the farmers and entrepreneurs. She further expressed that the island is having the typical problem of up scaling agriculture, animal husbandry, fisheries, and other allied sectors on a large scale, which may be due to limited resources and the non-availability of proper backward and forward linkages. There is a need to have proper synergy between the triangle comprising knowledge, policy, and marketing to carry forward agricultural and allied technologies for sustainable remuneration. She suggested to organise an International Symposium to assemble the scientific fraternity of different Island Nations to debate on various pros and cons, exchange of ideas, and technology and policy frameworks. At the Mela Ground, she inaugurated the agriculture drone used for effective crop management and also planted the coconut sapling in the presence of other dignitaries and staff of CIARI.

The Guest of Honour, Smt. Archana Singh, General Manager, NABARD, Port

Blair, expressed her desire to have many more collaborative programmes with the proactive scientific team of CIARI, benefiting the farmers from far-flung islands. Dr. C. Sivaperuman, Officer in Charge, ZSI, Port Blair, called upon the August gathering to visit CIARI, which is a good scientific institute for seeking knowledge on biodiversity with special reference to bird watching. Dr Eaknath B Chakurkar, Director, ICAR-CIARI, in his presidential address, briefed about the various achievements of the institute during one year and expressed that many high-rated papers were published and technologies commercialised, besides two varieties of coconut released at the national level, three animal genetic resources registered. He also appreciated the achievements made by the staff of the institute in reaching new heights in service and the women’s contingents in sports for bringing laurels to the Institute. Challenges such as effective fund utilisation, mitigating water scarcity on campus, and aiming towards reducing energy use were also put forth. Dr TV.R.S. Sharma, Ex PS, CIARI and Ex GB member ICAR delivered a foundation day lecture on online mode wherein he shared his experience of working in CIARI. He threw light on the conservation of native species of plants and underutilised fruits, popularised IFS, and also suggested conducting an international workshop involving nearby island researchers and policymakers.

The Chief guest and the other delegates honoured the awardees in the categories of scientist, administration, technical, Skilled supporting, and contractual workers during the occasion. The function was attended by officers of the Development Department, the Central Government, progressive farmers,





the scientific community from CIARI and RS Minicoy and Staff, KVK personnel, and the media. At the outset, Dr Jai Sunder, Principal Scientist, Incharge PME, ICAR-

CIARI, welcomed the gathering, and Dr. P.K. Singh, Principal Scientist, expressed the vote of thanks. Dr. Sirisha Adamala, scientist, coordinated the programme.



Plate 10: Celebration of 46th Foundation Day

### ICAR-CIARI celebrates World Environment Day

ICAR-Central Island Agricultural Research Institute, Port Blair, celebrated World Environment Day 2023 on June 5, 2023, under the campaign “Beat Plastic Pollution” at its Garacharma campus. Speaking on the occasion, Dr. E.B. Chakurkar, Director, ICAR-CIARI, Port Blair, highlighted the significance and importance of World Environment Day in protecting, conserving, and restoring the ecology and ecosystem. He impressed upon the use of natural, biodegradable materials in place of plastic in day-to-day life. He emphasised that ICAR-CIARI has already taken initiatives to replace the plastic nursery pots with pandanus or coconut nursery pots, which are environmentally friendly and biodegradable. On this occasion, a mass plantation of 155

high yielding coconut varieties, viz. Dweep Harita, Dweep Sona, and Annapurna, was planted in the coconut conservation block of the Garacharma farm. The scientific team of ICAR-CIARI Regional Station, Minicoy along with Department of Environment and Forest, Minicoy organized plantation drive. The program was inaugurated by Dr. Chokkalingam, Principal, Govt. Polytechnic College Minicoy as Chief Guest. On the occasion, 50 stem cuttings of annual moringa and 200 saplings of mangrove species (*Cerriopstangal*, and *Bruguiera cylindrical*) were planted. The program was attended by 15 students and three teachers of Polytechnic College, along with staff of Department of Environment and Forest, Minicoy.



Plate 11: Celebration of World Environment Day



## Awards/ Honours

### Awards and honours on the occasion of 46<sup>th</sup> Institute foundation day

Sl No.	Category	Technology/work	Name of awardees
1	Commercialization of technology	Dweep-Gau Maa Humpsore Rakshak	Dr. P. Perumal Dr. A.K De
2	Commercialization of technology	Dweep-Vertigrow	Dr. T. Subramani Dr. T.P. Swarnam Dr. A. Velmurugan Dr. V. Baskaran
3	Best Experimental Field Award	Garcinia Conservation block	Dr. Pooja Bohra & Dr. Ajit Arun Waman
4	Best Working Lab Award	Plant Tissue Culture Laboratory (Horticulture)	Dr. Ajit Arun Waman & Dr. Pooja Bohra
5	Best Administrative Section	Finance Account Section	Smt. Ashima Saha & Team
6	Best Research Publication (2022)	Policy framework and development strategy for freshwater aquaculture sector in the light of COVID-19 impact in Andaman and Nicobar archipelago, India. Aquaculture, 48(1):737596. (NAAS: 10.24)	Dr. Kiruba Sankar R. Dr. Saravanan K. Dr. Haridas H. Dr. Praveenraj J. Dr. Biswas U. Dr. Sarkar R.
7	Best Research Publication (2022)	Legacies of domestication, Neolithic diffusion and trade between Indian subcontinent and Island Southeast Asia shape maternal genetic diversity of Andaman cattle. PLoS One, 17(12):e0278681, DOI: 10.1371/journal.pone.0278681. (NAAS Rating: 9.24)	Dr. A.K. De Dr. Sawhney, S. Dr. Muthiyan, R., Dr. Bhattacharya, D. Dr. Ponraj, P. Dr. Malakar, D. Dr. Sunder, J. Dr. Sujatha, T. Dr. Kumar, A. Dr. Mondal, S. Dr. Bera, A.K. Dr. Bala, P.A. Dr. Chakurkar, E.B.
8	New Initiative/Innovation Award	Development of New mother block of CIARI Coconut varieties in area of 1ha.	Dr. I Jaisankar Dr. Sirisha Adamala Shri. A K Tripathi
9	Best cell	PME Cell	Dr. Jai Sunder & Team
10	Best experimental unit	Modern Goatry unit	Dr. Jai Sunder & Team

**Individual awards**

Sl. No.	Category	Name of awardees
1	Best technical staff	Shri. A K Tripathi
2	Efficient administrative staff	Shri Ravi Babu
3	Efficient account staff	Shri. Errayya
4	Efficient field worker staff	Shri Sanichar Baraik
5	Efficient security personal	Shri K Jagdesh
6	Efficient sanitary staff	Shri Ruban Tigga

- Dr. K. Saravanan was selected for Dr. C.V. Kulkarni Best Young Scientist Award for the year 2022-23 from ICAR-CIFE, Mumbai.

**Trainings/ Meetings/ Interaction/ conducted**

**ICAR-CIARI conducts Twin training programme for Tribal Farmers and Youth at Katchal under AKAM**

A twin programme under the theme “tribal empowerment” under the aegis of Azadi ka Amrit Mahotsav (AKAM) was conducted on “Agricultural technologies for enhancing the income and nutritional security of tribal farmers and income-generating activity for tribal youth” under the STC by ICAR-Central Island Agricultural Research Institute in coordination with Zonal Agricultural Office, Nancowry at 4 tribal villages, namely Upper Katchal, E-Wall, Meenakshi Ram Nagar, and Japan Tikri of Katchal Island, on April 6th–7th April, 2023. A total of 131 tribal farmers (95 males and 36 females) participated in the programme, including 43 from Upper Katchal, 32 from E-Wall, 31 from

Meenakshi Ram Nagar, and 25 from Japan Tikri. Shri D. Karunakaran, scientist and coordinator of the programme, explained mobile apps related to coconut crops and pig management, as well as entrepreneurship opportunities in coconut production and value addition for enhancing income and nutritional security. Dr. I. Jaisankar, Senior Scientist, explained various ICAR-CIARI technologies and the importance of agro-forestry, trees and shrubs for soil health, fodder, and fence management. During the two-day programme, 50 coconut climbers were distributed, which was very much appreciated by the tribal farmers.



**Plate 12: ICAR-CIARI conducts Twin training programme for Tribal Farmers and Youth at Katchal under AKAM**



## Training on Natural Farming, Goat & Poultry Farming at Regional Station Minicoy

Regional Station, Minicoy of in collaboration with KVK, Kavarathi conducted a “Training programme on Natural Farming and Scientific goat and poultry farming and Input Distribution under Schedule Tribe Component (STC)” for the welfare of marginal farmers of Minicoy from 20<sup>th</sup> to 23<sup>th</sup> May 2023. Speaking on the occasion, Dr. V.M Abdul Gafoor, SMS, Animal Science, KVK Kavarathi expressed his views on scientific goat and poultry farming in Islands. He focused on fodder cultivation, startup of agri-entrepreneurship through goat and poultry farming, emphasizes on suitable varieties in Island condition, disease surveillance and management. Dr. Gladston Y. and Dr. Ajina S. M., interacted

with farmers on natural farming, organic farming, zero budget farming, integrated farming and disseminate the knowledge on how to initiative scientific farm practices in cost effective way. The team of Regional station Minicoy, trained the farmers to prepare fish amino acid and bio slurry preparations. Shri. Shareefuddeen Hassan, Senior Technical Assistant and Shri. Arif M.I., Senior Technician informed about the technical know-how and do how to the participants in ‘Mahl’ (the local language). Bio fertilizers and bio pesticides kits were distributed to the 13 male and 7 female farmers. A total of 25 people attended the program.



**Plate 13: Training on Natural Farming, Goat & Poultry Farming at Regional Station Minicoy**

## Awareness programme on Control of flies in livestock

An awareness programme was organized on “Popularization of Biological control of fly in Livestock species” by Division of Animal Science, ICAR-Central Island Agricultural Research Institute, Port Blair at Indiranagar, South Andaman on 11<sup>th</sup> April, 2023. The programme was coordinated by Dr. P.A. Bala, Dr. P. Perumal and Dr. A.K. De. Dr. Bala explained in detail about the major parasitic diseases of cattle and goats prevailing in the islands and the importance of balanced nutrition in animal husbandry and managing

parasitic infestation, microbial infection and boosting immunity and production in animals through proper and optimal



**Plate 14: Awareness programme on Control of flies in livestock**



nutrition. Dr. P. Perumal stressed on cattle management and importance of indigenous herbs and calcium to reduce the losses incurring due to poor management and parasitism and he was also instrumental in relating calcium supplementation to curb the effect of parasitism on livestock and optimize their production. Dr. A.K. De

enlightened the gathering with scientific pig rearing practices and different strategies to increase the profit margin. Demonstration on castration in piglet was also done by the team. The farmers were distributed with calcium, vitamin supplements and antiseptic ointments

### **Awareness program on responsible fishing practices**

ICAR-Central Island Agricultural Research Institute (CIARI), Port Blair in collaboration with Krishi Vigyan Kendra (KVK), Car Nicobar conducted an awareness program on responsible fishing practices and input distribution program on 13<sup>th</sup> April 2023 under the Scheduled Tribe Component (STC) at Big Lapathy, Car Nicobar. Fishing nets (34 Nos.) were distributed as input to 40 tribal people by the Chief Guest, Shri. Lionald Nicomed, Chief Captain, Tribal Council, Car Nicobar. He appreciated the efforts of ICAR-CIARI and KVK towards upgrading the fisheries-based infrastructure and support services for the tribal fishermen in Car Nicobar. He also assured that the

inputs would be used in a proper manner for improving marine fishing activities. Dr. R Kiruba Sankar, Senior Scientist, ICAR-CIARI outlined the importance of responsible fishing practices for harnessing long-term benefits in the marine fisheries sector of Car Nicobar Island.



**Plate 15: Awareness program on responsible fishing practices**

### **Awareness Programme on Foot & Mouth Disease and lumpy skin disease in livestock**

An awareness programme on foot and mouth disease and lumpy skin disease in livestock was organized by ICAR-Central Island Agricultural Research Institute, Port Blair in collaboration with DAHVS, A&N Administration at Calicut Community Hall on 26<sup>th</sup> May 2023. Shri T. Yaghambaram, Pradhan, Gram Panchayat, Calicut was the chief guest. Dr. Jai Sundere, Pr Scientist & Head was the resource person. Dr. Baljit Kaur, Sr Veterinary Officer, Garacharma Veterinary Officer along with para-veterinary staff also attended the programme. Altogether 25 dairy farmers

participated in the awareness program. On the occasion mineral mixture, anthelmintic and vitamin tonic were also distributed to the farmers. Speaking on the occasion, Shri. T. Yaghambaram, Pradhan appreciated the effort of ICAR-CIARI & DAHVS for conducting the programme for the benefit of farmers. He also requested to conduct such type of programme in the future also. Dr. Jai Sunder, Pr. Scientist and Coordinator of the programme explained in detail the causes, symptoms, treatment, and control measures of FMD and lumpy skin disease in livestock. He stressed the importance of





such an awareness programme that will curb the prevalence of FMD on this island. Dr. Baljit Kaur, Sr. Veterinary Officer, DAHVS highlighted the significance of vaccination programmes and informed that the next

round of vaccination will commence very shortly. She urged all the farmers to come forward and cooperate with the vaccination programme.



Plate 16: Awareness Programme on Foot & Mouth Disease and lumpy skin disease in livestock

### Input distribution cum awareness programme on backyard fruit farming for Nicobarese farmers

As a part of Azadi ka Amrit Mahotsav an awareness programme on “Fruit Cultivation in Home Garden” was conducted by ICAR-CIARI on May 8, 2023 at Harminder Bay, Little Andaman under Scheduled Tribe Component. During the programme, coordinator - Dr. Pooja Bohra, Scientist-SS (Fruit Science), ICAR-CIARI made the participants aware about importance of fruit consumption and encouraged them to grow fruits in their home gardens. To facilitate them in this venture, variety of hand tools which are required for farming such as

pick axe, sickle, spade, machete and hand hoe were distributed to 100 participants, which included 64 male and 36 female participants. Mr. Festus N., Secretary, Tribal Council, Harminder Bay expressed his gratitude for conducting the programme for the benefits of tribal farmers of our islands. The programme was co-coordinated by Dr. Ajit Arun Waman, Scientist-SS, ICAR-CIARI under the supervision of Dr. P.K. Singh, Head (I/c), Division of Horticulture and Crop Improvement.



Plate 17: Input distribution cum awareness programme on backyard fruit farming for Nicobarese farmers



## Demonstration on Drudgery reducing climbing devices demonstration and inputs distribution

Coconut cultivation in the islands is an important sector that is going through multiple challenges. Of these, lack of skilled manpower for harvesting, crown cleaning and other farm operations has been one of the key factors affecting the sector. Use of suitable technologies could help in addressing the challenges of present day agriculture and coconut climbing devices are one such simple yet effective means for reducing the drudgery involved in the climbing of palms. To extend the benefits of these farmers-friendly devices, ICAR-CIARI has been actively involved for many years in popularization of this technology among the Nicobari tribal farmers, for whom coconut is a mainstay crop. Popularity of the device is evident by christening of the device as *chaklak* by the tribal farmers. As a part of *Azadika Amrit Mahotsav*, Dr. Ajit Arun Waman, Scientist-SS, ICAR-CIARI coordinated demonstration and distribution programme at Harminder Bay, Little Andaman under Scheduled Tribe Component on May 9, 2023. During the distribution programme, the elected representatives of Tribal Council, Harminder Bay selected 100 beneficiaries, to whom climbing devices were provided

for use in their day to day activity. Also, 40 existing users, to whom devices were distributed by ICAR-CIARI during past years, were provided with spare ropes and fixtures as maintenance replacement so as to ensure their safety. Both male and female participants showed keen interest in the programme as with proper training, the devices could be used by both alike. The mass demonstration of this device was carried out by involving 14 tribal farmers and attended by 180 farmers from the village. Mr. Andrew Moses, First Headman and Mr. Festus N., Secretary, Tribal Council, Harminder Bay termed the event as *Chaklak* festival seeing the enthusiasm of the participants. Further, a demonstration of use of Dweep HanGreens, a hanging structure developed by ICAR-CIARI for cultivation of herbs was also made to 25 farmers, following which 25 units were distributed to the participants for setting up the units in their households. The programme was co-coordinated by Dr. Pooja Bohra, Scientist-SS, ICAR-CIARI under the supervision of Dr. P.K. Singh, Head (I/c), Division of Horticulture and Crop Improvement, ICAR-CIARI and guidance of Dr. E.B. Chakurkar, Director, ICAR-CIARI.



**Plate 18: Demonstration on Drudgery reducing climbing devices demonstration and inputs distribution**



## Trainings/ Meetings/ Interaction/Field day

Title	Course Co-ordinators	Period	Venue	M	F	T
Agricultural technologies for enhancing the income and nutritional security of tribal farmers and Income generating activity for tribal youth	S.K Zamir Ahmed R. Kirubasankar, D.Karunakaran, K. Saravanan, J. Praveenraj	6 <sup>th</sup> to 7 <sup>th</sup> April 2023	Nancowry group of Islands	95	36	131
Awareness program on responsible fishing practices and distribution of fishing inputs	R. Kiruba Sankar, K. Saravanan, J. Praveenraj, S.K Zamir Ahmed and Mohamed Sarief	13 <sup>th</sup> April, 2023	Tribal Council, Car Nicobar	40	-	40
Value addition in flower: Specially bouquet making	V. Baskaran T.Subramani	17 <sup>th</sup> to 21 <sup>st</sup> April, 2023	ICAR-CIARI	10	01	21
Training on Leaf cup making for nursery production to the Skilled Supporting Staff of ICAR-CIARI	I.Jaisankar, T. Subramani, T.P Swarnam	24 <sup>th</sup> to 28 <sup>th</sup> April, 2023	ICAR- CIARI, Port Blair, HRD cell	9	2	11
Orientation training programme on topic "Exposure and knowledge development in agriculture and allied sectors	S.K Zamir Ahmed, R. Kiruba Sankar, D.Karunakaran, K. Saravanan, J. Praveenraj,	9 <sup>th</sup> May to 12 <sup>th</sup> June, 2023	ICAR-CIARI	1	-	-
Freshwater ornamental fish breeding	J. Praveenraj, R. Kiruba Sankar, K. Saravanan, S .K Zamir Ahmed & Chittranjan Raul	10 <sup>th</sup> to 12 <sup>th</sup> May, 2023	Fisheries Training Hall, Department of Fisheries	-	25	25

\*M- Male , F- Female, T- Total

## Publications

- Pooja Bohra, Ajit Arun Waman and Karthika Devi R. (2023) Morphological and biochemical attributes of potted acerola as affected by shade conditions. *Erwerbs- Obstbau*, <https://doi.org/10.1007/s10341-023-00916-6> (IF: 1.3)
  - Devi Priyanka G., Sohini Ghosh, R. Karthika Devi and Ajit Arun Waman (2022). Effect of drying methods on quality parameters of lemon grass (*Cymbopogon flexuosus*) Var. OD-19, *J. Andaman Sci. Assoc.* 27(2):204-209 (NAAS rating:4.15)
  - T. Subramani, A.Velmurugan, N. Bommayasamy, T.P. Swarnam, Y. Ramakrishna, I. Jaisankar and Lakhan Singh. (2023). Effect of Nano Urea on growth, yield and nutrient use efficiency of Okra under tropical island ecosystem. *International Journal of Agricultural Sciences*, 19:134-139. DOI:10.15740/HAS/IJAS/19,RAAAHSTSE-2023/134-139.
  - Adamala, S., Velmurugan, A., Kumari, N., Subramani, T., Swarnam, T.P., Damodaran, V., Srivastava, A. (2023). Application of RMMF based GIS Model for Soil Erosion Assessment in Andaman Ecosystem. *Land*, 12:, 1083.
- Gene bank accession numbers:**
- K. Abirami, V. Baskaran and Augustine Jerard, B. (2023). IC number (0647062) for KhattaChampa(*Musa balbisiana* x *Musa paradisiaca*) from ICAR-NBPGR, New Delhi.
  - K. Abirami, V. Baskaran and Augustine Jerard, B. (2023). IC number (0647063) for Korangi(*Musa balbisiana* x *Musa paradisiaca*) from ICAR-NBPGR, New Delhi.
  - K. Abirami, V. Baskaran and Augustine Jerard, B. (2023). IC number (0647064) for Mitta Champa(*Musa balbisiana* x *Musa paradisiaca*) from ICAR-NBPGR, New Delhi.
  - Augustine Jerard B, M. Sankaran, K. Abirami, V. Damodaran and V. Baskaran (2023) IC number (0647061) for Raja Kela(*Musa balbisiana* x *Musa paradisiaca*) from ICAR-NBPGR, New Delhi.
- Radio talks/ TV programme broadcast**
- (Dr. S.K. Zamir Ahmed): As Expert in Live-in-Phone “Agriculture – Green Revolution Programme” on 15.06.2023 from 5:30 pm to 6:00 pm for the topic “Agriculture Technologies for Employment Activities”.



## Schedule Tribe Component

Programme	No	No of beneficiaries
Training	11	601
Demonstration	4	389
Input distribution	Farm implements=1440 Pesticide= 925 Liquid fertilizers= 40q	706

## Participation in national seminars/ symposia/ conferences/ workshop

Name	Programme	Date/Venue/ Organizer
All Scientist of ICAR-CIARI, Port Blair	Workshop on Sustainable Agro-ecotourism for Andaman and Nicobar Islands: Opportunities and Challenges held at ICAR-CIARI	ICAR-CIARI during 22-23 May 2023
Dr. Ajit Arun Waman	Annual Review Meeting of CSS-MIDH Project on Spices	June 8-9, 2023 at Agricultural Research Station, Mandor, Jodhpur
Dr. Ajit Arun Waman	Delivered an invited lecture entitled 'Technological Interventions in Spices- A complementary sector for island tourism' and also served as co-coordinator during the workshop on Sustainable Agro-ecotourism for Andaman and Nicobar Islands: Opportunities and Challenges	May 22-23, 2023, ICAR-CIARI, organized by Andaman Science Association, Port Blair
Dr. Pooja Bohra	Delivered a lecture entitled 'Processing and value addition of underutilized horticultural crops' during World Intellectual Property Day- 2023 celebration.	26/04/2023, Institute Technology Management Unit, ICAR-CIARI, Port Blair

## Appointment/ Promotion/ transfer/ retirement/ obituary

### Appointment

- Dr Chittaranjan Raul, Scientist (Aquaculture) joined ICAR-CIARI on 13<sup>th</sup> April, 2023

### Promotion

- Dr. Jai Sunder, Pr. Scientist to Head, Animal Science Division on 16<sup>th</sup> June 2023
- Dr. T. Sujatha, Sr. Scientist to Pr. Scientist on 27<sup>th</sup> June, 2021

- Dr. K. Abirami, Sr. Scientist to Pr. Scientist on 14<sup>th</sup> July, 2021

### Transfer

- Dr. Augustine Jerard, Pr. Scientist promoted as Project Coordinator in CPCRI, Kasaragod in AICRP on Palms on 4<sup>th</sup> May, 2023

### Voluntary Retirement

- Dr. Benny Varghese retired on 31<sup>st</sup> May, 2023



Larval rearing technology for fresh water ornamental fish culture



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