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Coconut Development Board

The Coconut Development Board is a statutory body established by the Government of India for the integrated development of coconut cultivation and industry in the country. The Board which came into existence on 12th January, 1981, functions under the administrative control of the Ministry of Agriculture and Farmers Welfare, Government of India, with its headquarters at Kochi in Kerala State and Regional Offices at Bangalore, Chennai, Guwahati and Patna. There are five State Centres situated in the states of Orissa, West Bengal, Maharashtra and Andhra Pradesh and in the Union Territory of Andaman & Nicobar Islands. DSP Farms are located at Neriyamangalam (Kerala), Vegiwada (Andhra Pradesh), Kondagaon (Chhattisgarh), Madehpura (Bihar), Abhayapuri (Assam), Pitapalli (Orissa), Mandya (Karnataka), Palghar (Maharashtra), Dhali (Tamil Nadu), South Hichachara (Tripura) and Fulia (West Bengal) besides a Market Development cum Information Centre at Delhi. The Board has set up a Technology Development Centre at Vazhakulam near Aluva in Kerala.

Functions

❒ Adopting measures for the development of coconut industry. ❒ Recommending measures for improving marketing of coconut and its products. ❒ Imparting technical advice to those engaged in coconut cultivation and industry. ❒ Providing financial and other assistance for expansion of area under coconut. ❒ Encouraging adoption of modern technologies for processing of coconut and its products. ❒ Adopting measures to get incentive prices for coconut and its products. ❒ Recommending measures for regulating imports and exports of coconut and its products. ❒ Fixing grades, specifications and standards for coconut and its products. ❒ Financing suitable schemes to increase the production of coconut and to improve the quality and yield of coconut.

❒ Assisting, encouraging, promoting and financing agricultural, technological, industrial or economic research on coconut and its products. ❒ Financing suitable schemes where coconut is grown on large scale so as to increase the production of coconut and to improve its quality and yield and for this purpose evolving schemes for award of prizes or grant of incentives to growers of coconut and the manufacturers of its products and for providing marketing facilities for coconut and its products. ❒ Collecting statistics on production, processing and marketing of coconut and its products and publishing them. ❒ Undertaking publicity activities and publishing books and periodicals on coconut and its products.

The development programmes implemented by the Board under the project Integrated Development of Coconut Industry in India are- production and distribution of planting material, expansion of area under coconut, integrated farming for productivity improvement, technology demonstration, market promotion and Information and Information Technology. Under the Technology Mission on Coconut, the programmes implemented by the Board are development, demonstration and adoption of technologies for management of insect pest and disease affected coconut gardens, development and adoption of technologies for processing and product diversification and market research and promotion.

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Message from the Chairman's desk

Dear Readers,

During this quarter of the year, we will be celebrating the World Coconut Day. The celebration of World Coconut Day during 2021 has gained more prominence with the advent of coconut as a wonder crop especially during the pandemic. The properties of coconut products in increasing the human immunity have been discussed globally with countries like Philippines and Indonesia initiating clinical trials with the use of Virgin Coconut Oil as adjuvant therapy for Covid – 19 patients. The Ministry of Ayush, Government of India has also recommended use of coconut oil for oil pulling therapy as an immunity boosting measure. The coconut industry has indeed risen as a Sunrise industry and we have to orient our efforts to capitalize on the potentials and diverse uses of this multifaceted crop to the advantage of farming community.

Coconut Development Board has been celebrating September 2nd as 'World Coconut Day' in commemoration of the foundation day of the International Coconut Community (ICC). India is a founder member of ICC and leads in production and productivity of coconut among the major coconut growing countries. Coconut is rightly called the Kalpavriksha, the most useful tree to human being in the plant kingdom providing food, nutrition, drink, health and aesthetic value. During World Coconut day, the crop is celebrated by the coconut community across the globe in unison, bringing a harmony among the coconut growers. The theme announced by ICC for this year's Coconut Day is "Building a safe, inclusive resilient and sustainable coconut community amid covid 19 pandemic and beyond".

The objective of observing coconut day is to create increased awareness on the goodness of coconut and focus national and international attention to this crop and to enhance its potential to alleviate poverty, encourage investment in the sector and promote the total development of coconut industry in the coconut producing countries. Coconut is a crop well suited to accomplish the Sustainable Development Goals and this day helps in increasing awareness about the significance of coconut in human life and its relationship with the social, cultural and economic wellbeing of humans.

The World Coconut Day celebrations during 2021 has an added privilege of being part of the celebrations in commemoration of the 75 years of Independence of our country. It has been included in the Proposed Action Plan of celebrations of "Azadi ka Amrut Mahotsav". The event will be organized virtually with participation of progressive farmer groups, processors, exporters, researchers and other stakeholders.

Let us join together to celebrate the World Coconut Day and beyond to empower our coconut farmers through all round development of the sector.

Rajbir Singh IFS

Chairman

New distributional record of Neotropical Coconut Whitefly *Aleurotrachelus atratus* (Hemiptera: Aleyrodidae) in Tamil Nadu

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Abstract

Occurrence of Neotropical palm infesting whitefly, *Aleurotrachelus atratus* (Hemiptera: *Aleyrodidae*) on coconut (*Cocos nucifera*) was recorded for the first time in Dharmapuri and Krishnagiri districts of Tamil Nadu. Aleurotrachelus atratus is a highly invasive, oligophagous pest which prefer to feed on palm plants and mostly distributed in tropical and subtropical regions. The observed infestation level was low (less than 10 live colony or adults /leaflet) to moderate (11-20 live colony or adults /leaflet). This study also revealed the co-existence of A. atratus with earlier invaded whiteflies viz., rugose spiralling whitefly Aleurodicus rugioperculatus, Bondar's nesting whitefly, Paraleyrodes bondari and nesting whitefly Paraleyrodes minei on coconut. This quick dispersal was believed to occur through transportation of infested seedlings from pest affected areas. Strict domestic quarantine and sensitization of farmers and other stakeholders need to be advocated to avoid spread of this pest to other coconut and other palms growing areas in the country.

Introduction

Invasive whiteflies viz., rugose spiralling whitefly *Aleurodicus rugioperculatus* during 2016, Bondar's nesting whitefly, Paraleyrodes bondari, nesting whitefly, Paraleyrodes minei during 2018 and palm infesting whitefly, Aleurotrachelus atratus during 2019 were invaded on coconut palms and raised biosecurity concerns in India (Selvaraj et al., 2020). They prefer to colonize on palm plants belonging to Arecaceae family. Origin of these invasive species was believed to be Neotropical regions and their interception was likely through importation of plant materials for the trade. Both nymphs and adult whitefly inflict direct feeding injury on the host plants while sucking sap which leads to excessive drains of the sap, necrosis and premature drying. Indirectly, they are producing a significant amount of honeydew which deposit on the upper even some times on lower surface of the infested plants leading to the growth of black sooty mould (Fig.1). This is the secondary infection arising out of the whiteflies infestation which is believed to interfere on plant normal photosynthesis and yield parameters.

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Fig.1. Symptoms of damage of palm infesting whitefly on coconut

Among these whiteflies, Neotropical palm infesting whitefly, Aleurotrachelus atratus was recorded for the first time from India during 2019 in Mandya district of Karnataka on coconut and areca palm *(Dypsis lutescens)* (Selvaraj et al., 2019). Subsequently it spread rapidly to adjoining districts viz., Ramanagara, Mysore, Bengaluru rural, Bengaluru Urban, Hassan, Chamrajnagar and Tumkur and extended its host ranges on areca nut (Areca catechu) and oil palm (Elaeis guineensis) (Selvaraj and Sumalatha, communicated). So far, this species is distributed in various coconut growing areas in Karnataka state only. Its rapid spread and establishment could affect high fecundity, high dispersal and survival ability, voracious feeder, ability to withstand many environmental conditions and benefits from mutual interaction with other insects.

This paper analyses the occurrence and spread of this species in Tamil Nadu for the first time, and its natural enemies and their interaction with other invasive whiteflies infesting coconut.

Materials and Methods

Survey: Feld survey was conducted in Dharmapuri, Krishnagiri, Tirupathur, Tiruvannamalai and Viluppuram districts of Tamil Nadu to assess the incidence and infestation of these invasive whiteflies on coconut and other host plants. Besides, an infested coconut leaf sample was received for identification from a farmer from Marandahalli village of Dharmapuri district. Whiteflies sample along with coconut leaves were collected in paper for further species confirmation. Whitefly species confirmation based on morphological characteristic was achieved by permanent mounts of the puparium and the best mounts were obtained from puparial cases from which adults emerged. During survey, the level of infestation was assessed by visual inspection using a qualitative scale as follows, 0-10= live egg spirals or adults/leaflet (Low); 11-20 live egg spirals or adults/leaflet (moderate) and > 21% live egg spirals or adults/leaflet (severe). To assess this, randomly 10 leaves/palm were selected consisting of upper, medium and lower strata at each location.

Field collected infested plants were sorted out as the prevailing whitefly species-wise and placed in rearing jar (21×10 cm) separately and observed for the emergence of parasitoid adult/ predators. The emerged adult parasitoids were collected using aspirator and preserved in vials containing 70% ethanol for further identification. Assessment of parasitism (%) was determined based on the number of puparium parasitized as against un-parasitized pupae in the host leaves. Identification of natural enemies of other natural enemies such as predators was confirmed by morphological means.

Results and Discussion

New distributional record: Present study revealed the presence of rugose spiralling whitefly *Aleurodicus rugioperculatus*, Bondar's nesting whitefly, Paraleyrodes bondari, nesting whitefly, Paraleyrodes minei and palm infesting whitefly, Aleurotrachelus atratus on coconut. Occurrence of *A. rugioperculatus* (Sundararaj and Selvaraj, 2017), P. bondari and P. minei (Josephrajkumar et al., 2020) in the state was reported earlier. The present study revealed the presence of Neotropical palm infesting whitefly, *A. atratus* in Dharmapuri and Krishnagiri districts of Tamil Nadu. The infestation of *A. atratus* was low (0-10= live egg spirals or adults/leaflet) to

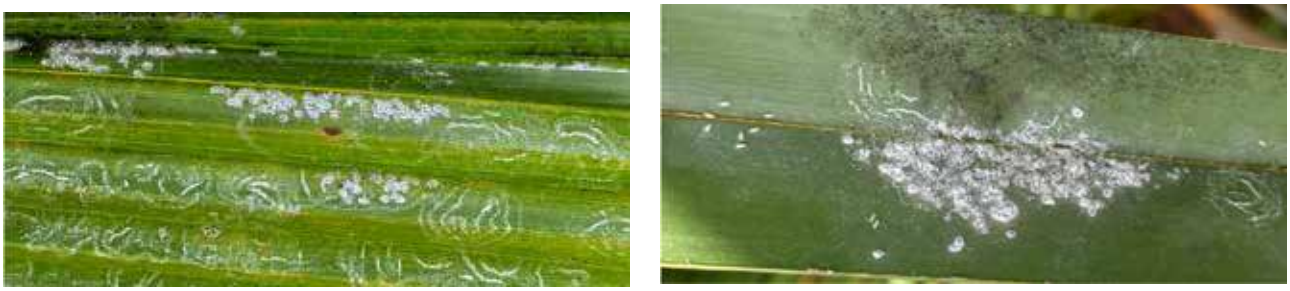

Fig 2: Co-occurring of palm infesting whitefly with rugose spiralling whitefly on coconut

moderate (11-20= live egg spirals or adults/leaflet) and it seems that pest was at initial stage of invasion. This pest population may increase during dry months (March to May) in the district based on interaction with other species. Spread might be from Karnataka through transportation of infested seedling from adjoining districts viz., Mandya and Ramanagara.

Study also revealed the co-occurring of *Aleurotrachelus atratus* with other invasive species such as rugose spiralling whitefly *Aleurodicus rugioperculatus* (Fig. 2), nesting whiteflies, P. bondari and P. minei (Fig.3). Among the species, *Aleurodicus rugioperculatus* and Bondar's nesting whitefly, Paraleyrodes bondari was found to be dominant with moderate (11-20= live egg spirals or adults/leaflet) to severe (30= live egg spirals or adults/leaflet) infestation and major portion of leaves infested in terms of number of colonies. These whiteflies colonizes on the under surface of the leaflets in groups, A. rugioperculatus and A. atratus has higher damage potential, produce of intense white wax which often cover entire immature stages as compared to nesting whiteflies which produce moderate wax. On the other hand, the feeding damage by the nesting whiteflies was not as intense as that of *A. rugioperculatus* and *A. atratus* with minimum honey dew and sooty mould deposits observed on coconut.

Occurrence of parasitiod *Encarsia guadeloupae* Viggiani (*Hymenoptera: Aphelinidae*) on *Aleurodicus rugioperculatus* was recorded with natural parasitism to the extent of 42-68% on coconut. *Encarsia guadeloupae* is the potential dominant parasitoid for *A. rugioperculatus* with 62-82% natural parasitism on coconut and many other host plants (Selvaraj et al., 2016). In case of Bondar's nesting whitefly, P. bondari, nesting whitefly, P. minei and palm infesting whitefly, A. atratus, no parasitism was observed so far under field conditions. Similar observation was also reported earlier in Karnataka (Selvaraj et al., 2019). These show that these invasives might have entered into India without their natural enemy's complex and this might have favoured for severe outbreak situation in short span of time. Among predators, only a generalist predator, Pseudomallada astur (Neuroptera: Chrysopidae) was found to feed on A. atratus, P. bondari and P. minei during survey.

This quick dispersal believed to occur through transportation of infested seedlings from pest affected areas. Strict domestic quarantine and sensitization of farmers and other stakeholders need to be advocated to avoid spread of this pest to other coconut and other palms growing areas in the country.

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The authors thank the Director, ICAR-NBAIR, Bengaluru for providing facilities to carry out the research and The Chairman, Coconut Development Board, Kochi for financial support through research grant.

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Strategies to protect coconut palm
from rhinoceros beetle attack during monsoon

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Removal of beetle using hook

Coconut, *Cocos nucifera (L.)* is popularly known as "Tree of life" or "Kalpavrishka" because of the innumerable benefits it offers to mankind. The crop faces challenges from various biotic and abiotic factors at different phases of its growth and development. Among the biotic stresses, borers are the major constraint limiting the palm plantation productivity worldwide up to 30 %. The Coconut rhinoceros beetle (CRB), *Oryctes rhinoceros Linn. (*Coleoptera: Scarabaeidae) is one of the major borer palm pest which is endemic to all the coconut growing regions. Besides coconut, it also infests oil palm, date palm, areca palm, toddy palm and occasionally feeds on sugarcane, agave, pineapple, banana and taro.

Damage Symptoms

The robust adult black beetles damage the palms by boring into unopened spear leaves, spathes and inflorescences in contrast to the grubs which feed only on decaying organic matter. As the beetles bore deeper into the palm, the chewed fibers are seen extruding from the entry holes. The damaged fronds show characteristic V- or wedge-shaped cuts as they unfold, reducing the photosynthetic area. Seedlings and juveniles are highly susceptible to beetle attack than the grown up palms. Twisting of the spear leaves, stunted growth and improper establishment were observed in the CRB damaged seedlings and such damaged seedlings gets often disposed by farmers in huge numbers. Besides the damage injury by CRB, the bore holes made by this beetle serve as entry points for lethal pests and pathogens like red palm weevil and bud rot fungi, respectively.

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Leaf damage by rhinoceros beetle

Perforated insecticide sachet

Bio – ecology

Although pest occurs throughout the year, peak adult emergence is noticed during June to September months. Adults of O. rhinoceros is a large stout black beetle, 35 – 50 mm long and 14 – 21 mm breadth, possess a characteristic cephalic horn which is longer in males. The pygedium is densely clothed with reddish brown hairs on the ventral surface in the females whereas males are devoid of pygidial hairs. Adults are nocturnal active fliers (active at night) and remain hidden during most of the daytime either in the feeding site or in the breeding sites. Adult live for about 3 – 6 months and average fecundity per female is 108 eggs. Freshly laid eggs are white in colour and globular in shape with incubation period of 8 - 12 days. Larvae are creamy white in colour, C - shaped with well developed brown head capsule, mandibles and thoracic legs. Larval period ranges from 82 to 207 days with three developmental instars followed by pupal period for 20 to 29 days. Larva feeds on the dead wood, dead palm logs and dead standing coconut palms which are killed by pest /disease/ lightning and decaying organic materials like cow dung heaps, compost pits and sawdust heaps are their major breeding sites. Environmental factors like temperature of 27 - 29°C with relative humidity of 85 – 95 % are highly suitable for the faster pest multiplication.

Integrated Pest Management

Oryctes rhinoceros is persistently active and reproductive throughout the year, its detection is often difficult due to its nocturnal activity and cryptic nature of residence within the palms. According to the popular saying, prevention is better than cure, our Integrated pest management (IPM) strategies for rhinoceros beetle emphasizes on phyto – sanitary, preventive methods than the curative methods and it should be deployed on a community basis to bring effective results.

▶ *Phyto – sanitary method*

Maintenance of farm hygiene and sanitation within and the surrounding coconut plantations forms the first line of pest defense. Since O. rhinoceros profusely breed on the organic matter, potential breeding sites like dead palms and decaying coconut logs from the coconut gardens must be cleared off. Compost heaps, cow dung pits and vermi -composting tanks have to be covered with mosquito / nylon nets and turned out frequently for collection of grubs.

▶ *Prophylactic / preventive method:*

• Placing of 250 g powdered oil cakes (neem/ marotti/ pongamia) mixed with sand (1:1) in the top three leaf axils of the palm thrice a year during May, September and December is recommended as prophylactic measure.

• Placing of 3 - 4 naphthalene balls in the leaf axils at the base of the spindle leaf covered with sand ensures protection for 45 - 60 days.

• Placement of two perforated sachets containing chlorantraniliprole (3 g) or fipronil (3 g) in the leaf axils at the base of spindle leaf during monsoon season was found effective. During dry period, 100 ml of water may be poured over the sachet after placement to release the molecule.

• Placement of botanical cakes made out of extracts from *Clerodendron infortunatum Linn.* and *Chromolaena odorata Linn.* on the topmost leaf axils

Shri.Saradindu Das, Chief Coconut Development Officer, Coconut Development Board repatriated to parent department

Shri.Saradindu Das, Chief Coconut Development Officer of Coconut Development Board repatriated to parent department on 1st July 2021. He was serving as Chief Coconut Development Officer of Coconut Development Board since 11th November 2016 on deputation. He has been holding the post of Director of Horticulture Department, Government of Tripura prior to his deputation basis at Coconut Development Board. Shri. Saradindu Das is a postgraduate in Agriculture from Bidhan Chandra Krishi Vishwa Vidyalaya, West Bengal. Shri.Das started his official career in Coconut Development Board as Technical Assistant at State Centre Kolkata in 1985. Subsequently he joined as superintendent in Agriculture Department, Tripura in 1988 and later on served as Deputy Director and Joint Director in Agriculture Department, Government of Tripura.

and or smearing the spindle and adjoining petioles with botanical paste/oils @ 10 gm developed by CPCRI protects juvenile palms from rhinoceros beetle attack.

▶ *Mechanical method*

Periodic observation on the palm crown for any damage symptoms and removal of the beetles using metallic hook during the peak attack period (June-September) can be followed (Fig. 5). As a prophylactic measure, loosely wrapping of unopened spear leaf with adjacent leaf base with locally available fish net/ nylon nets can be followed to avoid CRB damage in crown region. This technique is very effective in trapping adult beetles by entangling them in the nylon net mesh (Fig. 6).

Fig 6 : Wrapping crown portion with nylon net

Fig 7: PVC trap for rhinoceros beetle

▶ *Biological control*

CRB can be effectively managed by utilizing two microbial agents viz., green muscardine fungi (*Metarhizium anisopliae*) and Oryctes rhinoceros nudivirus (OrNV). These organisms are host specific, ecologically safe and they can be integrated with other management strategies.

• Application of green muscardine fungus (Metarhizium anisopliae) @ 5×1011 m-3 to the breeding sites is effective in killing all the stages of the CRB larvae.

• Field release of OrNV infected CRB adults @ 10-15 number/hectare is also effective.

▶ *Pheromone traps*

Installing specially designed PVC trap containing rhino lure or Oryctalure @ 1 trap per hectare are effective in trapping beetles in high numbers . The trapped adult beetles should be periodically collected and killed. However the traps are to be placed away from the seedlings and young palms. ■

Pink Husked Coconut types and its Biochemical Properties

Regi J. Thomas, M. Shareefa, Harsha H. and J. S. Sreelekshmi
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Inflorescence of pink husked type – variety: MGD

Coconut palm, botanically known as Cocos nucifera, belongs to family Arecaceae, an important member of monocotyledons. India is the third largest producer of coconut and has a rich diversity of coconut types. ICAR-CPCRI has a total of 455 germplasm holdings in its genebanks maintained at Kasaragod and Kidu. Coconuts with different traits are available in the germplasm collections available at ICAR-CPCRI.

Characterization of genetic resources in coconut is a pre-requisite for crop improvement initiatives in coconut as the breeding efforts are cumbersome in coconut owing to its perennial nature, long juvenile phase, large area requirement, lack of clonal propagation technique, height of palm and longer time duration for any evaluation trials. Germplasm characterization has resulted in identification and utilization of varieties with different traits and economic uses. However, unexplored diversity still exists in the coconut gene pool.

Scientific studies are lacking on certain specific traits which have already been reported in coconut. Though wide variability and diversity for many traits have been reported in coconut, characterization of individual accessions at different localities is important to utilize them for further improvement programmes. Therefore independently maintained populations at various localities are to be tested before going in for germplasm multiplication and utilization.

Pink husk is one such trait which has already been reported in coconut by workers from different countries. Sparse occurrence of pink husked types was reported from the West Coast Tall (WCT) population cultivated in the root (wilt) disease affected tracts of Kerala, India (Thomas et al., 2016). Such types were also observed in Malayan Green Dwarf (MGD) population cultivated at CDB Farm, Ernakulam (Kerala) and also from ICAR-CPCRI Regional Station, Kayamkulam (Kerala). Rarely such trait specific palms are observed and hence systemic studies using large samples become a constraint. A coconut palm bearing fruits with pink coloured mesocarp was identified in San Ramon Tall population from ICAR-CPCRI, Kasaragod. Flowers and fruits from all bunches exhibited pink colour below the tepals and the husk fibred of tender fruits also exhibit pink colour (Jerard et al, 2016).

Coconut palms with pink husked nuts are rarely reported in farmers' fields also. Morphologically the palms are similar to normal genotype except for the conspicuous pinkish colouration observed on parts

Plumule of pink husked type- variety: MGD

Pink husked types – WCT variety from farmers' field near Kayamkulam

Tendernut of pink husked type – variety: West Coast Tall

of nut between the calyx and the husk portion. The pinkish colouration is also observed in plumular region of germinating nuts and in inflorescence immediately after its opening which will fade in the subsequent days. In few palms roots and root tips also exhibited pinkish colour.

Farmers claim that this mutant coconut type with pink husked nuts has some medicinal properties. It is being used in traditional system of medicines for curing jaundice, for preparing a medicine known as 'Elaneer kuzhambu' and also for treating many eye infections including cataract. Because of these medicinal properties, the tender nut of 'pink husked' genotype is being sold at premium price in the market. In Kareelakulangara (near Kayamkulam), Mr. Soman, a vendor sells the tendernuts of Pink husked coconut types at Rs.60/- to Rs. 65/- compared to Rs. 30/- to Rs. 35/- for normal tendernut.

Systematic study was conducted for biochemical characterization of tendernut water from pink husked types identified from Guam Tall population planted at ICAR-CPCRI, Regional Station, Kayamkulam for validating its nutraceutical properties.

Biochemical characterization: The studies revealed that a significantly higher total phenol content in the tender nut water of pink husked types as compared to control (Table 1). Higher phenol content is clearly an indication of its ability to scavenge free radicals. Antioxidative properties of the coconut water could be attributed to the presence of phenolic compounds. There was no significant difference with regard to free amino acid content in both pink husked and normal husked types. Significantly higher protein content of 86 mg/100 ml was noted in pink husked type as compared to normal husked type with 58.7 mg/100ml indicating nutritional superiority.

Free radicals are unstable molecules that are made during normal cell metabolism (chemical changes that take place in a cell). They accumulate in cells and cause damage to other molecules. This damage may increase the risk of cancer and other diseases. In humans, many diseases are associated with the accumulation of free radicals. Antioxidants can protect cells from the damage caused by free radicals and thereby minimize their impact (Rahman et al., 2016). Therefore, the search for naturally occurring antioxidants of plant origin is imperative. The antioxidant activity of tendernut water from pink husked type was evaluated by DPPH assay. Radical scavenging activity of DPPH was expressed as IC50, which represents the concentration of the extract required to inhibit 50% of the free radical scavenging activity. Higher IC50 value indicates lower radical scavenging activity. Present studies revealed higher scavenging activity based on DPPH assay with pink husked recording IC50 value of 266.67 as compared to normal type with IC50 value of 358.27. Similarly the Phosphomolybdate assay also revealed higher free radical scavenging activity of pink husked type based on IC50 value of 415.17 s compared to 637.9 observed in normal husked type. Tender nut water can act as electron donors due to the presence of phenolic compounds present in it. This may justify its free radical scavenging activity. Significantly higher content of anthocyanin (25.97mg/100 g) was noted in the exocarp of pink husked types and it was negligible in normal husked type (1.464 mg/100g). The presence of higher anthocyanin content also can be correlated to higher antioxidant activity. ■

Mixed cropping of spices in coconut garden- A Success story of rising Rural women

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Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist Ratnagiri

Background

Small holdings and family farming are two predominant modes of agricultural production in the Konkan region of Maharashtra. Family farming is a means of undertaking agricultural and allied sector activities which are generally managed by a family which is predominantly reliant on family labour. Twelve years before, Mrs. Priyanka Nagwekar (34), a resident of Hatis village in Ratnagiri Tahsil of Ratnagiri District ventured into family farming. Both Priyanka and her husband are graduates and her husband was working in a private company in Ratnagiri. She was cultivating subsistence crops like rice, finger millet, vegetables, etc. in the traditional way in her 22 ha farm. Her farm income was very limited due to lack of knowledge and skill about improved agricultural technologies especially coconut and spices crops? She was very ambitious to harvest the full productivity and to make maximum income from the crop. One day she came across the leaflet prepared by Regional Coconut Research Station, Bhatye, Ratnagiri on the role of vermicompost in enhance crop productivity and mixed cropping of spices in coconut garden 'Lakhibaug' concept to enhancing farm income. She was interested about mixed cropping of spices in coconut garden and vermicompost production technology. She started to cultivate spice as mixed crops in coconut garden and successfully planted the spices Nutmeg, and Arecanut as mixed crop in their coconut garden which could get her additional income. She started preparing vermicompost in their farm, which is being used for mixed crops along with coconut crop. This initial step increased her confidence and mooted her interest to start mixed cropping system and vermicomposting as an income generating activity. After acquiring adequate knowledge and skill, availing capital was the main challenge before her for establishing mixed cropping system in coconut along with vermicomposting unit.

Training and motivational support

Priyanka attended a five days vocational training on coconut and spice cultivation technology and vermicompst production at Regional Coconut Research Station, Bhatye, Ratnagiri. The Regional Coconut Research Station scientists motivated her for taking up coconut and spices mixed cropping and vermicompost production. Regional Coconut Research Station, Bhatye, Ratnagiri provided her different spice crops and vermiculture of Eisenia foetida spp. for demonstration. She also attended six days vocational training programmme on coconut tree climbing, FOCT' programme organized at Regional Coconut Research Station, Bhatye, Ratnagiri in collaboration with CDB, Kochi. Afterwards she became a master trainer of 'FOCT Programme at Regional Coconut Research Station, Bhatye, Ratnagiri and also in the Konkan region.

Output

On realizing the financial benefits , she decided to start a commercial mixed cropping of spices in her old coconut orchard alongwith a vericompost production unit. She felt that there was huge demand for organic coconut and that spice farming is trending among the farming community. She realized that people prefer organic food especially tender coconut and spices including black pepper, nutmeg, kokum and banana. Therefore, she decided to expand her small-scale activity into a commercial business venture. The earnings of her husband was insufficient to run the family hence she insisted him to join her in her mixed cropping and nursery activity. Thus he joined her in farming and eventually they expanded their activity by producing root stock plants for spice grafting. They purchased a four wheeler for farming purposes. During the covid-19




Table 1 : Economic status of Agribusiness starting					
Name of startup	Production capacity	Selling rate (Rs)	Turnover /Year (Rs.)	Production cost. (Rs.)	Net Profit (Rs.)
Coconut & Spices	Nuts 6000 Cinnamon 6 kg	@22/- @500/-	132000/- 3000/-	46000/- 1140/-	86000/- 1860/-
Vermicompost unit	12.0 tonnes	@ 15/- kg Vermiculture @ 800 /-	225000/- 8000/-	68000/- 3600/-	156000/- 4400/-
Nursery Management	Black pepper 5000 Bushpepper 1000 Coconut 1200	15/- 60/- 70/-	75000/- 60000/- 70000/-	28000/- 18000/- 19000/-	47000/- 42000/- 51000/-
Grant total			573000/-	184740/-	388260/-

pandemic, this vehicle was used for delivering agricultural produces to market and also for home delivery of produces.

Nursery Management :A Jump Toward Next Agriculture based startup

After establishing herself in mixed cropping of coconut and spices, Mrs. Priyanka Nagwekar mooted the idea of setting up a spice nursery with black pepper cuttings/seedlings. Vermi compost is the media for growing spice plants and she has it in enough quantity. Another reason for starting spice nursery was the demand for spice plants especially 'Bush pepper' plants in Ratnagiri and as pot plants in urban areas. She also had a sales outlet in Ratnagiri. She attended another training in Nursery Management at Regional Coconut Research Station, Bhatye, Ratnagiri. According to her, production of vermicompost and vermiculture is the best option for rural women which can be set up with minimum input cost and time.

Outcome

Economic status of Agribusiness starting (Table 1)

Impact - She is grateful and not stressful

Mrs. Priyanka Nagwekar through her innovative agriculture practices could ensure economic stability to her family. Every year, her financial turnover is around Rs. 5.73 lakh from mixed cropping, vermicompost unit and spice nursery. She is gaining net profit of Rs. 3. 82 lakh from farming alone. Though her annual income is limited at present, she is planning to go for virgin coconut oil production to make better return in future. She is a beginner in agribusiness startup.

The motivation, inspiration and contribution that she receives from her husband is also commendable. She has not only made her family self-reliant but is also able to provide assured employment for her family members.

Contributing and enabling factors

While sharing her experience in agribusiness enterprises, she told that merely subsistence farming is not a solution to the resource poor farmers but secondary agriculture and agribusiness need to be promoted. ■

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Coconut Technology Day celebrated at AICRP centre Ratnagiri

V.V. Shinde[1]*, S.L. Ghavale[2], S.M.Wankhede[3] H.P. Maheswarappa[4]

Coconut sector in Maharashtra

Coconut is a major irrigated horticultural crop of Konkan region of Maharashtra. The agro-climatic conditions are very much congenial for its cultivation in Konkan and Western Maharashtra. Maharashtra Government has launched an ambitious Employment Guarantee Scheme (EGS) for fruit crop cultivation in 1990, because of which the total area has been increased to 43320 ha with productivity of 4885 nuts/ha. Maharashtra occupies the 7th place in area and the 9th place in production of coconut with the annual production of 209.87 million nuts. Over a period of 33 years from 1986-87 to 2020-21, the area under coconut has increased from 6900 ha to 43320 ha and production from 76.32 million nuts to 209.87 million nuts. The maximum area under coconut is in Sindhudurg district followed by Ratnagiri.

District wise Area, Production and Productivity of Coconut in Maharashtra State

Sr. No	Districts	Area (ha)	Production (Lakh nuts)	Productivity (Nuts/ha)
1	Sindhudurg	17929	1457.0	4845.0
2	Ratnagiri	5556.0	406.0	
3	Raigad	2248	107.0	
4	Thane	1161.7	8.0	
5	Palghar	1473.9	16.0	
6	Other	14852	96.0	
7	Total	43320	2098	

(Source;Joint Director of Agriculture report.2019)

[1]Agronomist, [2] Research Officer and Jr.Entomologist[3] ICAR-AICRP on Palms, Regional Coconut Research Station, Bhatye, Ratnagiri, Dr. B.S. Konkan Krishi Vidyapeeth, Dapoli, (M.S.), India [4]Project coordinator, ICAR-AICRP on Palms, ICAR-CPCRI, Kasaragod, Kerala,

Celebration of one day coconut technology day

Modified ground pollination for hybrid coconut production

Regional Coconut Research Station, Bhatye, in Ratnagiri district of Dr. Balasheb Sawant Konkan Krishi Vidyapeeth, Dapoli is catering to the needs of coconut growers in this region through the network of All India Coordinated Research Project on Palm since its establishment in the year 1955.

This research station has contributed to develop one hybrid variety and seven varieties of coconut which are popularly planted by coconut growers in this region. The technology of coconut developed at this station is helpful for coconut growers. The coconut based multistoried cropping system studied under AICRP on palms and recommended by Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli and developed at this station is popular as "Lakhi Baug" among the farmers which generates income of Rs. One lakh from one acre per year.

Repercussions of Nisarga Cyclone

Severe Cyclonic Storm Nisarga was the strongest tropical cyclone to strike the Indian state of Maharashtra since 1891. It was also the first cyclone impact to Mumbai since cyclone phyan of 2009. Nisarga strongly hitted on 3rd June and dissipated on 4th June 2020, making landfall in Maharashtra with winds of 110-120 km/h (70 mph), Though the coconut crop was performing well in Konkan region of Maharashtra the cyclone observed during June. 2020 caused major loss to the coconut estate. The cyclone hit about 3373 ha area loosing young and productive 6-7 lakh coconut trees in the seacoast of Maharashtra.

Challenges

In Maharashtra, the coconut plantation sector is confronted with challenges which is resulting in to abating yield. This down fall needs to be checked and management of garden be improved with standard operating practice and recommended package of practices advocated by the AICRP on palms, Bhatye centre,Ratnagiri. (M.S.)

Mitigation strategies

Our aim for mitigation strategies should be long term and short term planning to achieve fully developed and globally competitive coconut industry to meet the ever growing demand under a changing climate and dwindling natural resources. The marginal and small holding farmers may be trained to mitigate the climate change threats, it is felt necessary to give them training and awareness for economic, efficient and eco-friendly technologies since from planting to end use of coconut. Tracking of challenges in a systematic and holistic way by utilizing the natural resources efficiently can also be done. The key strategies are,

- Raising and supply of quality improved and hybrid seedlings prepared by SAU, DSP farms and registered nursery to nisarg affected farmers and to newly planters.
- Proper planting, after care and soil health management.
- Enhancing the yield with sustainable and recommended package of practice.
- Awareness through mass extension activities like of technological day and melas etc.

Coconut technology day—a way forward

After realising the threats, it was felt that more

Vermicompost preparation -demonstration

attention may be given to this crop to avoid threat from such calamities. faced the farmer community and admistration. The Regional Coconut Research Station, Bhatye Centre, Rastriy Chemicals and Fertilizers, Mumbai and the State Agriculture Department (M.S.) jointly organised a collaborative one day coconut technology day to create awareness and demonstrated coconut technologies among the farmer and coconut growers of Konkan region. Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli through Regional Coconut Research Station, Bhatye one day coconut technology day was celebrated on 27th Jan, 2021. Dr Sanjay Sawant, Hon. Vice Chancellor, Dr. B.S.K.K.V., Dapoli Dr. Parag Haldankar, Director of Research, DBSKKV, Dapoli, Shri. Deelip Zende, Director Inputs and Quality Control from State Agriculture Department, Shri, Madhukar Pacharane, Deputy General Manager, RCF, Pune, Dr. S. B. Kadrekar, Ex. Vice Chancellor, Dr. B.SKKV Dapoli along with Shri. Bal Mane ex. MLA, Ratnagiri attended the programme.

In the opening remarks Shri. Deelip Zende, Director (Agricultural Inputs and quality control) emphasized on the efforts being made by the state agricultural department for the area expansion & marketing of coconut, Hon. Vice Chancellor. Dr. Sawant in his presidential address focused on the need of value addition in coconut as well as proper scientific crop management aspects of coconut palm.

Regional Coconut Research Station, Bhatye organised live demonstration on the following technologies.

1. Coconut tree climbing (FOCT)
2. Virgin coconut oil preparation (VCO)
3. Coconut harvesting through hydraulic machine (HC)
4. Neera production
5. Modified ground pollination technology in coconut (MGPT)
6. High density multispecies cropping system (HDMCS) for konkan region
7. Cinnamon bark harvesting
8. Plant protection management in coconut(INM,IPM,IDM)
9. Vermicompost preparation (VP)
10. Metarizum preparation (MP)

239 farmers from Konlan region were participated in the function. Further, the farmers were given training on new coconut planting technologies, incorporation of green manure legumes in to coconut basin/ interspaces, drainage, manuring and moisture conservation practices, mulching etc.

Most of the farmers were keen and showed interest in VCO preparation & coconut based enterprenship development, as coconut oil and VCO are gaining global importance as a contributing factor for health, nutrient and wellness of human being. Multiple medicinal and nutraceutical properties of coconut were brought to the notice of the coconut growers. This new development in health sector has brought an un precedented increase in the demand of coconut oil.

Coconut products were exhibited at the venue, showcased everything about coconut products and by-products. During this programme the coconut varities developed and recommended by the centre, mode and method of planting, HDMSCS with spices, spice live samples, coconut chips, hydraulic harvester, modified ground pollination kit, neera tapping kit and virgin coconut oil samples were exhibited. The exhibition brought industries, farmers, stakeholders, processors, investors and policy makers together to a common platform.

Plant Protection Technologies

The programme demonstrated various plant

protection technologies for creating awareness among the farmers about coconut pest and disease management.

▶ *Rhinoceros beetle:*

A unit consisting of installation of pheromone traps with application of neem cake and sand (1:1) putting of naphthalene balls, application of botanical cake and making of pits for trapping of grubs of rhinoceros beetle. All the technologies were disseminated with preparation of palm model with treatments. Farmers were very happy to see the palm models.

▶ *Eriophyid mite:*

A live sample was created near the programme which was having eriophyid mite infested nuts. Root feeding technology disseminated by decoration of suitable root, its proper colour solution in plastic bag with rubber band and spraying of sulphur on nuts. The sample palm was self explanatory about mite management.

▶ *Red palm weevil:*

Stem injection with Imidacloprid technology was demonstrated to artificially infected palm having red palm weevil infestation. Identification of symptoms of damage caused by red palm weevil on stem and crown region was the attraction of farmers during rally.

▶ *Rugose spiralling whitefly:*

An invasive pest, rugose spiralling whitefly management technology was demonstrated with live specimen and use of botanicals like neem oil and water spray and also rearing and conservation of Encarsia at field condition. Farmers were very happy to see the live specimen of RSW and bioagents demonstration.

Besides that the bud rot disease management technology, black headed caterpillar management by bioagents with special emphasis on Reduviid bugs, preparation of vermicomposting, harvesting of vermiwash, Indian beekeeping with special emphasis on Trigona beekeeping technologies were demonstrated during farmers rally.

Feedback from farmers

The farmers were happy as they experienced the technological day with the extension principle "Seeing is believing & learning by doing". Most of the farmers pointed out the need and requirement of hybrid coconut seedlings for new coconut planting during forth coming season. Increase in percentage of senile palms is a serious issue in coconut growing garden. A number of gardens are in the process of replanting and rejuvenating. The major constraint in replanting is the unavailability of quality planting materials. The growers focused on the use of mass selection techniques to choose good quality mother palms, seed nuts and seedlings of elite local varieties for the replanting programmes. With increased pressure on land, water and soil nutrients, research should further focus on increasing productivity through development of improved varieties.

Many farmers and coconut growers showed interest to convert the coconut husk and dried leaves in to vermicompost and other fortified material, mannuring. Almost all farmers showed willingness for coconut based cropping system technology with nutmeg, cinnamon and black pepper on top priority.

Literature on INM in coconut based cropping system and plant protection management (IPM) was distributed during the occasion.

Scope for increasing area under coconut cultivation

Small irrigation reservoirs and fresh river water is available for irrigation of coconut in all five districts of Konkan region. Productivity of coconut is high in the Konkan region but this productivity can be increased to about 20,000 nuts/ha with intensive care and management, intercropping and pest control. Product diversification is the need of hour like tender coconut water, coconut powder, coconut charcoal, virgin coconut oil, tender ball copra, coconut chips, coir industry etc. Use of multispecies cropping system to increase yield per unit area of orchards.

Conclusion

Coconut technology day aimed to demonstrate and exhibit the selected technologies used in coconut cultivation to educate farmers about latest research issues, different methods of planting, new hybrids, INM, IPM, IDM and value addition of the coconut products. Such programmes not only convince the farmers about the viability of the technology but also help them in adoption, Such programmes also brings proper feedback. It created not only interest but also confidence among the coconut growers and rural youths. ■

Winter vegetables- a profitable combination with coconut

for better livelihood of the farming community

Arun Kumar Sit and Sandip Shil

ICAR-Central Plantation Crops Research Institute, Research Centre, Jalpaiguri, West Bengal

Coconut the Kalpabriksha is an important plantation crop and is closely related to human life from ritual to livelihood. West Bengal contributes about 384.14 million nuts from an area of 30.82 thousand hectare. A spacing of 7.5 m in the square system is recommended for coconut (175 palms/ha) for optimum production. The rooting pattern of coconut is such that only 23 percent of land area is effectively utilized. Coconut palm, like other monocots, has a typical adventitious root system. About 74 percent of these roots produced by a palm under good management condition do not go beyond 2 m lateral distance and 82 per cent of the roots are confined to 30 to 120 cm depth of soil. Thus, the active root zone of coconut is confined to 25 percent of the available land area and about 75% land is available for growing of inter/mixed crops for more return and employment generation. It has been estimated that 56% sunlight can penetrate through the canopy of around 25 years of coconut palm between 10.00-16.00 hrs. Thus there is ample scope for growing of intercrops for better utilization of available natural resources like land (75%), sunlight (56%) and nutrients.

Cultivation of vegetables under coconut plantation

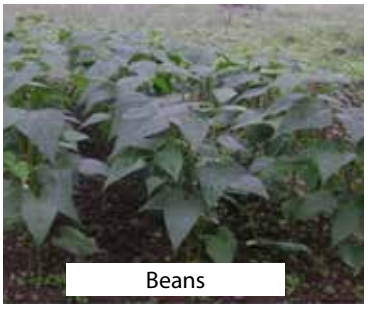
Vegetables play an important role in our daily diet by providing different minerals, dietary fibre, hormones and antioxidants. Different winter vegetables were tried in coconut garden at ICAR-Central Plantation Crops Research Institute, Research Centre, Mohitnagar to see their performance under coconut plantation, effect of intercrop on coconut yield, increase of system productivity and net return from the system. Raised bed having 0.3 m height, 1.2 m width and 4 meter length was prepared for each vegetable crop in between the interspace of palm leaving the 2 m area of active root zone of coconut. Seeds/seedlings of different vegetables like cabbage, cauliflower, knolkhol, spinach, radish, French beans, lafa sag - cluster mallow, tomato and carrot were sown/ transplanted during winter month. Recommended agronomic practices were followed throughout the growth period of the crops.

Yield of vegetables under coconut plantation

The study showed that the yield of cabbage was not as good

Spinach

Radish



Beans

aruncpcrircm@gmail.com


spinach


Tomato


Knolkhol


Lafsag


Cabbage

as open condition. Low yield was also noticed in carrot and tomato in comparison to open condition. The yield of spinach, knolkhol and beans was almost as like as open condition. The vegetative phase of all the winter vegetables was more under coconut canopy. First flowering/flower bud initiation of tomato, beans and cabbage was delayed in comparison to open condition due to shade. But the crop duration of all the crops was more. As a result the harvest duration is increased. Farmers can harvest the crop for more time span. It was also found that evaporation rate of the soil in intercropped area under coconut plantation is less. So minimum irrigation was required for the growth of the intercrops. Space utilization by intercrops also suppresses the weed growth in interspace. Thus the cost of cultivation of the system is reduced.

Yield of coconut under intercrop system

Coconut yield was increased under different inter cropping system. Increased coconut yield ranged from 14.8% to 25.9% over coconut as monocrop. Maximum percent (25.9%) increased yield was recorded in Coconut + carrot combination followed by Coconut + cauliflower (24.2%), coconut + radish (22.4%). Coconut yield is increased under intercropping system due to better management practices for interspace. Hence farmers can achieve more income from coconut in addition to the income from intercrops.

Percentage increase of total system productivity

Though the yield of intercrop is not as good as open condition but the inter space of the coconut plantation is properly used by growing vegetable crops. The yield of intercrops when converted to nut yield of coconut, the system productivity increases manifold. Percent increase of system productivity ranged from 80% to 276%. Maximum percent increase of system productivity (276%) was in coconut + tomato combination followed by coconut + radish (231%) and coconut + cauliflower (211%) combination.

Percentage increase of net return

The net return of all the combinations along with monocrop was calculated. It was found that more than 100% increase on net return for all the crop combinations was observed over coconut monocrop system. Maximum percent (323%) increase on net return was recorded on coconut + tomato combination where return per rupee investment was also more (6.3) in these combination followed by coconut + radish (251%) and coconut + cauliflower (214%). However return per rupee was recorded maximum (7.7) in coconut + spinach combination than the other combinations.

The performance of different intercrops (winter vegetables) is different in the system. Some vegetables performed well and some were not. But the growing of these crops definitely add more income to the farming community by the utilization of resources like light, water and nutrients through the proper distribution of different intercrops in time and space. It also enhances the total system productivity and net return from the system which leads towards doubling of farm income and provides economic stability to the farming community against production and price risk. ■

Exploring the potential of the Island coconut : an industry - grower interface

A stakeholder meet was organized by Coconut Development Board on 23rd July 2021 at Kochi in association with the Administration of the Union Territory of Lakshadweep and Lakshadweep Development Corporation Limited (LDCL). The major objective of the meet was to explore possibilities of establishing trade linkages with major exporters of coconut and coir products, potential collaboration with entrepreneurs/exporters/investors to invest in processing units in the UT or operationalise the existing processing infrastructure installed in the UT. Major exporters of coconut and coconut products participated in the meeting. Exporters of coir products were also invited through Coir Board. Representatives from Coir Board, Spices Board, LDCL, CPCRI and KVK Lakshadweep also participated at the event.

The meet started with a welcome address by Shri. Damodhar A.T. IFS, Secretary Agriculture of the UT and Shri. R. Madhu, Secretay CDB. Secretray Agriculture briefed on the objectives of the meeting. This was followed by opening remarks by Shri. Anbarasu IAS, Advisor to the Administrator of the UT of Lakshadweep who joined the meeting virtually from the island. He was also joined by Shri. O. P. Mishra, Special Secretary and Shri. Sachin Sharma, MD, LDCL.

Advisor informed that in association with NCDC, it is proposed to organize Farmer Producer Organisations in the UT. In order to ensure remunerative returns to the coconut farmers in the islands, it is proposed to promote processing and engage with the private sector in successfully operating the processing units. He also mentioned about the LANID scheme through which initiatives could be supported. He informed that around 8.5 crore nuts would be available for processing after meeting needs of household consumption and current processing undertaken in

the islands. The major development organizations comprising of the Agriculture Department of the UT, CDB, Coir Board and Spices Board presented on the potential activities that could be undertaken for the development of the sector in the UT and the support schemes available.

Discussions were then held with the exporters of coconut and coir products who had participated in the meeting. Around 15 major exporters of coconut products, coir exporters and representatives from the Coir exporters and trade bodies also participated. The investors/entrepreneurs actively discussed the concerns and enquired about the support that the UT can facilitate, the charges for electricity and other utilities, transportation costs, handling costs in ports, issue of ownership of land and non availability of loan for leased land, staff currently working in the units which are to be revived etc. The exporters of coir suggested that the amount of coir generated is not very attractive. But the island could use it for manufacture of geotextiles for protecting the long coastline of 180 km from erosion.

In the reply to the queries, Shri Damodhar IFS explained that the UT is looking for private handholding and partnership for the existing infrastructure and for investments in new infrastructure related to processing of coconut and coir. Trading of coconut, copra to mainland with transportation assistance could be explored initially to establish a channel of trade. Large area certification of the islands as organic territory is also pursued.

Dr. C Thamban, Principal Scientist, CPCRI suggested that there is need for nurturing the production scenario if processing is to be upscaled. The existing facilities and technology for processing have to be upgraded. He also mentioned about the women SHGs that are active in the island which could be used for processing. He stressed the need for restructuring of plant population to aid ecosystem stability and develop island wise scale of operation for processing. The entrepreneurs of the UT also shared their experiences and difficulties in maintenance of machinery, logistics, transportation costs, handling costs at ports etc.

In his closing remarks, Secretary Agriculture briefed about the EOI document for the existing infrastructure and pre bid meeting proposed. A new RFD document is being prepared. Since the season is starting from September, it was proposed to initiate sourcing of nuts in an organised manner. The Advisor added that there would be one to one online meeting meeting with the interested exporters/investors/ entrepreneurs to plan and finalise the way forward for promotion of processing of coconut and coir in the island. ■

Shri Purna Chandra Mishra, MTS retired from the services of Coconut Development Board on 28th February 2021 on superannuation. He served the Board for 31 years.

Shri T N Subramanian, Statistical Investigator retired from the services of Coconut Development Board on 31st March 2021 on superannuation. He served the Board for 31 years.

Shri Mukund Kumar Singh, Assistant Director retired from the services of Coconut Development Board on 31st March 2021 on superannuation. He served the Board for 33 years.

Smt. Annie Eapen, Chemist retired from the services of Coconut Development Board on 30th April 2021 on superannuation. She served the Board for 30 years

Shri P Sabareenathan, Senior Accounts Officer, retired from the services of Coconut Development Board on 31st May 2021 on superannuation. He served the Board for 25 years.

Shri V C Vasanthakumar, Statistical Officer, retired from the services of Coconut Development Board on 31st May 2021 on superannuation. He served the Board for 39 years.

Shri Pavanan T G, Driver Grade - I retired from the services of Coconut Development Board on 31st May 2021 on superannuation. He served the Board for 36 years.

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Indian Coconut Journal (English monthly), Indian Nalikeral Journal (Malayalam monthly), Bharatiya Nariyal Patrika (Hindi quarterly), Bharatiya Thengu Patrike (Kannada quarterly) and Indhia Thennai Idazh (Tamil quarterly) are the periodicals of the Coconut Development Board. These journals regularly feature popular articles on scientific cultivation and other aspects of coconut industry. The journals are subscribed by farmers, researchers, policy makers, industrialists, traders, libraries, etc.

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CDB Institute of Technology (CIT) located at South Vazhakulam,Aluva is the technical wing of Coconut Development Board and is committed to excel in skill development, Knowledge dissemination, Technology Demonstration and Human Resource Development in the area of Coconut Processing and Quality Assurance. The mandate of research and innovation is well supported by good infrastructure and pilot plant facilities.

CIT offers an excellent research environment for Undergraduate and Postgraduate students leading to submission of dissertation as a part of course curriculum and also for students who wish to undergo internship as part of their academics.

Degree/PG Students of the streams Food Technology/Food Science/Nutrition/Chemistry/ Microbiology/Other life sciences could avail this facility. They can carry out their project work in the areas of New Product Development, R&D in Coconut processing, Chemical analysis & Microbiological analysis of food products.

The Quality Testing Laboratory is accredited by NABL (National Accreditation Board for Testing and Calibration Laboratories) and is well equipped with sophisticated instruments like HPLC (High Performance Liquid Chromatography), GCMS(Gas Chromatography Mass Spectrophotometer), AAS(Atomic Absorption Spectrophotometer), UV-Visible Spectrophotometer etc. Pilot plant of CIT is also equipped with various coconut processing and packaging machineries.

During the last financial year, 15 students from six colleges completed their academic project from CIT. India's leading institutions like National Institute of Food Technology Entrepreneurship and Management (NIFTEM), Kerala University of Fisheries and Ocean Studies (KUFOS), Gujarath Forensic Sciences University, CFRD, Karunya University, MG University, Calicut University etc. has been a part of this program.

Technologies for processing various value added products from Coconut, Neera&Haustorium were developed as part of Student projects. Examples are Frozen desserts, Coco chips cluster, Coconut/tender coconut water blends, Sports drink formulation from coconut water, Coconut milk based yogurt, paneer etc are few products developed by students. Students also work on topics like development and standardization of spray dried pineapple flavoured coconut water, copra meal based products like copra meal incorporated chocolate, cake etc., development and standardization of Coconut haustorium based products like haustorium candy, haustorium powder, fresh haustorium juice, haustorum crunches, health mix incorporating haustorium powder, frozen dessert incorporating haustorium powder, haustorium cluster prepared by incorporating dried haustorium sticks and edible seeds, Instant stew mix incorporating haustorium and coconut milk powder etc. Value addition and by-product utilization are the major areas under focus. Students will get an exposure in the areas of product development, standardization, Sensory evaluation, Cost estimation, Quality analysis, Nutritional analysis, Microbiological quality analysis, Shelf life analysis etc. Students can also be a part of various research projects undertaken by CDB Institute of Technology.

CIT provides excellent opportunity for students to conduct study and research in field of Coconut processing and Quality control.

PAHs in Coconut oil testing facility available at Quality Testing Laboratory, CDB

Polycyclic aromatic hydrocarbons (PAHs) are a class of chemicals that occur naturally in coal, crude oil, and gasoline. They are produced when coal, oil, gas, wood, garbage, and tobacco are burned. They are also created in car and diesel exhaust, smoked or charbroiled food, wood burning stoves,cigarette smoke condensate, forest fires and volcanoes. PAHs generated from these sources can bind to or form small particles in the air.

Food contamination by PAHs is due to the natural environment's contamination and also through thermal treatment processes used in the preparation and manufacturing of foods. Barbecuing, smoking or charring food over a fire greatly increases the amount of PAHs in the food, edible oils and fats are also contributing sources of PAHs. Contamination of vegetable oils can mainly be a consequence of the exhaust gases during oilseed drying processes or contamination through the extraction solvent /high temperature during extraction of oil from seeds. To a lesser extent this is a result of atmospheric deposition onto the plant material and uptake by the oilseed plants through soil. This contamination may be then transferred to the final product results in increased amount of polyaromatic hydrocarbons in a final product.

Long-term exposure to low levels of some PAHs has carcinogenic potential. So they have to be monitored in the environment and food stuff. Although hundreds of PAHs exist, some of them are more common;The European Union 835/2011 commission directive defines the maximum content of benzo (a) pyrene in different food stuffs. Benzo (a) pyrene is considered to be a primary marker for the presence of PAHs and must not exceed 2ppb in edible oils. To improve the profiling of PAHs in food products, benz(a)anthracene, chrysene, and benzo(b)fluoranthrene are defined as additional markers. The maximum contamination for these four PAHs together must not exceed 10 ppb. For coconut oil intended for direct human consumption or used as an ingredient in food –the maximum permissible limit of benzo (a) pyrene is 2 ppb and the sum of PAHs is 20 ppb.

Quality testing laboratory of CDB is equipped with sophisticated HPLC instrument for the detection of PAHs in edible oils in ppb levels. Agilent 1260 infinity LC System is used for the direct analysis of polycyclic aromatic hydrocarbons (PAH) from edible plant oils.

It is desirable for coconut oil exporters to analyse and ensure that the quality parameters, metal contaminants and PAHs content of oil are within the permissible limits. Exporters can utilize the facility at QTL-CDB for analysing PAHs content of their oil at a rate of Rs.4956/- (including GST).

Obituary

Shri M.G Prabhakaran, UDC, CDB DSP Farm Fulia, West Bengal expired on 27th May 2021. He has been serving the Board since December 1990.

Shri Rajeev Ranjan Sinha, LDC, CDB Regional Office, Patna expired on 21st April 2021. He has been serving the Board since December 1998.

Cultivation practices for coconut-August

New planting

Plant the coconut seedlings after the cessation of the monsoon in low lying areas subject to inundation during monsoon.

Incorporate green manure legumes into coconut basin / interspace

Green manure crops sown in the coconut basin or in the interspace of coconut gardens have to be incorporated into the soil if they have attained 50% flowering. In the coconut basin, green manure, legumes can be incorporated by using a spade. If tractor is used for incorporating the green manure in the interspace of coconut garden, care should be taken to avoid injury to the coconut trunk.

Nursery management

If sufficient moisture is not available due to insufficient rainfall, continue irrigation for the seedlings in the nursery until rains set in to provide sufficient moisture. Weeding has to be done wherever necessary.

Drainage

Wherever water logging is experienced provide drainage channel to drain the excess water. If continuous heavy rain occurs, make raised bunds around the planting pits of newly planted coconut seedlings to avoid entry of water into the pits.

Manuring

In rainfed areas, circular basins of 1.8 m radius and 25 cm depth may be dug during the fag end of August and green leaf or compost or farm yard manure may be spread at the rate of 50 kg per palm basins. The remaining two-third of the recommended dose of fertilizers may be spread over the green leaf or compost and covered. Application of 500 g N, 320 g P_2O_5 and 1200 g K_2O per palm per year is generally recommended for adult plantations. To supply two-third of the above nutrients it is necessary to apply 0.67 kg urea, 1 kg rock phosphate (in acidic soil) or 1.4 kg Super Phosphate (in other soils) and 1.35 kg of Muriate of potash (MOP). Whereever boron deficiency is observed borax can be applied @100 g/palm. It is always advisable to test soil in the coconut garden periodically (once in 3 years) based on the results of which, type and dosage of chemical fertilizers can be decided.

Moisture conservation practices

Most of the coconut growing tracts in the country received less than average monsoon showers during this season. The month of June recorded 40-50% less rainfall compared to the average. Same trend is being observed during July also. The erratic behaviour of south-west monsoon indicates the significance of conserving each drop of water received. Depending upon the topography and soil type, the following soil and moisture conservation practices can be adopted in coconut gardens.

Mulching

In order to conserve soil moisture in the coconut plantations, mulching with various types of organic materials can be practiced. The best time for mulching is before the end of the monsoon and before the top soil dries up. For mulching, cut coconut leaves into two or three pieces. To cover 1.8 m radius of coconut basin, 10 to 15 fallen coconut leaves are required and can be spread in two to three layers.

Mulching with composted coir pith to 10 cm thickness (approximately 50 kg/palm) around coconut basin is also an ideal method to conserve moisture. Coir pith can hold moisture five times its weight. Due to its fibrous and loose nature, incorporation of coir pith considerably improves the physical properties and water holding capacity of soil. The applied material may last for about 1 to 2 years. Coconut husks are also used as surface mulch around the base of the palm. It can hold moisture to the tune 3 to 5 times of its weight. Approximately 250 to 300 husks will be required for mulching one coconut basin. Mulching is usually done up to a radius of 2 m leaving approximately 30 cm near the palm. Two layers of husk may be buried in the coconut basin with the concave side facing upwards. These layers facilitate absorption of moisture. Above this, another layer of coconut husk is placed with the convex side facing upwards to arrest evaporation. Effect of this mulch lasts for about 5-7 years.

Husk burial

Burial of husk in trenches in between the rows of palms is also effective for moisture conservation in coconut gardens. Husk burial is to be done at the beginning of the monsoon, in linear trenches of 1.2 m width and 0.6 m depth between rows of palms with concave side of husks facing upwards and each layer is to be covered with soil.

Catch pit filled with coconut husk

Catch pits can be constructed at slopes to conserve soil and water. Though there are no standard dimensions for catch pits, catch pits of 1.5 m length x 0.5 m width x 0.5 m depth can be constructed. A bund is to be made at the downside using the excavated soil and pineapple suckers may be planted on it. This pit is also to be filled with coconut husk.

Contour trench filled with coconut husk

This measure is to be taken up where the land slope is high. Trenches of 50 cm width x 50 cm depth and convenient length are to be made in between two rows of coconut palms. These trenches are to be filled with coconut husk. Coconut husks need to be filled in layers with the bottom layers facing up and top layer facing down. A bund of 20 cm height and suitable width (>50 cm) is made at the downstream using the excavated soil. Two layers of pineapple plants are to be planted on the bund with a spacing of 20 cm x 20 cm. Pineapple plants would stabilize the bund and provide additional income to the farmer. The runoff water from the upper side would be collected in the trenches. Soil particles would also get deposited in the trench along with the runoff water. Coconut husk retains the moisture and makes it available for plants during summer months.

Half-moon bund around coconut basin reinforced with pineapple

This measure is to be taken up where there is mild slope (15-20%). Here a flat basin with a slight inward slope towards upstream is made by excavating soil from the upstream side and filling the excavated soil at the downstream side. After making the basin, a bund of 30 cm height and >50 cm width is made at the downstream side of the coconut using the excavated soil. Two layers of pineapple plants could be planted with a spacing of 20 cm row to row and 20 cm plant to plant on the bund. The bund prevents runoff and water gets collected within the basin and percolates down. Pineapple would help to protect the bund and stabilize the same in addition to giving fruit yield.

Plant protection

August marks the transition phase between the two monsoon periods. Since the quantum of monsoon showers had dropped significantly, there is more emergences of sucking pests in this phase, especially the coried bug and spiralling whiteflies. Extreme care should now be focussed on the early diagnosis of coreid bug incidence as this pest causes a greater damage on the nut yield potential in different parts of the country more specifically in Southern Kerala. In areas where rugose spiralling whitefly was not reported so far, this pest could emerge as well for which greater emphasis is laid on biological control. Greater emergence of the killer disease, bud rot is more visible in this part of the year for which adequate prophylactic measures need to be undertaken to tackle this problem. Weakening monsoon showers as well as weather dynamics favoured a major shift in the pest and disease kinetics invading coconut, and therefore warrants systematic monitoring and timely prophylactic measures.

Pests

▶ *Rhinoceros beetle (Oryctes rhinoceros)*

Being a ubiquitous pest, the incidence of rhinoceros beetle is quite common during all periods. However its damage is well pronounced during monsoon phase when seedlings are also planted. In seedlings just planted, the spear leaf gets damaged and distorted by beetle damage. Juvenile palms are also prone to pest attack and sometimes appearing as elephant tusk-like symptoms. Damaged juvenile palms are stunted and get delayed in flowering. Of late incidence of nut boring symptoms are also noticed. Moreover, the attack by rhinoceros beetle would invariable incite egg laying by red palm weevil as well as entry of bud rot pathogen during this period.

Management

- Prophylactic treatment of top most three leaf axils


Life stages of the pest


Nut damage


Elephant-tusk like symptom


Metarhizium packets

with either botanical cake [Neem cake /marotti cake / pungam cake (250 g)] admixed with equal volume of sand or placement of 12 g naphthalene balls covered with sand.

- Routine palm scrutiny during morning hours along with brushing of teeth and hooking out the beetle from the infested site reduces the floating pest population. This strategy could reduce the pest population significantly.
- Shielding the spear leaf area of juvenile palms with fish net could effectively entangle alighting rhinoceros beetles and placement of perforated sachets containing 3 g chlorantraniliprole /fipronil on top most three leaf axils evade pest incursion.
- Dairy farmers could treat the manure pits with green muscardine fungus, *Metarhiziuman isopliae* @ 5 x 1011 /m3 to induce epizootics on the developing grubs of rhinoceros beetle. Area-wise farmer-participatory approach in technology adoption could reduce the pest incidence very effectively and forms an eco-friendly approach in pest suppression.
- Incorporation of the weed plant, *Clerodendron infortunatumin* to the breeding pits caused hormonal irregularities resulting in morphogenetic transformational aberration in the immature stages of the pest.
- Crop diversity induced by intercropping and ecological engineering principles would disorient pests and provide continuous income and employment as well.

White grub, *Leucopholis coneophora*

This subterranean pest feeds on the roots of coconut and cause yellowing of leaves, premature nut fall, delayed flowering, retardation of growth and reduction in yield. Since grubs are hidden in soil, symptom diagnosis is very crucial in the identification of pest damage. Grubs initially feed on organic materials, roots of grasses and intercrops before feeding on the palm roots. Adults emerge from the soil during the month of June. The pest is very severe in certain sandy belts of Kasaragod, Kerala and parts of Karnataka.

Management

- Repeated summer ploughing to expose the immature stages of predation
- Handpicking of adult beetles during evening of two weeks commencing from the onset of monsoon.
- Application of neem cake in the palms basin @ 5 kg /palm for regeneration of roots.
- Soil application of aqua suspension of entomopathogenic nematode, Steinernemacarpocapsae @ 1.5 billion/ha and need based repeated application

Rugose Spiralling Whitefly *(Aleurodicus rugioperculatus)*

This period could also witness the establishment of the invasive rugose spiralling whitefly (*Aleurodicusrugioperculatus*) in new areas as well as re-emergence in already reported areas. Presence of whitefly colonies on the lower surface of palm leaflets and appearance of black coloured sooty mould deposits on the upper surface of palm leaflets are characteristic visual symptoms of pest attack. In severe cases, advancement in senescence and drying of old leaflets was observed. Leaflets, petioles and nuts were also attacked by the whitefly pest and a wide array of host plants including banana, bird of paradise, Heliconia sp. were also reported.

Management

- In juvenile palms, spraying of water with jet speed could dislodge the whitefly and reduce the feeding as well as breeding potential of the pest.
- Ensure good nutrition and adequate watering to improve the health of juvenile and adult palms

Rugose spiralling whitefly Parasitized pupae

Encarsiaguadeloupae Sooty mould scavenger beetle

- No insecticide should be used as this causes resurgence of the pest and complete destruction of the natural aphelinid parasitoid, *Encarsiaguadeloupae*. A pesticide holiday approach is advocated for the build up of the parasitoid.
- Installation of yellow sticky traps and conservatory biological control using *E. guadeloupae* could reduce the pest incidence by 70% and enhance parasitism by 80%.
- Habitat preservation of the sooty mould scavenger beetle, *Leiochrinusnilgirianus* could eat away all the sooty moulds deposited on palm leaflets and cleanse them reviving the photosynthetic efficiency of palms.
- A close scrutiny should be made for the presence of other whiteflies including the nesting whiteflies on coconut system.

Coreid Bug, *Paradasynus rostratus*

Nymphs and adults puncture the meristematic regions of tender buttons (1-3 months old) injecting toxin around the feeding site causing necrosis. Feeding punctures develop into necrotic lesions and these spindle-shaped depressions could be visible when the perianth of shed button is removed. Female flowers are attacked prior to pollination and such flowers get dried and can be seen attached to inflorescence on the crown resulting in production of barren buttons. Most of the infested buttons and tender nuts shed down. Retained nuts on the bunch develop furrows and crinkles on their husks and are malformed. In many cases gummosis can be seen on such

Management

- Crown cleaning to destroy eggs and immature stages of the pest
- Spraying of azadirachtin 300 ppm (Nimbecidene) @ 0.0004% (13 ml / l) reduced the pest incidence at the highest level. Two rounds of azadirachtin spray on young coconut bunches 1-5 months old during May-June and September-October are quite essential for satisfactory control of the pest in the field
- Among the natural enemies, the weaver ant, Oecophyllasmaragdinais found to be the most efficient predator of coreid bug in the field.

● Two egg parasitoids, namely *Chrysochalcissaoviceps* and *Gryonhomeoceri*, were identified as potential egg parasitoids. Forty per cent parasitism was observed in the egg mass collected from the field due to these parasitoids.

● Spraying cholrantraniliprole 0.3 ml/litre or lambda cyhalothrin @ 1.0 ml/litre on the pollinated bunches was found effective.

Disease

Bud rot or immature nut fall *(Phytophthora palmivora)*

In certain humid locations bud rot occurred regularly killing hundreds of trees. In India, bud rot incidence is recorded as less than one per cent. Pathogen attacks the bud region leading to rotting of bud and death of palms. The first visible symptom is withering of the spindle marked by pale colour. The spear leaf or spindle turns brown and bends down. The affected spear leaf can easily be pulled out as the basal portion of the spindle is completely rotten emitting a foul smell. Temperature range of 20- 24ºC and relative humidity of 98% - 100% were found optimum for the development of the bud rot disease. Contiguous occurrence of such "favourable days" during rainy seasons determines the development of the disease and the intensity of infection. As Phytophthora diseases are known to be extremely fatal, a close scrutiny is mandatory during monsoon

period to assess the health of the palm especially the spear leaf zone.

Management

● Regular cleaning of the crown and prophylactic spraying of Bordeaux mixture (1%) to the crown just before the onset of monsoon and one more spray after 35-40 days help in reducing the bud rot incidence. For the newly planted seedlings also prophylactic spraying of Bordeaux mixture (1%) can be given to avoid infection. In localities where heavy wind is experienced and leaves of coconut palms got damaged, spraying of Bordeaux mixture (1%) is essential to prevent infection by Phytophthora.

● Field sanitation and provide proper drainage during rainy season.

● Placement of two Trichoderma (Trichoderma harzianum CPTD28 isolate) enriched coir pith cakes in the inner most leaf axils just before the onset of monsoon and again after every two months as prophylactic measure.

● In disease affected palms, remove the entire rotten portion of the spindle by cutting with a sharp knife and apply 10% Bordeaux paste to the wound and cover with polythene sheet to prevent entry of rain water. The protective covering has to be retained till normal shoot emerges.

As envisaged, timely monitoring and prophylactic measures are very critical to safeguard palm health and provide optimum nut yield. Protection is therefore the key strategy to boost up productivity and double farmer's income. ■

Market Review – April 2021

Domestic Price

Coconut Oil

During the month of April 2021 the price of coconut oil opened at Rs. 20900 per quintal at Kochi and Rs. 20950 per quintal at Alappuzha market and Rs. 21800 per quintal at Kozhikode market. The price of coconut oil at Kochi, Alappuzha and Kozhikode market expressed a downward trend during the month.

The price of coconut oil closed at Rs. 18650 per quintal at Kochi and Rs. 18300 per quintal at Alappuzha market and Rs. 20400 per quintal at Kozhikode market with a net loss of Rs. 2250 for quintal at Kochi and Rs. 2650 per quintal at Alappuzha and Rs.1400 per quintal at Kozhikode market.

No report was received from Kangayam market during the first week of the month.

During the Second week of the month the price of coconut oil at Kangayam market reported was Rs. 18533 per quintal and closed at Rs. 17067 per quintal with a net loss of Rs. 1466 per quintal.

Weekly price of coconut oil at major markets Rs/Quintal)				
	Kochi	Alappuzha	Kozhikode	Kangayam
01.04.2021	20900	20950	21800	NR
03.04.2021	20900	20900	21800	NR
10.04.2021	20150	20350	21700	18533
17.04.2021	19800	19800	21300	18400
23.04.2021	19800	19950	21300	18400
30.04.2021	18650	18300	20400	17067

Milling copra

During the month, the price of milling copra opened at Rs.13750 per quintal at Kochi and Rs.13650 per quintal at Alappuzha market and Rs. 13600 per quintal at Kozhikode market.

The prices of milling copra closed at Rs. 12350 per quintal at Kochi and Rs. 12100 per quintal at Alappuzha market and Rs. 12400 per quintal at Kozhikode market with a net loss of Rs.1400 at Kochi and Rs.1550 at Alappuzha and Rs.1200 per quintal at Kozhikode market.

**NR-Not reported*

During the Second week of the month the price of milling copra at Kangayam market opened at Rs. 12200 per quintal and expressed a downward trend and closed at Rs.10800 per quintal.

Weekly price of Milling Copra at major markets (Rs/Quintal)				
	Kochi	Alappuzha (Rasi Copra)	Kozhikode	Kan-gayam
01.04.2021	13750	13650	13600	NR
03.04.2021	13750	13650	13600	NR
10.04.2021	13300	13300	13300	12200
17.04.2021	13050	13050	13100	12000
23.04.2021	13100	13100	13200	12000
30.04.2021	12350	12100	12400	10800

Edible copra

During the month under report the price of Rajpur copra at Kozhikode market opened at Rs. 16600 and closed at Rs.18800 per quintal with a net gain of Rs.2200 per quintal.

Weekly price of edible copra at Kozhikode market (Rs/Quintal)	
01.04.2021	16600
03.04.2021	16600
10.04.2021	17100
17.04.2021	17800
23.04.2021	18700
30.04.2021	18800

Ball copra

The price of ball copra at Tiptur market opened at Rs. 14500 per quintal and closed at Rs.15700 per quintal with a net gain of Rs.1200 per quintal.

Weekly price of Ball copra at major markets in Karnataka (Rs/Quintal)	
01.04.2021	14500
03.04.2021	15000
10.04.2021	15500
17.04.2021	15800
23.04.2021	15900
30.04.2021	15700

Dry coconut

At Kozhikode market, the price of dry coconut opened at Rs.11050 and closed at Rs.10350 per quintal with a net loss of Rs.700 per quintal.

Weekly price of Dry Coconut at Kozhikode market (Rs/Quintal)	
01.04.2021	11050
03.04.2021	11050
10.04.2021	11050
17.04.2021	10350
23.04.2021	10350
30.04.2021	10350

Coconut

At Nedumangad market in Kerala, the price of coconut opened at Rs. 20000 and closed at Rs. 18000 per thousand nuts with a net loss of Rs. 2000 per thousand nuts during the month.

During the Second week of the month the price of Pollachi market was opened at Rs.16000 per thousand nuts and closed at Rs. 13000 per thousand nuts with a net loss of Rs. 3000 per thousand nuts.

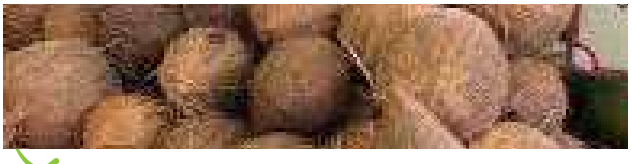
At Bangalore market in Karnataka, the price of coconut opened and closed at Rs. 22500 per thousand nuts during the month.

Weekly price of coconut at major markets (Rs /1000 coconuts)				
	Nedumangad	Pollachi	Man-glore	Banglore
01.04.2021	20000	NR	22500	22500
03.04.2021	20000	NR	22500	NR
10.04.2021	19000	16000	NR	NR
17.04.2021	19000	15000	NR	27500
23.04.2021	19000	15000	22500	NR
30.04.2021	18000	13000	22500	25000

International price

Coconut

The price of coconut quoted at different domestic markets in Philippines, Indonesia, Srilanka and India are given below.



Weekly price of dehusked coconut with water				
Date	Domestic Price (US$/MT)			
	Philippines	Indonesia	Srilanka	India*
03.04.2021	250	226	NR	NR
10.04.2021	251	226	NR	472
17.04.2021	263	226	NR	445
24.04.2021	261	207	NR	445
				*Pollachi market

Coconut Oil

International price as well as domestic price of coconut oil in other countries expressed an upward trend during the month. However domestic price of India expressed a downward trend during the month.

The price of coconut oil quoted at different international/ domestic markets are given below.

Weekly price of coconut oil in major coconut oil producing countries					
	International Price(US$/MT)	Domestic Price(US$/MT)			
	Philippines/ Indonesia (CIF Europe)	Philip-pines	Indo-nesia	Sri lanka	India*
03.04.2021	1460	NR	1322	2997	2582
10.04.2021	1502	NR	1374	3377	2501
17.04.2021	1528	NR	1302	3214	2483
24.04.2021	1681	NR	1446	3418	2474
					* Kangayam

Copra

The price of copra at Philippines, Srilanka and Indonesia expressed an upward trend during the month, whereas prices in India expressed a downward trend during the month. The price of copra quoted at different domestic markets in Philippines, Indonesia, and India are given below.

Weekly International price of copra in major copra producing countries				
Date	Domestic Price (US$/MT)			
	Philippines	Indonesia	Srilanka	India* * Kangayam
03.04.2021	918	826	1567	1700
10.04.2021	903	852	1763	1647
17.04.2021	911	846	1697	1620
24.04.2021	932	895	1924	1620

Market Review – May 2021

Domestic Price

Coconut Oil

During the month of May 2021 the price of coconut oil opened at Rs. 18650 per quintal at Kochi and Alappuzha market and Rs. 20100 per quintal at Kozhikode market. The price of coconut oil at Kochi, Alappuzha and Kozhikode market expressed a slight downward trend till third week of the month and there after registered improvement.

The price of coconut oil closed at Rs. 18400 per quintal at Kochi and Alappuzha market and Rs. 20200 per quintal at Kozhikode market with a net loss of Rs. 250 per quintal at Kochi and Alappuzha market and with a net gain of Rs.100 per quintal at Kozhikode market.

At Kangayam market the price of coconut oil opened at Rs. 17200 per quintal and closed at Rs. 16467 per quintal with a net loss of Rs. 733 per quintal.

Weekly price of coconut oil at major markets Rs/Quintal)				
	Kochi	Alappuzha	Kozhikode	Kangayam
03.05.2021	18650	18650	20100	17200
08.05.2021	18100	18250	19700	15667
15.05.2021	18200	18200	19700	16867
22.05.2021	18200	18100	19500	16333
29.05.2021	18400	18400	20200	16667
31.05.2021	18400	18400	20200	16467

Milling copra

During the month, the price of milling copra opened at Rs.12350 per quintal at Kochi and Rs.12250 per quintal at Alappuzha market and Rs. 12400 per quintal at Kozhikode market.

The prices of milling copra closed at Rs. 12050 per quintal at Kochi and Rs. 11850 per quintal at Alappuzha market and Rs. 12300 per quintal at Kozhikode market with a net loss of Rs.300 at Kochi and Rs.400 at Alappuzha and Rs.100 per quintal at Kozhikode market.

During the month the price of milling copra at Kangayam market opened at Rs. 10800 per quintal and expressed a downward trend and closed at Rs.10600 per quintal.

Weekly price of Milling Copra at major markets (Rs/Quintal)				
	Kochi	Alappuzha (Rasi Copra)	Kozhikode	Kan-gayam
03.05.2021	12350	12250	12400	10800
08.05.2021	11800	11800	11300	9800
15.05.2021	11850	11800	11400	10500
22.05.2021	11850	11650	11600	10550
29.05.2021	12050	11850	12200	10800
31.05.2021	12050	11850	12300	10600

Edible copra

During the month under report the price of Rajpur copra at Kozhikode market opened at Rs. 18800 and closed at Rs.20000 per quintal with a net gain of Rs.1200 per quintal.

Weekly price of edible copra at Kozhikode market (Rs/Quintal)	
03.05.2021	18800
08.05.2021	19000
15.05.2021	19000
22.05.2021	20000
29.05.2021	20000
31.05.2021	20000

Ball copra

The price of ball copra at Tiptur market opened at Rs. 15500 per quintal and closed at Rs.16300 per quintal with a net gain of Rs.800 per quintal.

Weekly price of Ball copra at major markets in Karnataka (Rs/Quintal)	
03.05.2021	15500
08.05.2021	15500
15.05.2021	15600
22.05.2021	16000
29.05.2021	16500
31.05.2021	16300

**NR-Not reported*

Dry coconut

At Kozhikode market, the price of dry coconut opened and closed at Rs.10350 per quintal

Weekly price of Dry Coconut at Kozhikode market (Rs/Quintal)	
03.05.2021	10350
08.05.2021	10350
15.05.2021	10350
22.05.2021	10350
29.05.2021	10350
31.05.2021	10350

Coconut

At Nedumangad market in Kerala, the price of coconut opened and closed at a constant rate.

During the first week of the month the price of Pollachi market was opened at Rs.13000 per thousand nuts and no report was received from pollachi market during the remaining weeks.

At Bangalore market in Karnataka, the price of coconut opened and closed at the same price during the month, which was at Rs.22500 per thousand nuts.

Weekly price of coconut at major markets (Rs /1000 coconuts)			
	Nedumangad	Pollachi	Banglore
03.05.2021	18000	13000	22500
08.05.2021	18000	12000	NR
15.05.2021	18000	NR	NR
22.05.2021	18000	NR	27500
29.05.2021	18000	NR	NR
31.05.2021	18000	NR	25000

International price

Coconut

The price of coconut quoted at different domestic markets in Philippines, Indonesia, Srilanka and India are given below.

Weekly price of dehusked coconut with water				
Date	Domestic Price (US$/MT)			
	Philippines	Indonesia	Srilanka	India*
01.05.2021	260	194	NR	400
08.05.2021	258	217	NR	366
15.05.2021	261	211	315	NR
22.05.2021	259	219	315	NR
29.05.2021	228	217	317	414
				*Pollachi market

Coconut Oil

International price as well as domestic price of coconut oil in other countries expressed a downward trend during the month. However domestic price of Srilanka expressed an upward trend and India expressed a mixed trend during the month.

The price of coconut oil quoted at different international/ domestic markets are given below.

Weekly price of coconut oil in major coconut oil producing countries					
	International Price(US$/MT)	Domestic Price(US$/MT)			
	Philippines/ Indonesia (CIF Europe)	Philip-pines	Indo-nesia	Sri lanka	India*
01.05.2021	1665	NR	1588	3639	2375
08.05.2021	1651	NR	1545	3634	2064
15.05.2021	1711	NR	1546	3684	2330
22.05.2021	1703	NR	1454	3681	2256
29.05.2021	1690	NR	1455	3784	2302
					* Kangayam

Copra

The price of copra at Philippines and Srilanka expressed an upward trend during the month. Price in Indonesia expressed a downward trend and India expressed a mixed trend during the month. The price of copra quoted at different domestic markets in Philippines, Indonesia, and India are given below.

Weekly International price of copra in major copra producing countries				
Date	Domestic Price (US$/MT)			
	Philippines	Indonesia	Srilanka	India* * Kangayam
01.05.2021	936	908	1907	1491
08.05.2021	940	932	1980	1354
15.05.2021	964	948	2030	1464
22.05.2021	983	898	2028	1457
29.05.2021	979	895	2155	1491

Market Review – June 2021

Domestic Price

Coconut Oil

During the month of June 2021 the price of coconut oil opened at Rs. 18300 per quintal at Kochi and Rs. 18400 per quintal at Alappuzha market and Rs. 20200 per quintal at Kozhikode market. The price of coconut oil at Kochi, Alappuzha and Kozhikode market expressed a downward trend during the month.

The price of coconut oil closed at Rs. 17900 per quintal at Kochi and Rs. 17900 per quintal at Alappuzha market and Rs. 18400 per quintal at Kozhikode market with a net loss of Rs. 400 per quintal at Kochi and Rs. 500 per quintal at Alappuzha and Rs.1400 per quintal at Kozhikode market.

During the month, the price of coconut oil at Kangayam market opened at Rs. 16133 per quintal and closed at Rs. 15467 per quintal with a net loss of Rs. 666 per quintal.

Weekly price of coconut oil at major markets Rs/Quintal)				
	Kochi	Alappuzha	Kozhikode	Kangayam
01.06.2021	18300	18400	20200	16133
05.06.2021	18300	18300	20000	16267
12.06.2021	18300	18300	18900	16000
19.06.2021	18200	18200	18700	16000
26.06.2021	17900	17900	18400	15400
30.06.2021	17900	17900	18400	15467

Milling copra

During the month, the price of milling copra opened at Rs.11950 per quintal at Kochi and Rs.11850 per quintal at Alappuzha market and Rs. 12000 per quintal at Kozhikode market.

The prices of milling copra closed at Rs. 11200 per quintal at Kochi and Rs. 11350 per quintal at Alappuzha market and Rs. 11100 per quintal at Kozhikode market with a net loss of Rs.750 at Kochi and Rs.500 at Alappuzha and Rs.900 per quintal at Kozhikode market.

During the month the price of milling copra at Kangayam market opened at Rs. 10500 per quintal and expressed a downward trend and closed at Rs.10350 per quintal.

Weekly price of Milling Copra at major markets (Rs/Quintal)				
	Kochi	Alappuzha (Rasi Copra)	Kozhikode	Kan-gayam
01.06.2021	11950	11850	12000	10500
05.06.2021	11850	11800	11600	10700
12.06.2021	11850	11800	11500	10500
19.06.2021	11750	11650	11350	10600
26.06.2021	11300	11350	11100	10300
30.06.2021	11200	11350	11100	10350

Edible copra

During the month under report the price of Rajpur copra at Kozhikode market opened at Rs. 20000 and closed at Rs. 17100 per quintal with a net loss of Rs.2900 per quintal.

Weekly price of edible copra at Kozhikode market (Rs/Quintal)	
01.06.2021	20000
05.06.2021	19000
12.06.2021	18500
19.06.2021	17500
26.06.2021	16800
30.06.2021	17100

Ball copra

The price of ball copra at Tiptur market opened at Rs. 16400 per quintal and no report was received from Tiptur market during the last week.

Weekly price of Ball copra at major markets in Karnataka (Rs/Quintal)	
01.06.2021	16400
05.06.2021	16000
12.06.2021	15300
19.06.2021	15900
26.06.2021	NR
30.06.2021	NR

**NR-Not reported*

Dry coconut

At Kozhikode market, the price of dry coconut opened at Rs.10350 and closed at Rs.15250 per quintal with a net gain of Rs.4900 per quintal.

Weekly price of Dry Coconut at Kozhikode market (Rs/Quintal)	
01.06.2021	10350
05.06.2021	10350
12.06.2021	10350
19.06.2021	10350
26.06.2021	16000
30.06.2021	15250

Coconut

At Nedumangad market in Kerala, the price of coconut opened at Rs. 18000 and closed at Rs. 16000 per thousand nuts with a net loss of Rs. 2000 per thousand nuts during the month.

Price was not reported from Pollachi market during the first three weeks of the month. During the last week of the month the price of Pollachi market was Rs.12000 per thousand nuts.

At Bangalore market in Karnataka, the price of coconut opened at Rs. 22500 per thousand nuts sand closed at Rs. 27500 per thousand nuts during the month.

Weekly price of coconut at major markets (Rs /1000 coconuts)			
	Nedumangad	Pollachi	Banglore
01.06.2021	18000	NR	22500
05.06.2021	18000	NR	22500
12.06.2021	18000	NR	22500
19.06.2021	17000	NR	22500
26.06.2021	17000	12000	22500
30.06.2021	16000	12000	27500

International price

Coconut

The price of coconut quoted at different domestic markets in Philippines, Indonesia, Srilanka and India are given below.

Weekly price of dehusked coconut with water				
Date	Domestic Price (US$/MT)			
	Philippines	Indonesia	Srilanka	India*
05.06.2021	228	217	314	NR
12.06.2021	228	204	302	NR
19.06.2021	221	201	NR	NR
26.06.2021	NR	206	NR	370
				*Pollachi market

Coconut Oil

International price as well as domestic price of coconut oil in other countries expressed a downward trend during the month. The price of coconut oil quoted at different international/ domestic markets are given below.

Weekly price of coconut oil in major coconut oil producing countries					
	International Price(US$/MT)	Domestic Price(US$/MT)			
	Philippines/ Indonesia (CIF Europe)	Philip-pines	Indo-nesia	Sri lanka	India*
05.06.2021	1680	NR	1481	3706	2189
12.06.2021	1712	NR	1516	3579	2153
19.06.2021	1564	NR	1450	NR	2153
26.06.2021	NR	NR	1464	NR	2072
					* Kangayam

Copra

The price of copra at Philippines, Srilanka, India and Indonesia expressed a downward trend during the month. The price of copra quoted at different domestic markets in Philippines, Indonesia, and India are given below.

Weekly International price of copra in major copra producing countries				
Date	Domestic Price (US$/MT)			
	Philippines	Indonesia	Srilanka	India* * Kangayam
05.06.2021	984	908	2103	1440
12.06.2021	990	940	2103	1413
19.06.2021	963	910	NR	1427
26.06.2021	NR	907	NR	1386

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