Achievements in coconut research by AICRP on Palms

Maheswarappa, H. P. and Jilu V. Sajan
ICAR-AICRP on Palms, ICAR-CPCRI, Kasaragod

The All India Coordinated Research Project on Palms started functioning from 1972 with the objective of conducting location-specific research in the mandate crops. During 2017-18, cocoa has been included as mandate crop. At present the project has coconut, oil palm, arecanut, palmyrah and cocoa as mandate crops and it is implemented in 30 centres. Its headquarters is at ICAR-CPCRI, Kasaragod and 15 centres are conducting research on coconut, 8 on oil palm, 4 on arecanut, 4 on palmyrah and 7 on cocoa. The coordinating centres are located at 14 states and one union territory covering 13 SAUs/SHUs, two CAUs and four ICAR institutes.

Achievements made in coconut research by AICRP on Palms during 2017-18

Genetic Resources and Crop Improvement

Under local germplasm collection of coconut, two collections were made from Sabour centre and five from Pilicode centre.

Abhaya Ganga: A dwarf x tall hybrid cross between Gangabondam Green Dwarf and Laccadive Ordinary Tall with average nut yield of 136 nuts/palm/year, copra output of 21.7 kg/palm/year, oil content of 72 % and oil yield of 15.5 kg/palm/year was released for cultivation in Andhra Pradesh.

Gauthami Ganga: A dwarf coconut variety which is a selection from Gangabondam Green Dwarf (GBGD) suited for tender nut purpose with average nut yield of 85-94 nuts/palm/year with TSS of 5.6 g/100 ml was released for cultivation in Andhra Pradesh.

Among the seven location specific Tall x Tall coconut hybrids and six Dwarf x Dwarf coconut hybrid combinations under evaluation at Ambajipeta centre, the cross LCOT x ECT recorded the highest yield (68 nuts/palm/year) followed by PHOT x ECT (65 nuts/palm/year) after seven years of planting. Among the Dwarf x Dwarf hybrid combinations, the highest yield (83 nuts/palm) was recorded in COD x MGD followed by CGD x MGD (74 nuts/palm) at the

Abhaya Ganga (GBGD x LCOT)

Gauthami Ganga

age of seven years. At Aliyarnagar centre, among the five Tall x Tall cross combinations planted during August 2011, the cross combination ADOT x ECT recorded the highest nut yield of 104.2 nuts/palm/year followed by ECT x LCT (76.7 nuts/palm/year).

Crop Production

At Aliyarnagar, coconut based cropping system with coconut + cocoa + banana + pineapple was established during 2008. Treatments of integrated nutrient management were imposed during 2012-13 and compared with the control plot of monocropping. Yield of coconut and intercrops in the cropping system were maximum in T1 followed by T2 and T3 treatments. Similarly, net returns (Rs. 3,29,600/ha) was the highest in T1 followed by T2 and T3 treatments. The Highest earthworm population and more microbial population counts were recorded in fully organic treatment (T3) treatment followed by T2 and T1. Mono cropping of coconut registered reduced earthworm, fungi and bacteria population. At Ambajipeta centre, application of 75 % RDF + 25 % through organic recycling with vermicompost followed by 50 % RDF + 50 % through organic recycling with vermicompost + vermiwash + bio fertilizer + *in situ* green manuring

recorded superior yields of 178.5 and 172.6 nuts/palm/year, respectively, compared to coconut monocropping (142.5 nuts/palm/year). Higher net income of Rs. 2,69,802 per ha was recorded in T1 followed T2 (Rs 2,48,208 per ha) and fully organic nutrient management treatment (Rs 1,41,242 per ha) whereas it was lower in coconut monocrop (Rs. 78.450). At Mondouri centre, coconut + black pepper + ginger+ colocasia cropping system recorded net return of Rs. 3,87,874/ ha as compared to mono cropping of coconut (Rs. 87,318/ ha). Performance of six cocoa clones viz. VTLCC – I, VTLCH – I, VTLCH – 2, VTLCH – 3, VTLCH – 4 and VTLC – 1, as intercrop in coconut at Ambajipeta centre is being evaluated and during the period 2017-18, clone VTLCH – 2 recorded the highest yield of 2.1 kg dry beans per tree. At Arsikere centre, coconut + dairy (5 milch animal) integrated farming system recorded a net return of Rs. 1,86,280/ acre as compared to mono cropping of coconut (Rs. 63,860/ acre).

Disease Management

Basal stem rot

Eight latest fungicides comprising single and combi-products in commercial formulation were tested against growth of Ganoderma sp. under *invitro* at various dosages viz., 100, 250, 500 ppm and at their respective recommended dosages in perennial crops. The result revealed that at recommended concentration, all fungicides had cent percent inhibition except Kresoxymethyl. The fungicides viz., Zineb 68 % + Hexaconazole 4 % WP and Fluxapyroxad 250 g/l + Pyraclostrobin 250 g/l SC at lowest concentration ie., at 100 ppm had cent

percent inhibition indicating their effectiveness even at lower concentration against the pathogen.

Stem bleeding

The new fungicide molecules with both single and combi-products were tested against mycelial growth of Thielaviopsis paradoxa under in *vitro*. Each fungicide was tested at four different concentrations namely 100, 250, 500 ppm and recommended concentration in perennial crops. The result revealed that, at recommended concentration except Thifluzamide 24 SC and Kresoxymethyl 44.3 % SC, all other fungicides showed varying inhibition of the pathogen. However, the fungicide carbendazim 25 % + Mancozeb 50 % WS had cent percent inhibition of the pathogen at its recommended concentration. The analysis of inhibitory action at lower concentration ie., 100 ppm revealed, the fungicide carbendazim 25 % + Mancozeb 50 % WS had cent percent inhibition of pathogen indicating its strong action against the test pathogen. Application of neem cake based formulation of Trichoderma harzianum cakes (one cake /bleeding patch/year) was found effective for the management of stem bleeding disease in coconut in Andhra Pradesh.

Leaf blight

Molecular characterization of Lasiodiplodia theobromae isolates was carried out at Aliyarnagar centre. Through PCR amplification of ITS region of L. theobromae isolates, an expected amplicon of 550 bp was obtained and the sequences were deposited in GenBank (Accession numbers; MG685854, MG685855 and MG 697234).

Bud rot

Talc based formulation of T. ressei @ 5 g/seedling of coconut at spindle region is found to be effective for the management of bud rot disease.

Pest Management

Incidence of invasive rugose spiralling whitefly, Aleurodicus rugioperculatus Martin

At Aliyarnagar centre, studies pertaining to host range, varietal preference and natural enemy fauna of RSW were carried out and IPM measures were devised to manage the pest. Several host plants viz., banana, bhendi, sapota, custard apple, citrus, nutmeg, hibiscus and guava were found to harbour different life stages of RSW. The IPM measures included installation of yellow sticky traps smeared with castor oil @ 10 traps/ acre for monitoring the RSW adult population, spraying water forcibly on the under surface of the leaves or spraying with neem based botanicals for inhibiting the growth and development of RSW, release of Chrysoperla @ 1000/ ha and distribution of coconut leaflets containing parasitized (by Encarsia guadeloupae) pupae. Releasing the parasitoids in infested gardens led to drastic decrease in population from more than 150 adults per leaflet to less than 25 adults per leaflet. Simultaneously parasitisation by Encarsia also

increased to more than 70 % (from an initial 10-20 %) within a span of six months. The IPM measures were propagandized through various awareness meetings and sensitization programmes. A total of 4000 farmers in Coimbatore and Tiruppur districts were provided with Encarsia parasitoids. Awareness among the coconut farmers through interactive meetings and awareness-cum-sensitization campaigns to about 1200 farmers led to minimal use of pesticides in the ecosystem and is keeping the RSW population under check.

At Ambajipeta centre, RSW was observed in East Godavari, West Godavari and Srikakulam districts of Andhra Pradesh. The specific parasitoid E. guadeloupae was obtained from AICRP on Palms

centre, Coconut Research Station, Aliyarnagar and released in RSW infested gardens. The parasitoid established successfully in the white fly affected gardens in Kalavalapalli and Chikkala villages of West Godavari district. Leaves containing the parasitized pupae were redistributed to other affected coconut and oil palm gardens. About 40-60 per cent parasitisation was observed in the parasitoid released gardens.

At Ratnagiri centre, RSW was observed in RCRS Bhatye and DBSKKV, Dapoli during the month of December 2017. Awareness campaigns against the RSW were organized in Konkan region of Maharashtra and wide publicity was given through newspapers, posters, TV Programme and Radio talks. The State Agriculture Department was also sensitized about the incidence of the new invasive pest. Recorded huge number of coccinellid predators in RSW infested gardens.

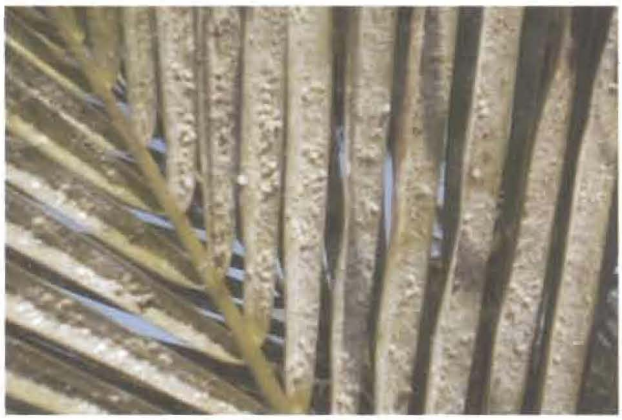
At Arsikere centre, surveys revealed the incidence of RSW in Mandya district and coastal regions of Karnataka (Mangaluru, Brahmavar and Udupi). The aphelenid parasitoid, E. guadeloupae, green lace wings and coccinellids were recorded in RSW infested gardens.

Management of rhinoceros beetle

CPCRI Botanical cake + paste @ 15 g each/palm were found to be effective in reducing spindle damage and leaf damage due to rhinoceros beetle in juvenile palms.

Annual Group Meeting of ICAR-AICRP

27th Annual Group Meeting of ICAR-AICRP on Palms was conducted from 24-26 May, 2018 at ICAR-IIOPR, Pedavegi. Dr. J. Dilip Babu, Director of Research, Dr. YSRHU, Venkataramannagudem, Andhra Pradesh was the Chief Guest of inaugural function. The inaugural function was presided over by Dr. W.S. Dhillon, ADG (Hort. Sci. I), ICAR, New Delhi. Dr. K. U. K. Nampoothiri, Former Director, ICAR-CPCRI, Kasaragod, Dr. P. Chowdappa, Director, ICAR-CPCRI, Kasaragod and Dr. D. Damodar Raddy, Director, ICAR-CTRI, Rajamahendravaram were the guests of honour. Dr. R. K. Mathur, Director, ICAR-IIOPR welcomed the gathering. Dr. H. P. Maheswarappa, Project Coordinator (Palms), ICAR-AICRP on Palms presented the Project coordinator's report. He briefed the achievements of different AICRP on Palms centres during 2017-18. . In his report, he explained the total budget outlay of Rs. 485 lakhs for the preceding year and expenditure



under various heads. Further, he also emphasized on the technology passed on to farming community, publications made from AICRP centres, and front line demonstrations being conducted at various centres. In addition to this, the attempts made in curtailing the menace of emerging pest on coconut, rugose spiralling whitefly in various parts of country were also briefed. Dr. Dilip Babu emphasized on the need of strong farming system based technologies to help the farmers for survival and increasing profitability. He highlighted status of horticulture sector in Andhra Pradesh and its contribution to the economy of the state. During the presidential address, Hon'ble Asst. Director General Dr. W. S. Dhillon has emphasized on the need for increasing the productivity which is possible through quality planting material production. He also discussed about the role of processing and value addition in increasing the profitability.

During the inaugural function eight extension folders were released from different AICRP on Palms centres in local languages on various aspects of the mandate crops. AICRP on Palms centre, Bhubaneswar has been awarded with Best AICRP centre award during 2017-18 based on the location specific research on coconut crop improvement and crop production. About 100 scientists from 30 AICRP centres, ICAR-CPCRI and ICAR-IIOPR attended the programme. Different technical sessions on crop improvement, crop production, crop protection, post harvest technology in palmyrah and transfer of technology were carried out for subsequent days to assess the progress of research during 2017-18 and to formulate new technical programme for 2018-19. Technologies emerged by continuous research in various AICRP on Palms centres were recommended for different mandate crops to benefit the farming community. The sessions concluded with plenary session on 26th May 2018. ■