



CPCRI News



Views and News on advances in Coconut, Arecanut and Cocoa

Vol. 27, No. 4

October-December, 2008

Wish You A Happy New Year

MEETINGS / IMPORTANT EVENTS HELD

NATIONAL CONFERENCE ON ORGANIC FARMING ORGANISED

“National Conference on Organic Farming in Horticultural Crops with Special Reference to Plantation Crops” was held at Central Plantation Crops Research Institute, Kasaragod from 15-18th October, 2008 under the auspices of Indian Society of Plantation Crops, Central Plantation Crops Research Institute, Kasaragod and the Association for the Improvement in Production and Utilization of Banana (NRC Banana), Trichy. The advancement made in organic horticulture was dealt under nine technical sessions viz. 1) Current status of organic farming: National and International Scenario, 2) Current status of organic farming in different states, 3) Technological advancement in organic horticulture, 4) Organic farming in medicinal and aromatic crops, 5) Input management through organic recycling and biofertilizers, 6) Soil health management, 7) Plant health management, 8)

Standards, certification, marketing and export, and 9) Interface with farmers and NGOs.

The papers presented revealed the advancements made in development of package of practices for



Dr. H.P. Singh, DDG (Hort.), ICAR addressing during the valedictory session



Dr. K.V.A. Bavappa inaugurating the conference

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organic cultivation of a number of horticultural crops including coconut, cashew, spices, fruit crops, vegetables, tuber crops and aromatic plants. Vermicomposting technology provided further dimensions in recycling waste biomass of different crops to enable *in situ* generation of organic manure. Vermiwash application proved to be effective to bring about quality improvement in a number of vegetables. The interface with NGOs and farmers served as a forum for discussion of success stories of farmers practicing organic farming in different states. The future strategies for accelerating research and development in organic horticulture were formulated in the plenary session.

The conference was inaugurated by Dr. K.V.A. Bavappa, former Director, CPCRI and FAO Consultant. Dr. P. Rethinam, Former Executive Director, Asia and Pacific Coconut Community presided over the function. Mr. K.R. Viswambaran, IAS, Vice Chancellor, Kerala Agricultural University, Dr. G.K. Veeresh, former Vice Chancellor University of Agriculture Sciences, Bangalore and Dr. M.K. Nair, Former Director, CPCRI also spoke in the inaugural function. Dr. H.P. Singh, Deputy Director General (Hort.), Indian Council of Agricultural Research, New Delhi in his valedictory address stressed the

need for concerted efforts to address various issues related to production, processing, marketing and export so that there would be accelerated growth of organic horticulture. He emphasized that selection of appropriate crops with high potential for organic farming is necessary for increasing export. Research efforts are to be undertaken to evaluate the specific advantages of organic farming in terms of qualitative differences of produce, long term soil fertility, economic viability and higher returns. More efforts are needed to create awareness among the farmers to encourage the adoption of organic concept of farming. Delineation of specific zones having ideal conditions for development of sustainable organic production systems has to be undertaken. Dr. George V. Thomas, Director, Central Plantation Crops Research Institute, Kasaragod and the organizing secretary of the Conference presented the recommendations emerged during the Conference.

An exhibition on organic farming and a field visit to organic farms were also arranged as a part of the conference. About 200 delegates from different parts of the country including scientists from ICAR Institutes, SAUs, officers of commodity boards, certification agencies, NGOs and successful organic farmers attended the conference.

RESEARCH HIGHLIGHTS

Hybrid evaluation trials at Minicoy

In the hybrid evaluation trial planted in 1990, Laccadive Ordinary Tall x Laccadive Green Dwarf (LCT X LGD) recorded highest average yield of 191 nuts/palm/year (10 years mean). In terms of copra out turn, three hybrids, viz., LCT x LGD, LYD x LCT and LYD x LCT were better with 21.18 to 21.28 kg/palm than other hybrids.

Hybrid	Mean nut yield per ha. (/palm/year)	Copra (grams/nut)	Copra (tonnes/ ha)
LGD X LCT	123 c	172.2 a	3.707 a
LOD X LCT	107 c	169 a	3.164 b
LYD X LCT	121 c	180 a	3.815 a
LCT X LGD	191 a	111 b	3.724 a
LCT X LOD	157 b	122 b	3.340 bc
LCT X LYD	148 b	137 b	3.535 c
SEm ±	12.5	13	0.113
CD 5%	25	26	0.226

The figures followed by same alphabet are statistically at par.

Molecular marker based characterization of six coconut ecotypes from Southern Kerala

Simple sequence repeat (SSR) analysis was conducted to study the pattern of diversity in 90 selected coconut palms representing six coconut ecotypes (Evoor Green Tall, Evoor Brown Tall, Evoor Brick Red Tall, Jappanan, Green Dwarf and Orange Dwarfs) from three coconut communities viz., Pathiyoor, Devikulangara (Alappuzha District) and Thodiyoor (Kollam District). A total of 61 alleles were detected with an average of 4.35 alleles per SSR locus. The heterozygosity was much high in tall ecotypes (0.387-0.452) compared to the dwarf ecotypes (0.038-0.041). The overall degree of genetic differentiation was high (0.471) indicating a high level of genetic variation among the populations. Genetic similarity was calculated using UPGMA

clustering analysis. Two major clusters were noticed, with tall and dwarf ecotypes clustering separately. Among the tall, 'Jappanan' clustered with 'Evoor Green Tall'.

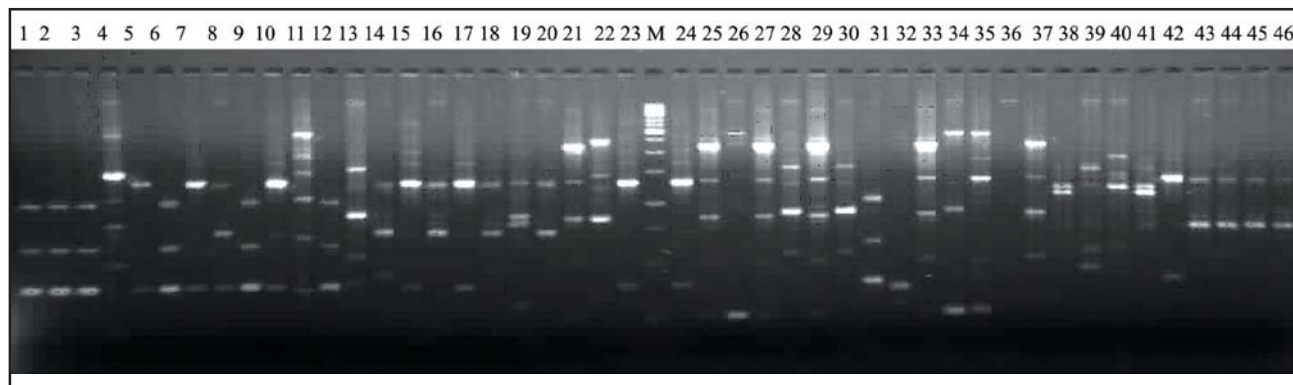
RAPD analysis of coconut rhizospheric potassium solubilizing bacteria

A total of 46 bacterial isolates showing potassium solubilizing potential were taken up for RAPD analysis. Out of 46 isolates, 17 were isolated from rhizosphere of coconut palms growing in red laterite soil (Manya, Kasaragod) and 29 were isolated from rhizosphere of coconut palms growing in sandy soil (CPCRI Farm, Kasaragod). DNA was isolated from these isolates and RAPD analysis was done. Eight primers of OPA and OPAF series were used for RAPD analysis. All the eight primers exhibited 100% polymorphism. A total of 187 RAPD markers were produced across the 46 bacterial isolates. The isolates showed only 6% similarity amongst themselves.

would like to produce earthworms as a source of protein feed.

Studies on pest vectors

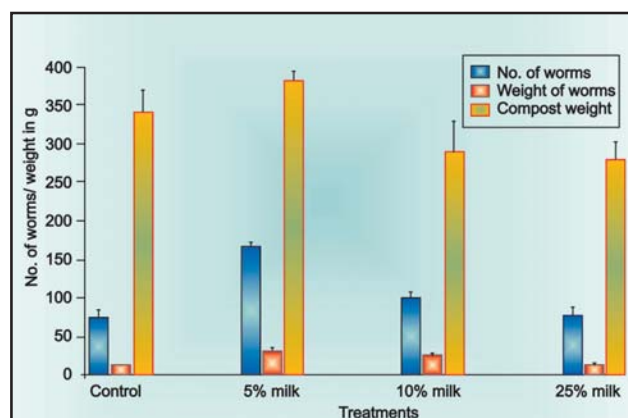
Entomologists from CPCRI, RS, Kayamkulam visited CA Plantations, Cumbum and reported remarkable yellowing of coconut palms on the outer whorls and a few palms with symptoms of root (wilt) disease. Besides the prevalence of erect-winged plant hopper *Proutista moesta* and lace bug *Stephanitis typica* observed on younger coconut palms, coconut whitefly, *Aleurocanthus arecae*, spiralling whitefly, *Aleurodicus dispersus* and coconut scale, *Aspidiotus destructor* were also recorded from Cumbum. *A. destructor* was always associated with lady beetle, *Chilocorus nigritus*, an effective predator against the pest. Survey conducted at Sullia, Dakshina Kannada district of Karnataka and Mavellai, Kannur district, Kerala, insect vectors of coconut root (wilt) disease viz., *P. moesta* and *S. typica* were recorded from these



RAPD marker profile of rhizospheric K-solubilizing bacteria from laterite and sandy soils using the primer OPAF 04

Effect of milk on *Eudrilus* sp. and its vermicomposting efficiency

A 60 day experiment was conducted to study the effect of diluted pasteurized milk (3% fat, 8.5% SNF) on *Eudrilus* sp. and coconut leaf vermicompost production. At the end of the experiment, it was observed that 5% milk addition increased the earthworm numbers and its biomass compared to 10% and 25% milk amended and control (water) treatments. The vermicompost turnover was on par in control and 5% milk amended treatments. Addition of higher concentrations of milk was not beneficial. The results of the study are useful for farmers who



Effect of milk on *Eudrilus* sp. numbers, weight and coconut leaf vermicompost recovery

tracts along with occurrence of coconut root (wilt) disease in limited number of palms. Further, in a survey conducted at Kulasekharam and Colachel areas of Kanyakumari Dist., Tamil Nadu revealed the occurrence of coconut root (wilt) disease and insect vectors.

Ball copra production

A study on ball copra production in selected coconut germplasm was undertaken. The mean ball copra yield per fruit ranged from as high as 288g in the case of Kalpa Pratibha (IND016S) to as low as 92g in the case of MYD. In case of LMT (IND030S) and AYKT (IND073) the ball copra weight was 129g. However, it was observed that all accessions were suitable for ball copra production. Many of the fruits had germinated in storage, while in some accessions though sprouting had not occurred; still the copra had got spoiled due to fungal infection. Hence, the 16 accessions studied could be grouped into three categories: (i) accessions in which the fruits had germinated and also the copra was spoiled; (ii) accessions in which the fruits had not germinated but still the copra was spoiled and (iii) accessions with good quality ball copra. It was observed that only LMT (IND030S) grouped into the third category and is the best suited accession for ball copra production. On the other hand, 10 accessions fell into the first category and the percentage of fruits

germinated in storage ranged from 37.5% in FMST (IND0 S) to 6.67% in Kalpa Mitra (IND022S). The second category comprised the remaining five accessions including WCT (IND069S) and AYKT (IND073). Based on the percentage of spoiled nuts, which ranged from 83.33% in the case of Kalpa Pratibha (IND016S) to 0% in the case of LMT (IND030S), it can be concluded that four accessions LMT (IND030S), WCT (IND069S), Kalpa Mitra (IND022S) and AYKT (IND073) are better suited for ball copra production.

Ball copra yield in selected coconut accessions

Accession	Fruit wt. (g)	Ball Copra wt. (g)	% Spoilt nuts	% Germinated nuts
LMT (IND030S)	455	129	0.00	0.00
WCT (IND069S)	536	181	9.09	0.00
Kalpa Mitra (IND022S)	608	186	13.33	6.67
AYKT (IND073)	380	129	22.22	0.00

Cocoa germplasm

One cocoa hybrid MCB.C.3 x KKM.22 of Malaysian Cocoa Board and 19 collections comprised of Trinidad, Ghana and UK clones were imported from Reading University, UK and the total germplasm holding enhanced to 230.

PUBLICATIONS

Research article

- Anitha Karun, Radha, E., Sangeetha Vijayan, P., Jiji George, Rajesh, M.K. and Ananda, K.S. 2008. Assessment of genetic fidelity of arecanut plantlets derived through direct somatic embryogenesis by RAPD markers. *J. Plantation Crops*, **36**: 228-231.
- Anitha, N., Lakshmi Jayaraj, Arun Kumar, E.P., Jiji George and Rajesh, M.K. 2008. Assessment of cross-taxa utility of coconut microsatellite markers. *Indian J. Horticulture*, **65**: 319-323.
- Bhat Ravi, Sujatha, S. and George V. Thomas. 2008. Soil microbiological and enzymological response to organic matter recycling and chemical fertilization in arecanut based cropping system. *J. Plantation Crops*, **36**(3): 281-289.
- Devakumar, K., Damodaran, V.K. and Prabakaran, J. 2008. Observations on syncytial nuclei development in a mutant endosperm bearing coconut tree. *J. Plantation Crops*, **36**: 155-160.
- Jayabose, C., Ganesh, S., Mohanan, K.V. and Arulraj, S. 2008. Estimation of economic heterosis of agronomically important characters of coconut (*Cocos nucifera* L.) hybrids. *J. Plantation Crops*, **36**: 151-154.
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- Kasturi Bai, K. V., Naresh Kumar, S., Rajagopal, V. and Vijayakumar, K. 2008. Principal component analysis

of chlorophyll fluorescence transients for tolerance to drought stress in coconut seedlings. *Indian J. Horticulture*, **65** (4): 471-476.

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- Namboothiri, C.G.N., Niral,V. and Parthasarathy, V.A. 2008. Diversity of esterase and peroxidase isozymes in a segregating population of coconut. *Indian J. Horticulture*, **65**(3), p 322-325.
- Naresh Kumar, S., Kasturi Bai, K. V. and John George, 2008. A method for non-destructive estimation of dry weight of coconut stem. *J. Plantation Crops*, **36** (3): 296-299.
- Radha, E., Anitha Karun, Rajesh, M.K. and Nancy Mariya, J. 2008. Effect of cytokinins on growth and maturation of direct somatic embryos in arecanut (*Areca catechu* L.). *J. Plantation Crops*, **36**: 243-245.
- Rajesh, M. K., Arunachalam, V., Nagarajan, P., Lebrun, P., Samsudeen, K., Thamban, C. (2008) Genetic survey of ten Indian coconut landraces by simple sequence repeats (SSRs). *Scientia Horticulturae*, **118**: 282-297.
- Rajesh, M.K., Subaharan, K., Sathish Kumar, R., Ritto Paul, Bobby Paul, Sreesmitha V. and George Thomas, V. 2008. A comparative study of insect odorant protein binding (OBP) genes and isolation of a partial OBP gene from coconut red palm weevil, *Rhynchophorus ferrugineus* F. *J. Plantation Crops*, **36**: 418-424.
- Sreesmitha V., Rajesh M.K., Subaharan K., Sathish Kumar R. and George V. Thomas (2008) Homology modelling and docking studies in an odorant binding protein from palm weevil. *J. Plantation Crops*, **36**: 430-434.
- Vidhan Singh, T. and Udhaykumar, R. 2008. Thin layer drying characteristics of copra and coconut oil. *J. Plantation Crops*, **36**: 480-485.
- Thamban, C., Vasanthakumar, J., Arulraj, S., Mathew A.C. and Muralidharan, K. 2008. Farmer participation in the field implementation of micro irrigation system. *J. Plantation Crops*, **36**: 522-525.
- Niral, V., Augustine Jerard, B., Kavitha, K. V., Samsudeen, K., and Nair, R. V. 2008. Variability and association among floral traits and pollen recovery in coconut (*Cocos nucifera* L.). *J. Plantation Crops*, **36**(3): 186-191.
- agement of coconut crown choke problem in farmer's field. *Bharatiya Nariyal Patrika*, **19** (2) p 3-6.
- Hussain, M., Ray, A. K., Maheswarappa, H.P. and Ranjana Chakrabarty. 2008. Vermicompost technology for recycling arecanut biomass under Assam condition. *Indian Farming*, **58** (7) : 34-36.
- Kasturi Bai, K. V. and Naresh Kumar, S. 2008. Processing and storage of copra and coconut oil. *Bharatiya Nariyal Patrika*, **19** (2): 15-16. (in Hindi).
- Ray, A.K., Chakrabarty, R. and Acharya, G.C. (2008). Ganoderma disease of arecanut in Assam. *Indian J. Arecanut, Spices and Medicinal Plants*, **10** (1) : 4-7.

Papers presented in symposia/ seminar

Maheswarappa H.P., Srinivasa Reddy, D.V., Subramanian, P., Dhanapal, R. and Krishna Kumar, V. 2008. Performance of black pepper (*Piper nigrum* L.) varieties/hybrids as mixed crop in coconut garden. In: Peperaceae crops-Technologies and Future Perspectives- Harnessing Agro-Technologies for Accelerated Production of Economically important species. P. 339. (Eds. Krishnamurthy, K.S., Prasath, D., K. Kandiannan, Suseela Bhai, R., Saji, K.V., and Parthasarathy, V.A.). IISR, Calicut.

Papers presented in National Conference on Organic Farming in Horticultural Crops with Special Reference to Plantation Crops, Programme and Abstracts. 15-18 October, 2008, CPCRI, Kasaragod.

- George, V. Thomas. Technological advancements in organic farming of coconut. P.17.
- Thamban, C., Palaniswami, C. and Muralidharan, K. On farm recycling of biomass for sustainable farming: an analysis of farmers' experiences in the production and use of vermicompost. P. 105.
- Palaniswami, C., George, V. Thomas, Subramanian, P., Dhanapal, R. and Selvamani, V. Comparative evaluation of soil health and fertility under organic, inorganic and integrated nutrient management in coconut based mixed farming system. P. 114.
- Sujatha, S., Bhat, Ravi and George, V. Thomas. Effect of vermicompost application on soil microbes and productivity of arecanut. P.122.
- Murali Gopal and Alka Gupta. Coconut leaf vermiwash for soil health improvement and quality yield of vegetable crop – Validation in farmers' fields. P. 123.
- Nair, C.P.R., Rajan, P., Chandrika Mohan and Murali Gopal. Management of rhinoceros beetle *Oryctes rhinoceros* L. in coconut gardens by biocontrol method. P. 158.
- Sosama, V.K. Effect of vermiwash on *Radopholous similis* on coconut seedlings. P. 141.

Popular article

Barman, I., Ray, A.K., Maheswarappa, H.P. 2008. Effectiveness of training cum demonstration for the man-

- Maheswarappa, H.P., Srinivasa Reddy, D.V., Krishna Kumar, V., Subramanian, P and Dhanapal, R. Organic cultivation of medicinal plants as inter/mixed crops in coconut gardens. p. 65.
- Subramanian., P., Krishnakumar., V., Alka Gupta, George Thomas, V. and Palaniswami, C. Effect of organic cultivation practices on soil microbes and productivity on coconut p.79.
- Jacob, P.M., Thomas, G.V., Thomas, R.J., Muralidharan, P., Shanawaz, M. and Namboothiri, C.G.N. 2008. Impact of organic cultivation practices on coconut yield and soil nutrient status in Minicoy Island of Lakshadweep. pp117.
- Muralidharan, K., Subramanian, P., Krishnakumar, V., Thamban, C., Anithakumari, P. and Rayudu, B. T. Organic input use in coconut farming – Farm level scenario in different states in India pp.104-105.
- Nair, C.P.R. Advances and approaches in ecofriendly pest management in Organic Agriculture. P. 130-131.
- Nair, C.P.R., Rajan, P., Chandrika Mohan and Murali Gopal. Management of rhinoceros beetle *Oryctes rhinoceros* L. in coconut gardens by biological method. p. 158-159.
- Chandrika Mohan, Nair, C.P.R. and Rajan, P. Large scale field validation of biocontrol strategy for management of coconut leaf eating caterpillar *Opisina arenosella* walker utilizing indigenous parasitoids. p. 167.
- Papers presented as poster in PLACROSYM XVIII, 10-13 December, 2008, NRCC, Puttur**
- Mathew, A. C., Shajatnan, K. H. and Sujatha, S. 2008. Development and management of water harvesting structure in lateritic soils to irrigate arecanut palms using harvested water in conjunction with surface water.
- Muralidharan, K., Thamban, C., Anithakumari, P., Palaniswami C. and Subramanian, P. 2008. Forecasting of All India production of coconut.
- Radha, E., Anitha Karun, Rajesh, M. K. and Nancy Mariya J. 2008. Effect of cytokinins on growth and maturation of direct somatic embryos in arecanut (*Areca catechu* L.).
- Rajesh, M.K., Subaharan, K, Sathish Kumar, ritto Paul, Bobby paul, Sreesmitha V and George V. Thomas. 2008. A comparative study of insect odorant protein binding (OBP) genes and isolation of a partial OBP gene from coconut red palm weevil, *Rhynchophorus ferrugineus* F.)
- Sreesmitha V, Rajesh MK, Subaharan K, Sathish Kumar R and George V. Thomas. 2008. Homology Modelling and Docking Studies in an Odorant Binding protein from palm weevil.
- Jiji George, K. T. Venkataraman, Anitha Karun and Rajesh M. K. 2008. Existence of cosexuality in palmyrah palm and study of relationship between monoecious and dioecious plants using molecular markers.
- Naresh Kumar, S., Kasturi Bai, K.V. and John George. 2008. A method for non destructive estimation of dry weight of coconut stem.
- C.T. Jose, C. Thamban and Ravi Bhat. 2008. Input-response analysis in arecanut - a semiparametric regression approach.
- Ravi Bhat, S. Sujatha and George V. Thomas. 2008. Soil microbiological and enzymological response to organic matter recycling and chemical fertilization in arecanut based cropping system.
- K.S. Ananda, B. Rajesh and D. Shobha. 2008. Variation in germination, seedling morphology and bio-chemical traits in indigenous arecanut (*Areca catechu* L.) accessions.
- S. Elain Apshara, V. R. Bhat, K. S. Ananda, R. V. Nair and D. Suma. 2008. Evaluation and identification of high yielding trees in Nigerian cocoa germplasm
- C. Kannan and C. T. Jose. 2008. Activation of defense enzymes in arecanut (*Areca catechu* L.) seedlings upon inoculation with the biocontrol agents.
- Arun Kumar Sit, G. C. Acharya and Avrajyoti Ghosh. 2008. Comparative study of different horticultural Crops in open and arecanut garden under sub Himalayan Terai Region of West Bengal.
- Arumugam, V., Riju, A., Arunachalam, V. 2008. Mining of Expressed Sequence Tag (EST) libraries and core nucleotide sequences for simple sequence repeats (SSR) in papaya. Second international symposium on papaya held at AC & RI, Tamil Nadu Agricultural University Madurai, 9-12 Dec. 2008.

Review Article

- Arunachalam, V. and Rajesh, M.K. 2008. Breeding of coconut palm. CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources (CABI Publications). 3(053):1-12.

Technical Bulletin

- Nair, R.V., Jerard, B. A., Samsudeen, K. and Niral, V. 2008. Coconut Nursery Management. Technical bulletin, CPCRI, Kasaragod.

Book chapters

- Manimekalai R. 2008. Applications of genomics and proteomics in diagnostics. *In*: Plant pathogens and their biocontrol agents: Diagnostics and characterization (Eds. Eapen, S.J., Kumar, A., Anadaraj, M.). Indian Institute of Spices Research, Calicut. pp 160-164.

Rajesh M.K. 2008. DNA microarrays in microbial studies. In: Plant pathogens and their biocontrol agents: Diagnostics and characterization (Eds. Eapen, S.J., Kumar, A., Anadaraj, M.). Indian Institute of Spices Research, Calicut. p. 95-102.

Others

Reddy, D.V.S., Maheswarappa, H.P. and George V. Thomas. 2008. Black pepper- An inevitable crop component in plantation crop based cropping system. In: Piperaceae Crops-Technologies and Future Perspectives- Harnessing Agro-Technologies for Accelerated Production of Economically important species. 85-93. (Eds. Krishnamurthy, K.S., Prasath, D., K. Kandiannan, Suseela Bhai, R., Saji, K.V., and Parthasarathy, V.A.). IISR, Calicut.

Souvenir. 2008. National Conference on Organic Farming in Horticultural Crops with Special Reference to Plantation Crops with the theme "Promoting organic horticulture for safe food and healthy environment", October 15-18, 2008. CPCRI,

Kasaragod. (Eds. George Thomas, V., Anitha Karun, Maheswarappa, H. P., Subramanian, P. and Naresh Kumar, S. CPCRI, Kasaragod. 108 p.

The articles contributed by the scientists of this institute in the above souvenir are as under:

V. Krishnakumar, P. Subramanian and Alka Gupta 2008. Prospects of organic farming in coconut based cropping system. p. 79-91.

George Thomas V. 2008. Organic farming in plantation crops - strategies, practices and potentials. p 2-8.

Chandramohan, R. 2008. Plant disease management under organic production systems. p 34-37.

Alka Gupta, Murali Gopal and George Thomas V. 2008. Potential of biofertilizers in organic farming p 92-103.

George Thomas V. 2008. Technological advancement and future strategies for enhancing production and productivity in coconut, arecanut and cocoa. In: Nagaraja K.V. and Bhat P.S. (Eds.) Souvenir, PLACROSYM XVIII, NRCC, Puttur. p 6-18.

DEPUTATION ABROAD

Name of staff	Designation	To (Place of visit)	Purpose
Dr. Anitha Karun	Sr. Scientist (Hort.)	PCA Zamboanga Research Station Philippines from 11-12-2008 to 15-12-2008	Expert to the Training and Research Workshop on Coconut Embryo Culture.

TRANSFER OF TECHNOLOGY

KASARAGOD

Dr. R.V. Nair, Head, Division of Crop Improvement, CPCRI and Dr. P.M. Jacob, Principal Scientist, CPCRI, Regional Station, Kayamkulam visited CPCRI, Regional Station, Minicoy (Union Territory of Lakshadweep) to assess the performance of six hybrid combinations involving Laccadive Ordinary Tall and three locally available dwarfs (Green, Orange and Yellow). During the visit they also met Mr. P.M. Mullakoya, Director of Agriculture, Union Territory of Lakshadweep at Kavaratti on 15.11.2008 and held discussions regarding the possibility of release of best coconut hybrids.

Dr. Anitha Karun delivered a class on "Hi-Tech Horticulture" on 19.11.2008 in connection with a 21 days training programme held at CIAH, Bikaner.

Dr. M.K. Rajesh delivered two classes on "Simple Sequence Repeats" and "Single Nucleotide Polymorphism" on 18.12.2008 in connection with a training programme on "*In silico* analysis and annotation of ESTs" organized by the Bioinformatics Centre, IISR, Calicut from 17th-19th December 2008.

Participation in workshops/training

Dr. C. Thamban, Sr. Scientist (Agrl. Extension) participated in the workshop on 'Leadership for innovation in agriculture' at MANAGE, Hyderabad during 17-21 November. He has also attended the participatory learning workshop on coconut farming organized by Kerala Institute for Local Administration (KILA) at Perambra on 30-10-2008.

Training programme for extension personnel

The training programme for extension personnel sponsored by State Horticulture Mission-Kerala on

“Horticultural crops for multiple cropping in coconut garden – Importance of integrating innovations and focusing on stakeholder participation” was conducted at CPCRI, Kasaragod during 18-24 November 2008. Officers from Kannur and Kasaragod Districts attended the training programme.

Special training programme

A special training programme on ‘Sustainable coconut production technologies’ was conducted on 30.12.2008 for the selected 50 farmers from Alanthatta watershed area under the Western Ghat Development Programme (WGDP) in Kayyur-Cheemeni gramapanchayat.

A special training programme on ‘Preparation of Coconut Chips and SBTN’ was organized on 31-12-2008 in which entrepreneurs from Kasaragod, Kannur, Malappuram, and Ernakulam Districts participated.

ATIC activities

Technology inputs and products including planting materials, farm products, farm literature and CD ROMs worth Rs. 95,056/- were sold through ATIC. A total of 1618 visitors including farmers, extension personnel and students made use of ATIC facilities during the quarter October to December 2008.

Radio programmes

Dr. C. Thamban, Sr. Scientist delivered a radio talk on ‘Drip irrigation for coconut’ which was broadcast by All India Radio, Kannur on 06-12-2008.



Participants of special training programme on ‘Sustainable coconut production technologies’



Special training programme on ‘Preparation of coconut chips and SBTN’

He had also participated in the Phone-in-programmes which were broadcast by All India Radio, Kannur as per the details below:

Topic	Date
Rat control in coconut	07-10-2008
Management of barren nut formation in coconut	20-10-2008
Control of stem bleeding disease of coconut	12-11-2008
High yielding varieties and dwarf hybrids of arecanut	10-12-2008
Mother palm selection and seednut collection in arecanut	10-12-2008
Management of young arecanut palms	17-12-2008
Control of bud rot in coconut	17-12-2008

Television programmes

An interface programme on coconut farming entitled “Nalikerathinte nattil” involving 150 personnel including selected coconut farmers, entrepreneurs, extension personnel and scientists was organized in collaboration with Doordarshan Kendra, Thiruvananthapuram on 25-11-2008 at



Mr. P. Karunakaran, Hon'ble Member of Parliament, Kasaragod inaugurating the interface programme on coconut farming entitled “Nalikerathinte nattil”

CPCRI, Kasaragod. Mr. P. Karunakaran, Hon'ble Member of Parliament, Kasaragod inaugurated the programme. The interface programme on coconut farming is scheduled for telecast by Doordarshan Kendra, Thiruvananthapuram in six episodes from 26-12-2008 to 30-1-2009.

KAYAMKULAM

Exhibitions

CPCRI RS, Kayamkulam has participated in an exhibition organized by Kerala State Department of Agriculture and Onattukara Vikasana Agency at Kayamkulam during 7-8 November, 2008. Also participated in Farm Fest – 2008 organized by AIR and Chaithaya Pastoral Centre at Kottayam during 28-30 November, 2008.

Training Programmes

Dr. N. Srinivasan, Principal Scientist (Plant Pathology) had trained 60 persons from southern districts of Kerala who were engaged by Coconut Development Board, Kochi, for the purpose of undertaking quick survey and assess the status of root (wilt) disease in disease endemic (southern) districts of Kerala state on "Identification of coconut root (wilt) disease" on 14th October 2008.

Dr. Regi Jacob Thomas, Sr. Scientist conducted a one day training programme for 35 Officials (Agricultural Officers and Agricultural Assistants) of Department of Agriculture on "Hybridization techniques in coconut" covering aspects like Coconut Seed Garden Development, Mother palm selection, Pollination and Hybridization, Selection of seed nuts and Nursery management in coconut at Hotel Pearl Residency, Trichur on 01-12-2008.

He also conducted another one day training programme for 40 staff (including Asst. Director, Agricultural Officers, Agricultural Assistants and Pollinators) of Seed Garden Complex, Munderi, Malappuram District on "Hybridization techniques in coconut" covering aspects like Seed Garden Development, Pollination and Hybridization and Nursery Management in coconut at Seed Garden Complex, Munderi, Malappuram on 12-12-2008.

Dr. Chandrika Mohan, Senior Scientist conducted a three day training programme on "Parasite

breeding and biocontrol of coconut pests". A total of 15 officials of Department of Agriculture, Kerala attended the programme at CPCRI(RS) Kayamkulam during 23-25 October 2008. She also had organized a seven-day training programme on "Recent advances in crop protection of coconut" during 18-24 November 2008 at CPCRI (RS) Kayamkulam. Eleven participants from various states of the country attended the programme.

Dr. P. Muralidharan handled a training session on "Soil and water conservation measures and water harvesting techniques for increasing productivity" for selected farmers and people's representatives at Bedadka panchayath, Kasaragod district on 31-10-2008. He had delivered a lecture on "Nutritional deficiency disorders in coconut" for the participants of the National Level training programme on "Recent advances in crop protection of coconut" held at CPCRI, Kayamkulam on 24-11-2008. He had also handled a session on "Watershed management for sustainable production" in a trainer's training programme for Officers of Agrl. and soil conservation depts., and NGO and people's representatives conducted at Krishi Vigyan Kendra, Pattambi, Palakkad district on 12-12-2008.

Farmers

1. One day training was given to 47 farmers in two batches under the CDB coconut clusters of Bharanickavu Panchayat on Scientific Management of Coconut on 2nd and 5th of December, 2008.
2. A batch of 32 farmers from AHADS, Attappady was given one day training on recent advances in coconut cultivation on 11-12-08.

Students and teachers:

1. A batch of 11 graduate students along with two teachers from Karunagappally were oriented to the Institute activities and achievements.
2. Four batches of 152 VHSE students, five batches of 302 HSS / HS students, eight batches of 514 UP / LP students along with 86 teachers were oriented to Institute activities.

VITTAL

Dr. Ravi Bhat, Sr. Scientist (Agron.) attended the following programmes:

- Workshop on Cocoa and farmers training at Idkidu on 03-10-2008 sponsored by Idkidu Service Co-operative Bank, Amrita Sinchana Farmers Service Group and CAMPCO Ltd. Mangalore.
- Cocoa seminar and training to farmers at Puttur on 31-10-2008 sponsored by Horticulture Department.
- Agriculture seminar on 01-11-2008 at Nirchal, Kasaragod on the eve of Golden Jubilee Celebration of the Kasaragod Agriculturists' Co-operative Marketing Society, Nirchal, Kasaragod.
- Puttur Taluk Agriculture Awareness Workshop at Bellippady, Puttur on 21-12-2008 organized by Dharmasthala Rural Development Project.

MINICOY

Dr. V. Arunachalam, Senior Scientist CPCRI, Regional Station, Minicoy participated in kitchen gardening / vegetable cultivation training programmes organized by Syndicate Bank during 15-11-2008 at Aoumagu village and on 19-12-2008 at Bada Village. Mrs. Amina Alibebege, Chairperson, Village Dweep Panchayat, Mincoy, Mr. Ibrahim Koduge, Plant Protection Officer, Dept of Agriculture and Mr K.V. Atmadass, Branch Manager, Syndicate Bank and villagers attended the programmes.

MOHITNAGAR

Two on-campus and two off-campus training programmes were arranged in and around Jalpaiguri and Dakshina Dinajpur districts on different aspects of plantation crops and plantation based mixed cropping for about 130 farmers.

Dr. Gobinda Ch Acharya, Sr. Scientist delivered a lecture on "Integration of black pepper in arecanut based farming system" on 29th November in the ICAR sponsored winter school on "Recent advances in rainfed horticulture based farming systems in plateau and hilly region" at HARP, Ranchi.

KAHIKUCHI

Three 'On Campus' and two "Off Campus" training to the farmers and extension workers were conducted.

Training on arecanut & coconut based cropping system and vermicompost technology was conducted on 29-10-2008 in the Centre. Another



Participants of the National training programme on "Recent advances in crop protection of coconut" with the resource persons



Training programme on "Parasite breeding and biocontrol of coconut pests"



Saudi Arabian delegates in CPCRI (RS) Kayangulam farm

training on scientific production technology of arecanut, coconut, black pepper and other related crops, arecanut based HDMSCS and vermicompost technology was conducted on 10-11-2008. Third training on scientific production technology



Kerala Assembly Subject Committee in CPCRI(RS),
Kayamkulam



Training programme at Bada Village

practices of arecanut, coconut, black pepper and other related crops, arecanut based HDMSCS and vermicompost technology was conducted on 28-11-2008. A total of 103 participants attended these trainings.

Two off campus trainings were also conducted on the above topic. A total of 110 participants attended these trainings.

KVK, KASARAGOD

Training : KVK at Kasaragod organised a total of 13 training programmes and trained 465 participants (Men 199 and Women 266 which includes 23 SC/ST) comprising farmers, farm women, members of women self help groups, rural youth and extension personnel.

KVK faculty had undertaken 196 extension activities and interacted with 1087 farmers and 58 extension personnel on various aspects of agriculture and allied sectors and suggested suitable technologies and clarified farmers' doubts in their farming situation.

Radio and Doordarshan programme

Mr. R. Sanal Kumar SMS (Plant Pathology) attended phone in programmes on 'Pest and disease management in mango trees' and 'Cultivation of tissue culture banana' in Jalakam programme of AIR Kannur broadcasted on 03-10-08 and 12-11-2008, respectively.

Mr. R. Sanal Kumar SMS (Plant Pathology) attended a radio talk on 'Management of stem bleeding disease in coconut' broadcasted in Kissan Vani programme of AIR Kannur on 18-12-2008.

Dr. Neelofar Illiaskutty SMS (Home Science) attended live programme in 'Kootukari programme' telecasted from Doordarshan Kendra Thiruvananthapuram on 18-11-08.

KVK, ALLEPPEY

Training programmes / Seminars

KVK Alleppey has conducted 15 on campus trainings, 14 off campus and 5 sponsored trainings during this quarter. In these trainings, a total of 364 male and 570 female participated.

Training type	No. of Trgs.	Men	Women	Total
On Campus	15	140	192	332
Off Campus	14	175	280	455
Sponsored	5	49	98	147
Total	34	364	570	934

Vocational trainings

A two months duration vocational training programme on "Broiler farming" as livelihood vocation for educated rural youths was organised during October, 2008 in which 13 participants attended.

Training for VHSE students

On the Job Training programmes were conducted for seven batches of Vocational higher secondary students from various schools of Alappuzha district in which 579 students participated.

Seminar on "Importance of agriculture in School campus" was conducted in November in which 200 students attended.

Agri - Quiz programme sponsored by All India Radio in connection with Farmfest was conducted by KVK.

External funded programmes

Ten days training programme on 'Fresh water fish culture' sponsored by National Fisheries development Board (NFDB) during Oct 2008 in which 32 farmers participated. They were exposed to the theory and



Off campus and on campus training programmes conducted by KVK Kasaragod

practical sessions on pond management and maintenance, aquaculture practices, food and feeding, aqua farm management, health management in aquaculture and harvesting, fresh water prawn culture and post harvesting/marketing and economics along with field visits.

Sponsored training

Screw Pine products -39 women participants were trained in this programme which was sponsored by Oachira block. Practical session in making bag, carpet, purse and various other products were organised by screw pine.

The following frontline demonstrations (FLD) were conducted during the period

- ◆ Demonstration of Krishnashree amaranthus
- ◆ Demonstration of Sheath blight management in paddy using *Pseudomonas fluorescens*
- ◆ Demonstration on Cultivation of high yielding cassava variety Sreejaya
- ◆ Demonstration of Stingless bee
- ◆ Demonstration on cultivation of saline tolerant rice variety

◆ **Demonstration on Drought management practices in coconut gardens**

The following on farm trials (OFT) were conducted during the period

- ◆ Management of bacterial wilt of Solanaceous vegetables
- ◆ Prophylactic measures for preventing mammary infection in dairy cattle
- ◆ Improving shelf life of coconut vinegar
- ◆ Comparison of different types of coconut climbing machine

Other Extension activities

During this period the Krishi Vigyan Kendra organised the extension activities as given below:

Extension activities	Number of activities
Agro clinic	108 Nos
Helpline Services	45 Nos
Press Release	6 Nos
Field Visits	34 Nos
Students group visit	5 Nos
Exhibitions	3 Nos

Inputs provided through KVK: Good quality planting materials, vegetable seeds, layer chicks (Gramasree & Kalinga brown), broiler, medicinal plants, mushroom spawn, M.E. trap, etc. were provided through KVK revolving fund activities during the quarter.

ATMA - Alleppey activities

The KVK participated in the ATMA – BTT meetings of Muthukulam block. The trainings, FLDs and OFTs are being taken up as proposed by ATMA.

WOMENS' CELL

A visit was arranged to the plot of Dr. Chandrashekhara Chowta, a progressive farmer. The members went round the field to get first hand information on the technologies such as *in situ* water conservation, organic farming, *in situ* vermicomposting, etc. adopted by the farmer.

SYMPOSIUM/WORKSHOP/SEMINAR/ MEETINGS ATTENDED

Name of Personnel and Designation	Name of the programme	Place & duration
Dr. George V. Thomas, Director Dr. C.P.R. Nair, Head, Dr. Kasturi Bai, Dr. Chandramohanam, Sri. P. Rajan, Dr. RV Nair, Dr. R. Dhanapal, Principal Scientists, Dr. K. Muralidharan, Dr. C. Thamban, Dr. Chandrika Mohan, Dr. V. Krishnakumar, Dr. H. P. Maheswarappa, Dr. Murali Gopal, Dr. C. Palaniswami, Dr. D.V.S. Reddy, Dr. P. Subramanian and Dr. Regi Jacob Thomas, Sr. Scientists & Dr. V. Selvamani, Scientist	National Conference on Organic farming in horticultural crops with special reference to plantation crops.	CPCRI, Kasaragod 15-10-2008 to 18-10-2008
Dr. George V. Thomas, Director Dr. S. Arulraj, Project Coordinator (Palms) Dr. K.V. Kasturi Bai, HoD, PB & PHT Dr. K.S. Ananda, Pr. Scientist Dr. K. Muralidharan, Dr. A.C. Mathew, Dr. T. Vidhan Singh, Dr. Ravi Bhat, Dr. H.P. Maheswarappa, Dr. V. Krishnakumar, Dr. C.T. Jose, Dr. S. Sujatha, Dr. V. Niral, Dr. C. Thamban, Dr. A. B. Jerard, Sr. Scientists Dr. M.K. Rajesh, Dr. C. Jayabose, Scientist (SS)s Smt. E. Radha, Technical Officer	Plantation Crops Symposium XVIII (Placrosym XVIII)	NRC for cashew, Puttur, (D.K) 10-12-2008 to 13-12-2008
Dr. H. P. Maheswarappa, Sr. Scientist (Agronomy)	17 th Group meeting of AICRP on Medicinal and Aromatic Plants	College of Horticulture KAU, Vellanikkara Thrissur 15-11-2008 18-11-2008
Dr. George V. Thomas, Director Dr. H. P. Maheswarappa Sr. Scientist Dr. D.V.S. Reddy, Sr. Scientist Dr. Gobinda Ch Acharya, Sr. Scientist	National Seminar on Piperaceae	IISR, Calicut Kozhikode 20-11-2008 to 21-11-2008
Dr. P.M. Jacob, Principal Scientist	Workshop on "Agricultural Development of Kollam District - Problems and Prospects" and presented a theme paper on "Coconut cultivation with special reference to elite coconut seedling production for the root (wilt) affected areas"	Kristu Jyothi Animation Centre, Kottiyam Kollam 21-12-2008

DISTINGUISHED VISITORS

Name of personnel & Designation	Date of visit/ Place	Purpose
Mr. Saud A. Aleyyad, Vice Director Gen., Min. of Agriculture, Mr. Abdulhadi Yaseen Al Abbad, Deputy Manager and Head, Department of Crop Protection, Mr. Abdullah Al Shagag, Crop Protection Expert, Mr. Sami Ahmed Al Sarouj, Crop Protection Expert and Mr. Mansour Mohammed Al Baqshy, Crop Protection Expert, National Date Palm Research Centre, Kingdom of Saudi Arabia	21-10-2008 to 24-10-2008 CPCRI, RS, Kayamkulam.	An exposure visit to get first hand information on ongoing research programmes under different disciplines at the Station. IPM for major insect pests of coconut with special emphasis on Red Palm Weevil was explained in detail to the delegates. #
Sri. Rajaji Mathew Thomas, MLA, Sri. CK Padmanabhan, MLA and Sri. Muhammadunni Haji, MLA	21-11-2008 CPCRI, RS, Kayamkulam.	Kerala Assembly Subject Committee-I for studying the problems in coconut sector.
Sri A.K. Upadhyay, Secretary ICAR and Addl. Secretary DARE, New Delhi	22-12-2008 Kasaragod 23-12-2008 CPCRI, RS, Vittal & CPCRI, RC, Kidu	To review the Institute activities
Dr. V.S. Korikanthimath Director, ICAR Research Complex for Goa	28-12-2008 CPCRI, RC, Mohitnagar	To get acquainted with the ongoing research activities.
Dr. R.P. Medhi, Director NRC for Orchids Pakyong, Sikkim	CPCRI, RC, Kahikuchi	To review MM - I activities.

Saudi Arabian delegation visited India as a part of FAO sponsored programme to acquaint with the latest technologies on the management of red palm weevil. They held discussion with Dr. HP Singh, DDG (Horticulture) at Krish Anusandhan Bhavan, New Delhi, visited IARI, New Delhi, NCIPM, New Delhi, CPCRI Regional Station, Kayangulam, PDDBC, Bangalore and ICAR Research Complex for Goa during October 19-31, 2008. Dr. A. Joseph Rajkumar, Sr. Scientist (Entomology) was the programme coordinator for the deligation.

AWARD/ HONOURS

Awards

The poster entitled "Large scale field validation of biocontrol strategy for management of coconut leaf eating caterpillar *Opisina arenosella* Walker utilizing indigenous parasitoids" presented by Dr. (Mrs.) Chandrikamohan in the *National Conference on Organic farming in Horticultural Crops with special reference to Plantation Crops* held during 15-18 October 2008 at CPCRI, Kasaragod bagged one of the best research paper (poster) awards.

Dr. R.L. Narasimha Swamy Memorial Award was presented to Mrs. Radha, E., Dr. Anitha Karun, Dr. Rajesh, M.K. and Ms. Nancy J. Mariya for the best original paper displayed at the Poster Session of PLACROSYM XVIII held at National Research Centre for Cashew, Puttur, Karnataka from 10th-13th December, 2008.

Dr. S. Elain Apshara, Senior Scientist (Horti.) was conferred with Dr.C.S.Venkataram Memorial Award for the best original research paper entitled 'Comparative studies on elite cocoa progenies in the initial years of

growth' co-authored by Vivek R.Bhat and R.V.Nair at the Poster Session of PLACROSYM XVIII.

Ph. D. Guides

Dr. H.P. Maheswarappa and Dr. (Mrs.) V. Niral have been recognized as Research guides by Mangalore

University in the Department of Applied Botany. Further, Dr. (Mrs.) V. Niral has been recognized as a Research guide by the Kannur University in the Department of Botany.

CELEBRATIONS

KASARAGOD

New Year Eve was celebrated by the CPCRI Recreation Club on 31-12-2008 from 6:30 PM onwards. Dr. George V. Thomas, Director, CPCRI presided over the function and Chief Guest was Sri Soopy Vanimel, President, Press Club, Kasaragod and Bureau Chief, Madhyamam Daily, Kasaragod. There were variety entertainments programmes in connection with the celebrations.



POST GRADUATE STUDIES/ HRD/ TRAININGS

Name of personnel & Designation	Programme	Place Duration
Mr.K.Manikandan, SMS (Agronomy)	5 days training on LAN and WAN technology in connection with e-linkage project of KVKs	TNAU, Coimbatore 09-10-2008 to 13-10-2008
Dr. Neelofar Illiaskutty, SMS (Home Science)	-do-	19-10-2008 to 23-10-2008
Dr. M.K. Rajesh Scientist Sr. Scale (Biotechnology)	21-days training on "Innovative approaches for increasing productivity in oilseed crops: A crop improvement perspective" organized by Director of Oil Seeds Research	Hyderabad 4-11-2008 to 24-11-2008
V. Niral & Dr. S. Elain Apshara Sr. Scientists	Short course on "Germplasm Exchange Policies and Procedures in India" conducted by NBPGR	New Delhi 17-11-2008 to 26-11-2008
Er. K. Madhavan, Pr. Sci.	Training programme on "Leadership for Innovation in Agriculture" IIM, Lucknow	Lucknow 3-11-2008 to 7-11-2008
Dr. V. Krishnakuar & Dr. C. Thamban, Sr. Scientists	Workshop on "Leadership for Innovation in Agriculture" at MANAGE,	Hyderabad 17-11-2008 to 21-11-2008

OTHER INFORMATION

IMC Meeting

The first meeting of reconstituted Institute Management Committee was held on 27-11-2008 at CPCRI, Kasaragod. Dr. S.N. Pandey, ADG (Hort. I), ICAR, New Delhi was present during the meeting.

IJSC Meeting

The Institute Joint Staff Council meeting was held at CPCRI, RC, Kidu on 24-11-2008. Various

developmental and management issues were discussed and action points evolved for smooth running of the Institute.

Public Information Officer Incharge

Sri. Muralikrishna H. Technical Information Officer has been designated as Public Information Officer in charge during the period in which Sri. T.K.N. Nambiar, AO, PIO is on leave at the institute.

Sri A.K. Upadhyay, Secretary ICAR and Addl. Secretary DARE, New Delhi visited CPCRI, Kasaragod on 22-12-2008 to review the Institute activities. He attended staff meeting organised during his visit, visited various laboratories and experimental fields. He has visited CPCRI, RS, Vittal on 23-12-2008 and reviewed activities of the Station. On the same day, he visited CPCRI, RC, Kidu and got acquainted with the activities.



Dr. D. Balasimha, Dr. George V. Thomas, Dr. M.G. Bhat, Shri A.K. Upadhyay and Dr. K.S. Ananda discussing at RS, Vittal

P E R S O N A L I A

P R O M O T I O N

Name of staff	From (designation)	To (designation)	Date (w.e.f.)
Sri T.E. Janardhanan	Assistant CPCRI Kasaragod	Asst. Admin. Officer, CPCRI, RS, Vittal	27-10-2008
Sri K.V. Kunhikannan	Assistant CPCRI Kasaragod	Asst. Admin. Officer CPCRI Kasaragod	28-10-2008
Sri Mohammed Haneefa	SS Grade I CPCRI Kasaragod	SS Grade II CPCRI Kasaragod	12-11-2008
Sri T.K. Gangadharan	-do-	-do-	-do-

T R A N S F E R

Name of staff	Designation	From (Place)	To (Place)
Dr. M. Gunasekaran	Scientist (SG) Pl. Pathology	CPCRI, Kasaragod	CICR, RS, Coimbatore
Dr. T. Arumuganathan	Scientist SS (AS & PE)	NRC for Mushrooms, Solun, H.P.	CPCRI, Kasaragod
Smt. K. Prabhavathy	Assistant	CPCRI RS Vittal	CPCRI Kasaragod
Dr. Shyam S. Salim	Scientist (SS) Agri. Econ.	CPCRI, Kasaragod	CMFRI, Kochi

R E T E I R M E N T

Name of staff	Designation	From (Place)	On account of
Sri K. Bhaskaran	SS Grade IV	CPCRI, Kasaragod	Voluntary retirement on 15-10-08
Sri Mukum Paul	SS Grade III	CPCRI, RC, Mohitnagar	Superannuation on 31-10-08
Sri Manglu Paul	SS Grade III	CPCRI, RC, Mohitnagar	Superannuation on 31-10-08
Smt. R.M. Sarasamma	Supporting Staff Gr. I	CPCRI, RS, Kayamkulam	Superannuation on 30-11-08
Smt. K. Khadeeja	Supporting Staff Gr. II	CPCRI, RS, Kayamkulam	Superannuation on 30-11-08
Smt. Gopi	SS Grade III (Mazdoor)	CPCRI, RS, Vittal	Superannuation on 30-11-08
Sri A. Janardhana Naik	UDC	CPCRI, RS, Vittal	Compulsory retirement on 10-12-2008
Sri Arun C. Sarmah	SS Grade IV (Lab. Attender)	CPCRI, RC, Kahikuchi	Superannuation on 31-12-2008
Sri Punaram Das	SS Grade IV (Mazdoor)	CPCRI, RC, Kahikuchi	Superannuation on 31-12-2008

Published by: Dr. George V. Thomas, Director; Compiled and edited by: Mr. H. Muralikrishna and Dr. D.V. Srinivasa Reddy

Photographic credits: Mr. K. Shyama Prasad and Mr. E.R. Asokan

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Printed at: Niseema Printers, SRM Road, Ernakulam North – 682 018 Phone: 0484 2403760