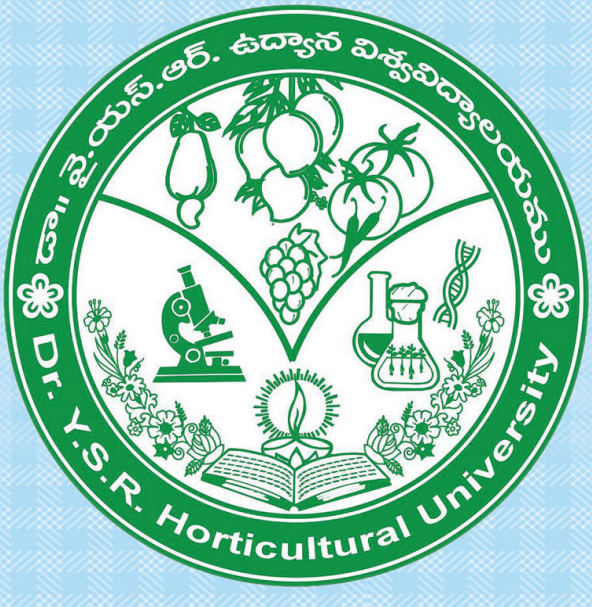
Annual Report
2014-15



Dr. Y.S.R. Horticultural University
Venkataramannagudem, West Godavari District – 534 101

Dr.YSRHU, Annual Report, 2014-15

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Dr. Y.S.R. HORTICULTURAL UNIVERSITY

Foreword

Dr.YSR Horticultural University established at Venkataramannagudem, West Godavari District, Andhra Pradesh on 26th June, 2007, is second of its kind in the country, with the mandate for Education, Research and Extension related to horticulture and allied subjects. The university at present has two Horticultural Colleges, four Horticultural Polytechnics, sixteen Research Stations and two KVKs located in 5 agro-climatic zones of the state.

The University offers B.Sc. (Hons.) Horticulture, M.Sc. (Horticulture) with specialization in four areas, namely i) Fruit Science, ii) Vegetable Science, iii) Floriculture & Landscape Architecture, iv) Spices, Plantation, Medicinal & Aromatic crops and Ph.D in Horticulture. The University runs on the land grant pattern followed in the USA, integrating Horticultural Education, Research and Extension. Further with the objective to provide self employment to rural youth and also to make use of the services of rural youth, the university has established six Horticultural Polytechnics to offer two year Diploma in Horticulture.

During the period of report two Academic Council meetings and two ZREAC meetings were held.

A total of 149, 30 and 6 students in B.Sc. (Hons.) Horticulture, M.Sc. (Horticulture) and Ph.D (Horticulture) respectively along with 90 students in Diploma in Horticulture course are on rolls during the year under report.

University is conducting basic, applied, location specific and anticipatory research for the overall development of Horticulture Sector in the state at 16 research stations. Two Krishi Vigyan Kendras 100% funded by ICAR are functioning to serve the farmers' needs and to impart technical knowhow through training and extension programmes.

The University scientists are involved in popularizing the proven technologies and improved varieties developed through various extension activities viz., All India Radio, Print and Visual media, Participation in Exhibitions, Kisan melas, Polam Pilusthondi, Rythu Sadassulu and extension trainings.

I take this opportunity to thank Government of Andhra Pradesh and Indian Council of Agricultural Research for their financial and technical support to the University.

I whole heartedly thank the Academic Council, University Officers, Associate Deans, Principals, Heads of Research Stations, Krishi Vigyan Kendras and supporting staff for their cooperation in preparation of the Annual Report.

(Sri Chiranjiv Choudhary)
Vice-Chancellor

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SUMMARY

Forecasting the horticultural growth potential in the state, the Govt. of Andhra Pradesh had established Andhra Pradesh Horticultural University (APHU) second of its kind in the country at Venkataramannagudem, West Godavari District vide Govt. Act No.30 of 2007 (G.O.Ms.No.134 dated 26.06.2007) carving out of its parent University i.e ANGRAU, Rajendranagar. Subsequently, it was renamed as Dr.Y.S.R. Horticultural University vide Act No.13 of 2011. The University has a mandate of human resource development through Education, conduct need based Research and dissemination of the proven technologies through Extension. After bifurcation of the state the university is functioning with 2 Horticultural Colleges, 16 Research Stations, 4 Horticultural Polytechnics and 2 Krishi Vigyan Kendras.

The University is governed by a Board of Management comprising of 21 members headed by the Vice-Chancellor. The Vice-Chancellor is supported by University Officers viz., Registrar, Dean of Horticulture, Director of Research, Director of Extension, Director of Industrial and International Programmes, Dean of PG Studies, Dean of Student Affairs, Controller of Examinations, Comptroller and Estate Officer in University management. The academic affairs of the University are governed by the Academic Council, UG and PG boards lead by the Vice-Chancellor, the Research and Extension services are guided by Research and Extension Council (REC).

EDUCATION

This university offers B.Sc. (Hons.) Horticulture in two constituent colleges namely HC & RI, Anantarajupeta (Kadapa District) and Venkataramannagudem (West Godavari District) besides the two years post graduate programme in M.Sc Horticulture with specialization in Fruit science, Vegetable science, Floriculture and landscape architecture and Spices, Plantation, Medicinal and Aromatic plants are being offered in the two constituent colleges in the university. At present the Ph.D. (Horticulture) degree programme is being offered in colleges i.e. HC & RI, Venkataramannagudem. Four Horticultural Polytechnics are run by the university in rural areas to offer two year Diploma in Horticulture. The Horticultural Polytechnics are located at Madakasira (Anantapuramu district), Kalikiri (Chittoor district), Ramachandrapuram (East Godavari district) and Nuzvid (Krishna district).

The University has taken up development of infrastructure like buildings for the colleges, separate hostels for girls and boys, staff quarters, well equipped laboratories by providing funds received from ICAR, NABARD and State Government to each college besides positioning well qualified faculty to these colleges so as to obtain ICAR and UGC recognition. The Peer Review Team under the chairmanship of Dr.N.C.Gautam, Vice-Chancellor, Mahatma Gandhi Chitrakoot Gramodaya Viswavidyalaya, Chitrakoot, Madhya Pradesh visited the University and its constituent colleges during 28th – 31st may, 2014 which has expressed satisfaction and appreciated the efforts of University in this regard.

The University is developing entrepreneurship among students in the field of post harvest technology and value addition, commercial horticulture and protected cultivation of horticultural crops as a part of Experiential Learning Programme(ELP) in the eighth semester which is very popular with the students.

The first convocation was held on 27th March, 2015 in which Dr.B.M.C.Reddy, Vice-Chancellor has conferred the degrees and gold medals to the successful students in B.Sc (Hons.) Horticulture, P.G. & Ph.D. programmes. The student out turn to whom the degrees were awarded during the convocation was 1149 B.Sc. (Hons) Horticulture (908); M.Sc (Hort) (227); Ph.D (14).

RESEARCH

Crop Improvement:

- In production and evaluation of new cross combinations in coconut, the coconut hybrid Vasista Ganga (GBGD X PHOT) was found promising and proposed for release in Andhra Pradesh and Karnataka states by the central sub-committee and notified in its 23rd meeting held at IIHR, Bangalore on 7th April, 2015.
- Among 13 different hybrids and commercial varieties of betelvine, GN hybrid performed well with bigger leaf size and yield. GN Hybrid recorded highest yield of 38.33 leaves per plant followed by Swarna kapoori (35.67 leaves per plant). Highest leaf length (16.0 cm) and leaf width (16.67 cm) were also recorded in GN hybrid. Tellaku ponnuru recoded highest plant height (171 cm) followed by Swarna kapoori (162.83 cm).
- Initial Evaluation Trial (IET) on 'K' efficient lines of tapioca was initiated with 10 entries. Maximum tuber yield per hectare was recorded in TCa 14-8 (50.6t/ha) which was on par with TCa 14-3 (44.9 t/ha) and Sree Athulya (43.1 t/ha). Highest starch content was observed in Sree Athulya (28.5 %) which was on par with TCa 14-2, TCa 14-6 and Local. Minimum amount of HCN (ppm) was recorded in TCa14-10 (79.4 ppm).
- Release proposals for high yielding chilli variety LCA-625 and paprika varieties LCA-424 and LCA-436 developed under Chillies Improvement Scheme were submitted for state release.
- A new chilli variety *viz.,* LCA-620 with bold pods, medium length, medium pungency and excellent colour value has been recommended for release as national variety during XXXII Annual Group Meeting of AICRP on Vegetable crops held at Raipur during June, 2014.
- Ten cross combinations of oil palm planted in 2007 were evaluated for yield and NRCOP-4 recorded higher number of bunches per palm (12) with an average bunch weight of 13.8 kg, FFB yield of 165.6 kg/palm/year 23.68 t/ha followed by NRCOP-5 cross which recorded an yield of 19.66 t/ha with an average yield of 137.5 kg per palm per year

Crop Production:

- The highest per hectare yield of 40.22 tons was recorded with application of NPK @ 169-29-220 g/plant for fertilizer adjustment equation in banana.
- Foliar spray of Fe_2SO_4 (0.2%) + $MgSO_4$ (0.2%) + $ZnSO_4$ (0.2%) + H_3BO_3 (0.2%) recorded higher yield (44.67 t/ha) and it was on par with $FeSO_4$ (0.2%) + $MgSO_4$ (0.2%) in banana.
- Among the organic treatments, application of FYM @15 kg along with neem cake @1.9 kg, vermicompost @ 7.5 kg and wood ash @ 2.6 kg /plant recorded highest yield of 42.5 t/ha in banana.
- Sapota cv. Kalipatti supplied with nutrients @ 100% RDF given at different stages of growth during June (NPK as 25-100-25), August (NPK as 50-0-50) and October (NPK as 25-0-25) recorded higher yields per tree (130.70 kg) and yield per hectare (13.07 t).
- Application of Potassium phosphonate (0.3%) as foliar spray + Soil application of *Trichoderma harzianum* (108 CFU) 50 g/vine with 1.0 kg of neem cake three times, i.e., before onset of monsoon (May 2nd fortnight) during monsoon (July 1st week) & and after monsoon (September 1st fortnight) is recommended for the management of phytophthora foot rot in black pepper.

- Drip irrigation once in a day at 80% PE recorded maximum yield (49.9 t/ha) followed by drip irrigation once in two days at 80% PE (49.5 t/ha) which were on par with each other and significantly superior to surface irrigation at 5 cm, 0.9 IW/CPE (45.0 t/ha).
- Soil application of 75 % RDF along with Arbiscular michorrhiza at 500 g/plant+ PSB at 100 g/plant + Azospirillum at 100 g/plant and *T. harzianum* at 100 g/plant was found to be a sustainable solution for increased production as well as fruit quality in sweet orange. The treatment has also given the highest cost benefit ratio (2.25) there by reducing the fertilizer input cost.
- Irrigation schedule with 80% ER uniformly during all the growth stages in sweet orange recorded significantly maximum number of fruits (210 fruits/plant), fruit weight(202.33 g) and fruit yield (42.36 kg/plant) and better quality fruits (0.55% acidity and 13.17 ^{0} Brix).
- Azospirillum (5 kg/ha) + P S B (7.5 kg/ha) + *Arbiscular michorrhiza* (12.5 g/ha) + 50% NPK recorded significantly longer plants (28.55 cm), higher leaf count (19.02), leaf area (106.74 cm^{2}), longer roots (34.07 cm), root diameter (16.44 cm), fresh weight of root (387.22 g) and highest root yield (52.46 t/ha) in radish cv. Pusa Himani.
- Hand weeding at 20, 40 and 60 DAT recorded more plant height (49.33 cm), polar (3.69 cm) and equatorial diameter (7.13 cm), fresh weight of bulb (177.16 g), more yield (23.56 t/ha) and more TSS (12.5%) followed by herbicidal treatment with pre emergence spray with Pendimethalin @ 1.0 kg a.i./ha + Post emergence spray of Quizalofop Ethyl @ 50 g a.i. ha. at 20 DAT with a plant height of 47.26 cm, equatorial diameter of 6.93 cm, fresh weight of bulb of 171.48 g and an yield of 21.83 t/ha in Onion.

Post Harvest:

- Palm jaggery powder was made with Neera collected through CPCRI method and traditional method. Jaggery powder from CPCRI method has given good quality in terms of colour, taste and keeping quality.
- Fruit endosperm (Nungu) was preserved at 40^{0}, 50^{0} and 60^{0} Brix and kept in deep freezer and the quality of nungu at 50^{0} Brix was good up to one year.

Plant Protection:

- Bio control based integrated disease management package (application of 50g of *Trichoderma viride* + 5 kg need cake/tree, removing and destroying dead trees and basin irrigation) showed significant reduction of both vertical and horizontal spread of basal stem rot disease in coconut under field conditions.
- Cake formulation of *Trichoderma virens* against stem bleeding disease was found effective under field conditions.
- On *Mucuna pruriens* yellow mosaic disease first appeared at 46 days after sowing and attained its peak by 78 days, with reduction in seed yield by 37.3%. The virus was found to be different from Mungbean yellow mosaic virus and Mungbean yellow mosaic India virus.
- Spinosad (0.25ml/l) followed by flubendiamide (0.4 ml/l), rynaxypyr (0.4 ml/l) and lamda cyhalothrin (1ml/l) were found effective against pod borer in chilli.
- Triazophos (1.25 ml/l) and rynaxypyr (0.4ml/l) were found effective against chilli blossom midge.
- Neem formulation 10000 ppm @ 5ml/l followed by thiamethoxam (0.025 %) was found to be significantly superior over control up to 14 days to control leaf miner in citrus.

- The treatments of neem formulation 10000 ppm @ 5ml/l followed by thiamethoxam (0.025%) or fipronil (0.01%) or dimethoate (0.06%) were found significantly superior and economical giving more than 75% pest control against thrips both on leaves and fruits in sweet orange.
- The pesticides ethion 50 EC (0.05 %), abamectin 1.9 EC (0.0007 %), propargite 57 EC (0.057%), spiromesifin 240 SC, fenazaquin are the effective chemicals with lowest pest infestation till 14 days after spraying against green mite in sweet orange.
- Highest per cent (81.25 %) recovery of dry root rot infected plants was recorded by treating the plants with mancozeb (0.2%) soil drenching + application of *Trichoderma reesei* (100g/tree) (107) + *Pseudomonas* fluoroscens (100g/plant) (108)+ 2 kg neem cake + FYM 25 kg after 15 days of drenching in sweet orange.
- Already recommended fungicide i.e Karathane @ 0.1% was still found to be effective in managing the ber powdery milew and bioagents *viz P. florescence* and *Trichoderma viride* were found ineffective.
- Tebuconazole 50% + trifloxystrobin 25% WG @ 0.5 g/l was found to be superior in controlling the purple leaf blotch in onion and recorded low incidence (19.36 %) and more yield (21.72 t/ha) and CB ratio (1:1.50).

EXTENSION

This University has two KVKs located at Pandirimamidi in East Godavari District and Venkataramannagudem in West Godavari District. Scientists of Dr.Y.S.R.H.U. have participated in Diagnostic Surveys, Polam Pilustondi, Rythu Kosam Chandranna Yatralu, disaster management programmes, training programmes to farmers and officers of State Department of Horticulture and Agriculture, conducting field days, transfer of technology through Mass media, publications, field demonstrations and village adoption programmes etc. ZREAC meetings were conducted involving scientists, departmental officers, REC Members & farmers has reprasentatives from other agencies. As a support to mass media cell of Commissioner of Agriculture, All India Radio and Doordarshan, monthly calendar of operations of horticultural crops was prepared well in advance and circulated to all the concerned stations and extension agencies in the state.

Zonal Research and Extension Advisory Council meetings were held involving scientists, officers of the line departments and farmers to identify the research/extension gaps and to finalize technical programme for research and extension.

The Krishi Vigyan Kendras and Research Stations mandated with transfer of technology are taking care of the extension activities. Nine villages were adopted by Krishi Vigyan Kendras in East and West Godavari districts to conduct location specific extension activities i.e., OFTs, FLDs, Trainings, Demonstrations etc. twelve on farm trials (OFTs), 23 Front line demonstrations (FLDs), 37 training programmes and 676 other extension activities were conducted covering 13,528 farmers to promote the best/location specific technologies for improving yields and reducing the cost of cultivation.

Every year "Udyana Panchangam" in telugu covering the production technology on horticultural crops is being brought out and released on Ugadi festival day for the benefit of the farmers. The other need based booklets and pamphlets are being published for providing latest technical information to the farmers on various horticultural crops.

I. INTRODUCTION

The Andhra Pradesh Horticultural University was established by the Government of Andhra Pradesh by Act 30 of 2007 with its headquarters at Venkataramannagudem near Tadepalligudem in West Godavari District and renamed as Dr.Y.S.R.Horticultural University w.e.f. 18th April, 2011 by Act 13 of 2011. It is the second Horticultural University in the country. The University runs on the Land Grant pattern followed in USA with emphasis on Education, Research and Extension in Horticulture and allied subjects.

The University at present has two constituent Colleges of Horticulture, four Horticultural Polytechnics, 16 Research Stations and two Krishi Vigyan Kendras across 5 agro-climatic zones of the state. Based on the present day need, ongoing research programmes at all the Research Stations have been re-oriented into eight thrust areas. Apart from the non-plan research programmes, fifteen All India Coordinated Research Projects are also operating at different research stations of the University. Funds for research are provided by the State Government and also the Indian Council of Agricultural Research (ICAR). The ICAR provides 75 per cent of funds for conducting research under various All India Coordinated Research Projects of ICAR.

The University is governed by a Board of Management headed by the Vice-Chancellor. The Vice-Chancellor is supported by University Officers viz., Registrar, Dean of Horticulture, Director of Research, Director of Extension, Director of Industrial and International Programmes, Dean of PG Studies, Dean of Student Affairs, Controller of Examinations, Comptroller and Estate Officer in University management. The academic affairs of the University are governed by the Academic Council, UG and PG Boards led by the Vice-Chancellor. The Research and Extension services are guided by the Research and Extension Council (REC).

This university offers B.Sc. (Hons.) Horticulture, M.Sc. (Horticulture) with specialization in i) Fruit Science ii) Vegetable Science iii) Floriculture and Landscape Architecture, and iv) Spices, Plantation, Medicinal and Aromatic crops and Ph.D (Horticulture). The course curriculum prescribed by the IV Deans' committee of Indian Council of Agricultural Research is being followed for the degree programme. At under graduate level, besides course work to equip the practical field knowledge on the Horticultural crops, the students shall also undergo Rural Awareness Work Experience Programme (RAWEP) and subsequently Experiential Learning Programme with subject modules, *viz*, (1) Commercial Horticulture (2) Protected cultivation of high value Horticultural crops (3) Processing of fruits & vegetables for value addition (4) Floriculture and landscape gardening. In RAWEP, the final year students are deputed to stay in villages and are attached to different host farmers for 90 days, where they will interact with farmers of the village, work with them, understand the field problems, apply the latest knowledge, acquire necessary skills and gain self confidence. In view of the globalization of horticultural trade and for imparting quality education and training in horticulture, to the students, the practical based training programmes i.e., RAWEP and Experiential Learning Programme (ELP) are useful to develop the manpower requirement with different technical expertise. With an intention to provide self employment to rural youth and also to make use of the services of rural youth in rural development, the University has established six horticultural Polytechnics in non-municipal areas to offer two year Diploma in Horticulture.

The University scientists are involved in popularizing the proven technologies and improved varieties developed through various extension activities *viz.,* All India Radio, print and visual media, participation in Exhibitions, Kisan Melas, diagnostic surveys, Polam Pilustondi, Rythu Kosam Chandranna yatralu, disaster management programmes, Rythu Sadassus and Training Programmes.

II. UNIVERSITY ADMINISTRATION

His Excellency, the Governor of Andhra Pradesh, **Sri E.S.Lakshmi Narasimhan** is the Chancellor of the University.

Dr. B.M.C. Reddy, Vice-Chancellor is the Academic Head and Principal Executive Officer of the University.

The organizational set up of the University is presented in flow chart.

The University is governed by the following authorities.

- Board of Management
- Academic Council

A. AUTHORITIES OF THE UNIVERSITY

1. Board of Management

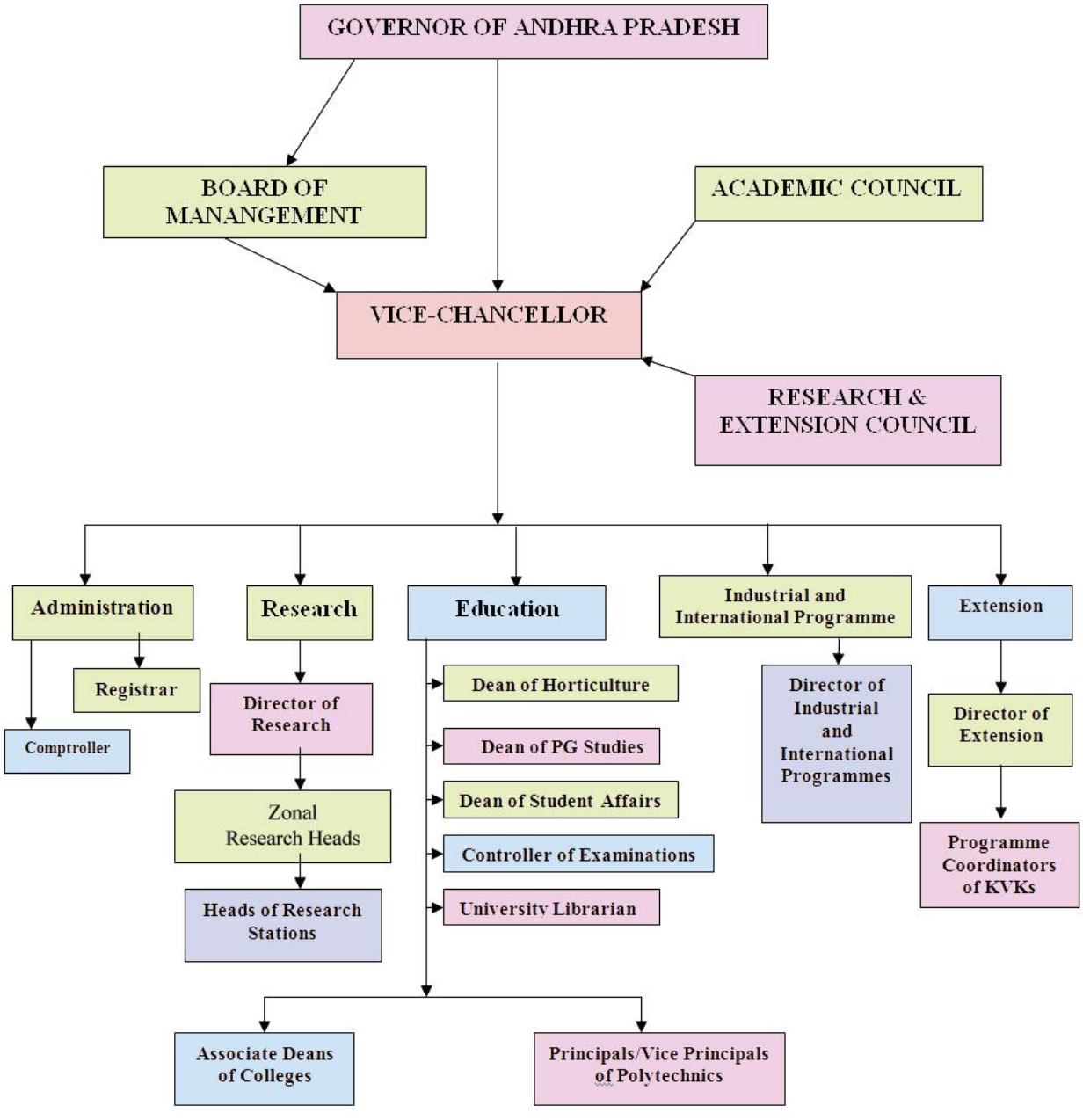
The Board of Management of Dr.YSRHU is the apex body with Vice-chancellor as its chairman and also the chief executive of the university, empowered to make policy decisions.

The Board of Management has representatives from State Legislature/Parliament (4 no.), the Horti-industry (2 no.) and State Chamber of Panchayat Raj (1) as well as Horticultural Scientific Community (1 no.). In addition, one representative from the Indian Council of Agricultural Research, three Members of Academic Council of the University, Secretaries to Government from Panchayat Raj and Finance Departments and Director of State Departments of Agriculture and Animal Husbandry are also the Members of the Board of Management of Dr.YSRHU. During the period under report the Board of Management was not constituted by Govt. of Andhra Pradesh except for the Ex-officio members.

Members of Board of Management, Dr.YSRHU

Ex-Officio Members	**Dr. B.M.C. Reddy**, Vice-Chancellor
	Dr. A. Padmaraju, Vice-Chancellor, ANGRAU
	Dr. Manmohan Singh, IAS, Vice-Chancellor (FAC), SVVU & Principal Secretary to Government, AH DD & F Dept. A.P.
	Smt. Ranjeev R. Acharya, IAS, APC & Principal Secretary to the Govt. of A.P. Agriculture & Cooperation (Horti.) Department.
	Smt. V. Usha Rani, IAS, Ex-Officio Secretary to Govt. of A.P. (Horti. & Seri) Agril. & Cooperation Department
	Dr. P.V. Ramesh, IAS, Principal Secretary to the Govt. of A.P. (R & F), Finance Department
	Sri M. Papi Reddy, I.R.T.S. Commissioner of Horticulture Govt. of Andhra Pradesh
	Smt. V. Usha Rani, IAS, Commissioner of Horticulture, Govt. of Andhra Pradesh., Hyderabad.

ORGANIZATIONAL STRUCTURE OF
Dr. Y.S.R. HORTICULTURAL UNIVERSITY



2. Officers of the University

The list of University Officers for the year is furnished as follows.

UNIVERSITY OFFICERS

Vice-Chancellor	**Dr. B.M.C. Reddy** (From 20-12-2013 onwards)
Registrar	**Dr. B.Srinivasulu** (01-11-2011 onwards)
Director of Industrial & International Programmes	**Dr. M.B.Nageswara Rao** (04-10-2013 onwards)
Dean of Horticulture	**Dr. M.Lakshminarayana Reddy** (12-07-2012 to 11-10-2013)
	Dr. M.Pratap (12-10-2013 to 26-12-2014)
	Dr.M.Lakshminarayana Reddy (27-12-2014 onwards)
Dean of Post Graduate Studies	**Dr. M.Lakshminarayana Reddy** (12-10-2013 onwards)
Dean of Student Affairs	**Dr. K.Vanajalatha** (17-10-2013 to 29-12-2014)
	Dr. M.B.N.Rao (30-12-2014 to 26-02-2015)
	Dr. D. Srihari (27-02-2015 onwards)
Director of Research	**Dr. J.Dilip Babu** (03-09-2013 onwards)
Director of Extension	**Dr. G.Srihari** (10-10-2013 to 05-01-2015)
	Dr.J.Dilipbabu (07-01-2015 to 27-02-2015)
	Dr.R.V.S.K.Reddy (27-02-2015 onwards)
Controller of Examinations	**Dr. D.Srihari** (13-10-2013 onwards)
Comptroller	**Dr. B.Srinivasulu** (01-06-2011 to 08-12-2014)
	Dr. D.Srihari (08-12-2014 to 26-02-2015)
	Dr. J.Dilip Babu (26-02-2015 to 24-02-2016)
University Librarian	**Dr. R.V.S.K. Reddy** (06-10-2014 onwards)
Estate Officer	**Sri P.R.P.Raju**

3. Academic Council

The Academic Council is vested with the responsibility of implementing and monitoring all the academic programmes. The Council is headed by the Vice-Chancellor, as Chairperson and consists of Deans of Faculties, Directors of Research and Extension, Dean of Student Affairs, Controller of Examinations, University Heads of Departments and Professors as Members. In addition, the Council consists of ten academicians, representing different faculties nominated by the Vice-Chancellor and two representatives of the Board of Management. As Chief Executive of the University, the Vice-Chancellor is having the powers and responsibilities for the academic administration.

MEMBERS OF ACADEMIC COUNCIL

Clause (i)The Vice-Chancellor	**Dr. B.M.C. Reddy,** Vice-Chancellor, Dr.YSRHU
Clause (ii)The Vice-Chancellor, ANGRAU	**Dr. A.Padma Raju,** Vice-Chancellor, ANGRAU
Clause (iii)The Vice-Chancellor, SVVU	**Dr.Manmohan Singh, I.A.S.,** Vice-Chancellor (FAC) & SVVU Principal Secretary to Government, AH, DD & F Dept., A.P.
Clause (iv)The Dean of Horticulture	Dr. Dr.M.Lakshminarayana Reddy, Dean of Horticulture, Dr.YSRHU
The Dean of PG Studies	Dr.M.Lakhsminarayana Reddy, Dean of PG Studies, Dr.YSRHU
Clause (v)The Directors	Dr. J.Dilip Babu, Director of Research, Dr.YSRHU
	Dr. R.V.S.K.Reddy, Director of Extension, Dr.YSRHU
	Dr.M.B. Nageswara Rao, Director of Industrial & International Programmes
Clause (vi)Dean of Students Affairs	Dr. D. Srihari, Dean of Students Affairs, Dr.YSRHU
Clause (vii)Controller of Examinations	Dr. D. Srihari, Controller of Examinations, Dr.YSRHU

Clause (viii) The University Librarian	Dr. R.V.S.K. Reddy, University Librarian, Dr.YSRHU
Clause (ix) The University Heads of Departments and Heads of Departments of College	
Clause (x) The Associate Deans of Colleges	Dr. A. Sujatha, Associate Dean Dr. K. Gopal, Associate Dean
Clause (xi) The Associate Directors of Research of the Regions / Zones	Dr. B.V.K. Bhagawan, Principal Scientist (H) & Zonal Head Dr. L. Naram Naidu, Principal Scientist (H) & Zonal Head Dr. K.T. Venkataramana, Principal Scientist (H) & Zonal Head
Clause (xii) Three Principal Scientists (Crop)	Dr. B. Govindarajulu, Principal Scientist & Head Dr. L. Naram Naidu, Principal Scientist & Head Dr. G. Ramanandam, Principal Scientist & Head
Clause (xiii) Members of Board of Management	-
Clause (xiv) The eminent educationists from outside the University in the field of Horticulture	Dr. A.B. Patil, Director of Extension, University of Horticultural Sciences, Bagalkot, Karnataka Dr. C. Ravisankar, Professor (Hort.) & Univ. Head (Retd.), ANGRAU
Clause (xv) One nominee of the Indian Council of Agricultural Research	Director, National Research Centre for Oil Palm
Clause (xvi) Two Associate Professors and two Assistant Professors from the Faculties	Dr. K. Swarajya Lakshmi, Associate Professor (Horticulture) Dr. D.R. Salomi Sunitha, Associate Professor Dr. N. Emmanuel, Assistant Professor (Entomology) Sri V.N.P. Siva Rama Krishna, Assistant Professor (Horticulture)
Clause (xvii) Principals of Polytechnics	Dr.C.N. Byanna, Vice-Principal Smt. D. Aparna, Vice-Principal
Clause (xviii) The Registrar	Dr.B.Srinivasulu, Registrar, Dr.YSRHU

B. MEETINGS OF THE AUTHORITIES OF THE UNIVERSITY

Academic Council

The Academic Council normally meets once in six months. Accordingly 13th Academic Council meeting was held on 18.05.2014 and 14th Academic Council meeting was held on 17.12.2014 at Dr.Y.S.R.Horticultural University, Venkataramannagudem, West Godavari District. No REC Meeting was conducted during the report period, how ever new REC has to be constituted.

C. FACULTY STRENGTH

The cadre-wise strength of teaching staff of Dr.YSRHU is as follows

Teaching Staff	
Post	**No.**
Professors	18
Associate Professors	15
Assistant Professors	64

III. EDUCATION

Teaching Institutions

Dr.YSR Horticultural University (Dr.YSRHU) offers, B.Sc. (Hons.) Horticulture, M.Sc. (Horticulture) with specialization in Fruit Science, Vegetable Science, Floriculture & Landscape Architecture and Spices, Plantation, Medicinal & Aromatic crops and Ph.D (Horticulture). In addition to these, Dr.YSRHU is also offering two years Post-metric-diploma programme in horticulture.

The list of colleges and polytechnics with their location, year of establishment and courses offered is given as follows:

S.No.	Year of establishment	Name of the institute & location	Courses offered
I. Colleges of Horticulture			
1.	2007	Horticultural College & Research Institute, Anantharajupet, Kadapa district	B.Sc. (Hons.) Horticulture, M.Sc. (Horticulture) with specialization in Fruit Science, Vegetable Science, Floriculture & Landscape Architecture and Spices, Plantation, Medicinal & Aromatic crops
2.	2007	Horticultural College & Research Institute, Venkataramannagudem West Godavari district	B.Sc. (Hons.) Horticulture, M.Sc. (Horticulture) with specialization in Fruit Science, Vegetable Science, Floriculture & Landscape Architecture and Spices, Plantation, Medicinal & Aromatic crops and Ph.D (Horticulture)
II. Horticultural Polytechnics			
1.	2003	SKPP Horticultural Polytechnic, Ramachandrapuram, East Godavari district	Diploma in horticulture and allied courses in Plant Breeding, Soil Science, Agronomy, Plant Pathology, Entomology, Economics, Engineering, English, Extension Education etc., are offered.
2.	2008	SSPG Horticultural Polytechnic, Madakasira, Ananthapur district	
3.	2009	Horticultural Polytechnic, Kalikiri, Chittoor district	
4.	2013	Horticultural Polytechnic, Nuzvid, Krishna district	

Admission Strength and out turn of Students

Horticultural College & Research Institute, Venkataramannagudem

Course	Students admitted (2014-15)			Students on roll (all years)		
	Boys	Girls	Total	Boys	Girls	Total
B.Sc.(Hons) Horticulture	21	71	92	86	191	277
M.Sc. (Horticulture)-4 departments	10	12	22	16	29	45
Ph.D in Horticulture	-	6	6	4	7	11

Horticultural College & Research Institute, Anantharajupet

Course	Students admitted (2014-15)			Students on roll (all years)		
	Boys	Girls	Total	Boys	Girls	Total
B.Sc. (Hons) Horticulture	20	37	57	88	124	212
M.Sc. (Horticulture)-4 departments	5	3	8	20	13	33

Horticultural Polytechnics

Name of the college	Students admitted (2014-15)			Students on roll (Both the years)		
	Boys	Girls	Total	Boys	Girls	Total
Ramachandrapuram	15	14	29	30	26	56
Madakasira	10	13	23	16	25	41
Kalikiri	9	10	19	20	19	39
Nuzvid	13	10	23	20	14	34

Scholarships and Stipends

Statement of scholarships and fellowships received during 2014-15

Name of the college/polytechnic	Category wise no. of students															
	BC			SC			ST			OBC			Minority			Total
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	
HC & RI, VR.Gudem	11	13	24	2	6	8	2	2	4	1	12	13	-	2	2	**51**
HC & RI, AR'Peta	5	6	11	-	1	1	-	-	-	-	-	-	-	-	-	**12**
HPT, Madakasira	4	6	10	-	1	1	-	-	-	-	-	-	-	-	-	**11**
HPT, RC.Puram	7	6	13	3	2	5	-	2	2	-	-	-	-	-	-	**20**
HPT, Kalikiri	5	4	9	1	2	3	-	-	-	-	3	3	1	1	2	**17**
HPT, Nuzvid	4	2	6	2	5	7	2	-	2	-	-	-	2	1	3	**18**

Students' Hostels

Details of hostels and students accommodated during 2014-15

Name of the college/polytechnic	No. of Hostels			No. of students accommodated		
	Boys	Girls	Total	Boys	Girls	Total
HC & RI, V.R.Gudem	1	1	2	108	137	245
HC & RI, AR'Peta	1	1	2	87	123	210
HPT, Madakasira	1	1	2	15	22	37
HPT, Ramachandrapuram	1	1	2	25	20	45
HPT, Kalikiri	1	1	2	19	20	39
HPT, Nuzvid	1	1	2	18	14	22

The first convocation of the university was held on 27th March, 2015 in which degrees awarded to 908 B.sc (Hons) Horticulture, 227 M.Sc. (Hort.) and 14 Ph.D students.

First Convocation:

The first convocation of the University was held on 27th March, 2015 in the presence of the distinguished chief guest Dr.S.Ayyappan, Secretary, DARE & Director General, ICAR and esteemed members of the Board of Management, Academic Council and University Officers. The out turn of students from 2007 to 2014 was 1149 i.e. B.Sc. (Hons.) Horticulture-908, M.Sc. (Horti)- 227 and Ph.D -14. Four girl students received Smt. Anne Shikhamany Memorial Gold Medal for securing highest OGPA in their UG Programme. Similarly seven post graduate students were awarded with Sri.T.B. Dasarathi Gold Medal for their meritorious performance. The best scientist award was presented to Dr. M. Rajashekar, Senior Scientist (Horticulture) and Dr. K. Swarajya Lakshmi, Associate Professor (Horticulture) received the best teacher award.

First convocation of Dr.Y.S.R.Horticultural University, Andhra Pradesh

Dr.S.Ayyappan, Secretary, DARE & Director General, ICAR and Dr.B.M.C.Reddy, Vice-Chancellor, Dr.YSRHU conferring gold medals to the meritorious students

Dr. M. Rajashekar, Senior Scientist (Horti.) receiving Best Scientist Award

Research projects taken up in colleges

Horticultural College & Research Institute, Venkataramannagudem

Survey for estimation of coconut production in Andhra Pradesh

- Dr.A.Sujatha, Associate Dean and Principal Investigator; Dr. R. V. Sujatha, Co-Principal Investigator has completed the project sponsored by Coconut Development Board (CDB), Kochi entitled 'Survey for estimation of Coconut production in Andhra Pradesh during 2013-14 and coconut yield forecasting during 2014-15. Data was uploaded to the CDB website and report was prepared.

➢ Ongoing externally funded ICAR project entitled "Survey and Expedition of Integrated Pest Management Strategies for the Management of Mango Fruit borers in Andhra Pradesh" was implemented during 2014-15 at HC&RI, V.R.Gudem. This project was started during January, 2015 at HC&RI, V.R.Gudem, with an outlay of Rs. 26 lakhs for a period of 3 years. This project is going to be concluded by 31-03-17. Dr.A.Sujatha, Associate Dean, HC&RI as Principal Investigator and Smt.P.Sunitha, Scientist (Ento.) HRS, V.R.Gudem as Co-Principal Investigator are implementing the project.

Horticultural College & Research Institute, Anantharajupeta

- Standardization of stage wise irrigation schedules in mango cv. Baneshan
- Testing the suitability of onion varieties for early and late kharif seasons
- Evaluation of papaya (*Carica papaya*) varieties
- Studies on management of Leaf Hoppers in mango with certain newer insecticides
- Screening of certain guava varieties against spiralling white fly (*Aleurodicus dispersus*) and its management with certain newer insecticides
- Studies on substitution of nutrients with organic & bio fertilizers on growth, yield and quality of papaya Cv. Arka Prabhat.

Theses submitted by M. Sc (Hort.) students as part fulfillment of PG programme

Horticultural College & Research Institute, Venkataramannagudem

M. Sc (Hort.) Courses		
S. No.	**Name of the Department**	**No. of Students**
1.	Fruit Science	01
2.	Vegetable Science	02
3.	Floriculture and Landscape Architecture	04
4.	Plantation, Spices, Medicinal and Aromatic Crops	01
	Total	**08**
Ph. D (Hort.) Courses		
1	Fruit Science	01
	Total	**01**

Horticultural College & Research Institute, Anantharajupeta

M. Sc (Hort.) Courses		
S. No.	**Name of the Department**	**No. of Students**
1.	Fruit Science	05
2.	Vegetable Science	04
3.	Floriculture and Landscape Architecture	02
4.	Plantation, Spices, Medicinal and Aromatic Crops	01
	Total	**12**

Students Activities

A. NSS Activities

Horticultural College & Research Institute, Venkataramannagudem

Planting of Coconut seedlings:

- NSS Volunteers of HC&RI, Venkataramannagudem in the presence of Dr.A.Sujatha, Associate Dean, Dr.R.V.Sujatha, Sri.M.Paratpara Rao, NSS Programme Officers along with teaching and non-teaching staff have planted coconut seedlings in the ladies hostel premises on the eve of Independence Day (15-08-2014).

Planting of Coconut seedlings by NSS Volunteers on the eve of Independence Day

- NSS special camp was conducted with final year B.Sc (Hons.) Horticulture students (59 girls and 38 boys) along with teaching staff of HC & RI, VR'Gudem in Hudhud cyclone affected areas in Visakhapatnam town by removing the fallen trees, dried branches, leaves and actively participated in greenery restoration work for 14 days from 18-10-2014 to 31-10-2014.

NSS Volunteers removing the fallen trees and branches in Hudhud cyclone affected areas

- **RUN for UNITY**: B.Sc (Hons.) Horticulture students and staff have participated in Run for Unity programme at Tadepalligudem on 31-10-2014 in memory of Sardar Vallabhai Patel Birth Anniversary. Sri.P.Manikyala Rao, Hon'ble minister for Endowments, Government of Andhra Pradesh inaugurated the programme and addressed the students on the occassion.

Students and Staff of HC&RI, V.R.Gudem participated in EKTA RUN

- **NSS Volunteers in Republic Day Parade**: NSS Volunteers, Ms.D.Priyanka Gandhi and Mr.S.Swagath Kumar were selected for West Zone NSS Pre-Republic Day parade camp-2014 held at National Academy of Constructions at Rajahmundry from 12-10-2014 to 21-10-2014. Out of two students, Ms.D.Priyanka Gandhi has participated in Republic Day parade witnessed by President of India at Red fort in New Delhi on 26-01-2015.

Ms.D.Priyanka Gandhi participated in Republic Day parade on 26-01-2015

- NSS Cell has organized Swatch Bharat programme with teaching and non-teaching staff at Girls Hostel, HC & RI, V.R.Gudem on 28-02-2015

- NSS Cell has conducted "Awareness Rally and Farmers" meeting' on Horticultural Education, Research and Extension on 28-02-2015 at Venkataramannagudem.
- Sri.M.Paratpara Rao, NSS Programme officer attended the workshop on "Preparation of Module on Piligrim Crowd and Volunteer Management" at Dr. MCRHRD institute, Hyderabad from 04-05-2015 to 08-05-2015.

Horticultural College & Research Institute, Anantharajupeta

This Institute has two NSS units with a strength of 110 volunteers and 2 NSS programme officers. Dr.M.Ramaiah, Asst. Professor (Ento.) and Sri.M.Bala Krishna, Asst. Professor (Soil Science). The NSS units organized International Women's Day, Birth Anniversaries of Dr.B.R.Ambedkar, Sri.Babu Jagjeevan Ram and "Andhra Kesari" Sri.Tanguturi Prakasam Pantulu. A Special NSS Camp was conducted at Punnativaripalle village in Obulavaripalle Mandal from 19th to 26thMarch, 2015.

Horticultural Polytechnic, Ramachandrapuram

The students and staff working in Horticultural Polytechnic College, Ramachandrapuram have participated in following activities as a part of NSS programme and also observe the important National Day celebrations:

Babu Jagajivan Ram Jayanthi on 05.04.2014

Dr.B.R.Ambedkar Jayanthi on 14.04.2014

NSS Day at R.C.Puram Town,
East Godavari on 24.09.2014

Gandhi Jayanthi and International Day
of Non violence and peace on 02.10.2014

National Unity Day at College Campus and
R.C.Puram Town, East Godavari on 31.10.2014

National Education Day
at college campus on 11.11.2014

AIDS awareness Campaign at R.C.Puram Town,
East Godavari on 01.12.2014

NSS Special Camp at Velangi Village
from 31.03.2015 to 06.04.2015

Horticultural Polytechnic, Madakasira

Dr.M.Ramakrishna, Principal participated in Rythu Sadassu conducted by Agricultural Engineering College, Madakasira in view of NSS special camp on Horticultural crops on 01.03.2015 at Neelakantapuram, Madakasira mandal.

NSS special camp was conducted in R.Anantapuramu village, Madakasira Mandal, Anantapuramu district from 30th March, 2015 to 5th April, 2015. Thirty eight NSS Volunteers have taken part in the Special Camping Programme. The Activities like Swachh Bharath, Sanitation, Economic Survey, Field visit, Human Health camp and Shramadhanam at old age home were conducted during the Special Camp.

NSS Special Camp at A. Anantapuramu Village, Madakasira mandal

Students at NSS activity in the village

Health camp organized in the village

NSS Volunteers along with villagers

➢ Plantation programme in the college campus: NSS Volunteers planted saplings of Papaya, mango, guava, acid lime, ramaphalam and banana Suckers in the field on 09.07.2014

Plantation work in the college campus

- NSS day was celebrated on 24.09.2014 and the students were explained about the importance of National Service Scheme and its objectives by the Vice-principal.
- Yoga programme was practiced by NSS volunteers with the help of Sri.M.Nagabhushanam, Yoga master, Madakasira for 10 days in the month of January, 2015.


Students practicing yoga

- NSS Volunteers involved in Pulse Polio programme on 22nd February, 2015 in Madakasira town with the staff of Department of Medical and Health. About 100 children were vaccinated by the NSS Volunteers.
- Cycle Rally was performed by NSS Volunteers on 11th February, 2015 in view of Silver Jubilee celebrations of NAAS in Madakasira town.


Cycle Rally in view 0f Silver Jubilee Celebrations of NAAS

- As part of Plantation Programme coconut, mango, guava plants, rama phal and acid lime plants were planted in the college campus on 27.09.2014.
- Teachers' day was celebrated on eve of Dr.Sarvepalli Radhakrishnan's Birth day on 05.09.2014 Dr.M.Ramakrishna, Principal was the president of the function and Sri.Balanna, Rtd. Principal was Chief Guest. On this occasion essay writing and elocution competitions were conducted to students and prizes were distributed to winners.
- International Women's day was conducted on 8th March, 2015 at this polytechnic. NSS Volunteers and Staff members have participated in this programme.
- NSS volunteers were involved in Mexican Lawn preparation in the campus on 8th October, 2015 for beautification of the campus.

Students at Lawn preparation

Celebration of
International Women's Day

NSS Special Camp

Horticultural Polytechnic, Kalikiri

- NSS special camp was conducted, 39 students attended at Sanyasivandlapalli village, Kalikiri Mandal, Chittoor from 31.03.2015 to 06.04.2015
- Medical Camp was conducted at Yellampalli village Kalikiri mandal on 28.04.2014
- Awareness programme on Nutrition was organized on 29.04.2014
- NSS general activities were organized on 01.09.2014
- NSS general activities were organized sowing of vegetable seeds (Cluster bean, Radish and leafy vegetables) were done in the backyard of the college buildings) on 02.09.2014

Sports, Games & Cultural activities

Horticultural College & Research Institute, Venkataramannagudem

The following events and important days were celebrated by observing and conducting various competitions to bring out the extracurricular and literary talents in students.

- **Celebration of Tanguturi Prakasam Panthulu Jayanthi:** Andhra Kesari Late Sri Tanguturi Prakasam Panthulu Jayanthi was celebrated on 23.08.2014. In view of this, all the teaching, non teaching staff and students gathered and paid tributes to the great leader.

Celebration of Andhra Kesari Tanguturi Prakasam Panthulu Jayanthi

- **Celebration of Teachers' Day:** All UG and PG students have celebrated Teachers' Day on 05-09-2014 and honoured all the teachers. Dr.A.Sujatha, Associate Dean and the teachers of the college have shared their experiences with the students.
- **Legal Awareness Camp:** Dr.N.Emmanuel as officer in-charge of student affairs arranged a Legal Awareness camp on "prohibition of ragging" to the students on 29.10.2014. Smt. Sarada Devi, Senior Civil Judge, Secretary & District Legal Service Authority, West Godavari district has explained the unsympathetic consequences of ragging.
- **National Education Day:** Celebrated **National Education Day** on 11th November, 2014 on the eve of the birth anniversary of Maulana Abul Kalam Azad.

Cultural activity performed by first year students

- **Fresher's day** was celebrated on 04-12-2014. Dr. D. Srihari, Dean of Student Affairs attended as Chief Guest of the function and Dr.A.Sujatha, Associate Dean presided over the function. Senior students welcomed the first year students and freshers have performed various cultural programmes.
- **National *Youth Day*:** National Youth Day was celebrated on 12th January, 2015 in memory of birth anniversary of Swami Vivekananda. The students have participated very enthusiastically and taken the message of Swami Vivekananda for improvement in their academic career and personal life.
- **Swine flu Awareness Programme** Dr.A.Avinash, Medical Officer at PHC, Venkataramannagudem participated along with his

team and explained all the precautionary measures against the Swine flu for the benefit of students, staff and field workers on 07.02.2015.

Women's Day celebrations at HC&RI, V.R. Gudem

- **National Science Day**: National Science Day was celebrated on 28th February, 2015 to mark the discovery of the Raman Effect on 28th February, 1928 by Sir.Chandrasekhara Venkata Raman.
- **International Women's Day:** All teaching, non-teaching staff and time scale women workers have participated in International women's day celebration conducted under the leader ship of Dr. A. Sujatha, Associated Dean, HC&RI, V.R.Gudem on 08-03-2015.
- **15th All India Agricultural Universities Youth Festival:** A total of 22 students, 2 accompanists and 2 team leaders (Dr N. Emmanuel and Mr.M.Balakrishna) have participated in 15th All India Agricultural University Youth Festival at NDRI, Karnal, Haryana from 18th to 21st March, 2015. Students have participated in various competitions like Patriotic Song, Solo Song, Mime, One Act Play, Skit, Rangoli, Mono Acting, Group Dance, Quiz, Debate, Elocution, Poster & Cartoon making and spot painting.
- **Andhra Pradesh Knowledge Mission:** Elocution and Essay writing competitions were conducted at HC&RI, V.R.Gudem on 08.04.2015 to create awareness among the students on Andhra Pradesh Knowledge Mission launched by Hon'ble Chief Minister of Andhra Pradesh. Ms. P.Asha Devi [VH/12-08] stood first in the elocutions entitled **"Neeru – Chettu" and Janmaboomi–Maa Vooru** and essay writing competition on "**Concentrating on Horticulture".** Ms.P.Lepakshi [VH/13-36] bagged the first prize in essay writing competition on "**Swatch Andhra Pradesh".**
- **College Day** was celebrated on 08.04.2015. Dr GSG Ayyangar, IAS, Joint Secretary, Sports development, Ministry of Youth Affairs & Sports, GOI has graced the occasion as special guest and encouraged the students for their future endeavors. Miss S.V.V.Prasanna, ID No. VH/12-83 received Dr M. B. Nageswara Rao "Gold medal" in best singer category during the Celebrations.
- Dr.N.Emmanuel as officer in-charge of student affairs involved in conducting the training programme on soft skills to the outgoing final year students by Mrs. Radha Shankar, smart series, Banglore from 23.03.15 to 26.03.15 at HC & RI, V.R.Gudem.
- Hon'ble Vice Chancellor, Dr YSRHU, Dr. N. Krishna Kumar, Deputy Director General and Dr. T. Janakiram, Assistant Director General, ICAR, have visited HC & RI, V.R.Gudem on 29-09-2015 and interacted with staff and students, where in the importance of horticulture in Indian economy and opportunities in the field of horticulture were highlighted.

Visit of Dr. N. Krishna Kumar, DDG (Horti) and Dr. T. Janakiram, ADG, ICAR

Horticultural College & Research Institute, Anantharajupet

Students of this college have participated in **National Youth conference and Inter University Debate competition at** Pantnagar, Uttarakhand from 12th to 15th January, 2015 and won the following positions.

S. No.	Name of the Student	ID. No.	Event	Position
1	K.Sreelekha	AH/12-40	Poster and Paper presentation	Second best poster and best paper.
2.	P.Shasank Roy	AH/12-37	Debate in English	Participation certificate
3.	K. Sreelekha	AH/12-40	Debate in English	Participation certificate
4.	Y.Rajasekhar Redddy	AH/12-55	Debate in Hindi	Special Appreciation certificate
5.	G.Venkata Kishore	AH/13-51	Debate in Hindi	Special Appreciation certificate

Students Activities- Achievements

Ms.K. Sreelekha of 3rd year won Second Best Poster Award

- T.Teja, M.Sc (Hort.) received the **Best Poster Award** for his research work entitled "Duplex PCR-Based assay for simultaneous detection of bud wood transmissible disease (Citrus greening and yellow mosaic) in Sweet orange budlings" by T.Teja, L.Mukunda lakshmi, K.Gopal, K.T.Venkataramana, T.Naga lakshmi, G.Thanuja sivaram, V.Gopi and T. Gouri Sankar during the National symposium on Plant health for sustainability of field and horticultural crops was Organized by Dr YSRHU & INSOPP from 18-11-2014 to 20-11-2014 at CRS, Tirupati.

Other Activities:

- Seventh College Day was celebrated at HC&RI, Anantharajupeta 25-04-2014, Prof.Ratna Kumari, Hon'ble Vice Chancellor, Mahila University, Tirupati graced the occasion as Chief Guest. Dr.M.L.N. Reddy, Dean of PG studies, Dr.Y.S.R.H.U participated as guest of honor and addressed the students.

The ICAR accreditation peer review team under the chairmanship of Dr. N.C. Gautham, Vice-chancellor, Mahatma Gandhi Chitrakoot Gramodaya Viswavidyalaya, Chitrakoot, Madhya Pradesh visited the university and its constituent colleges during 28th -31st May, 2014.

- **Peer Review Team (PRT**) visited the campus on 28th May 2014. PRT expert committee visited all class rooms, examination halls, PG seminar hall, laboratories, library with attached digital library wing, auditorium, boys and girls hostels, instructional farm and PG research plots, other experimental fields, poly house and shade net houses with high value flower crops grown inside, commercial nursery at HRS and HC&RI campus, Anantharajupet. They were satisfied with the available facilities for recreation and relaxation after the tight schedule of classes and field work for the students like RO water unit for pure drinking water, Gym facility at boys and girls hostels, hall with TV in hostels etc. PRT expert committee expressed satisfaction about the Health centre, Placement cell, SC/ST cell and the other facilities provided in the campus for the students.

Dr. P. Babu Ratan Associate Dean, HC&RI, Anantharajupeta
explaining the activities of the institute to the PRT.

- **An exhibition was organized** on the eve of PRT visit to the campus. Different varieties of mango, papaya, pomegranate, guava, tamarind, musk melons, rose and gerbera flowers were exhibited. The team members were highly impressed with varieties and enormous material collected and displayed in the campus.

Dr.C. Madhumathi, Senior Scientist (Horti.) and Head, HRS, AR'Peta, Dr.R.Naga Raju, Assistant Prof (Hort.) and Syed Sadarunnisa, Assistant professor(Hort.) explaining about the fruit specimens displayed.

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PRT visited the fields of HRS and HC&RI on the occasion of their inspection

National Ekta Diwas was celebrated on 31-10-2014 at HC&RI, Anantharajupeta and students and staff have participated in Ekta Diwas pledge swearing ceremony.

- **Swachha Bharat** programme was organized on 01-11-2014 at HC&RI, Anantharajupeta, in which all the staff and students of this college were voluntarily involved in clearing of the public road in front of the college and its adjoining areas.

- **Fresher's day** was organized for the newly admitted UG students during the academic year 2014-15 on 09-11-2014. Dr.D.Sarada Jaya Lakshmi, Professor (Pl. Path.), Member, Board of Management, ANGRAU graced the occasion as chief guest.

- Anti ragging committees were formulated to make the campus ragging free. All the staff members attended duties actively and prevented the incidence of ragging at hostels and at College Campus. Organized Awareness programme on Anti ragging on 03-11-2014 for I and II year students.

- Sri.A.Venkatrama Raju, President, Bar association, Rly Kodur was the Chief guest, Sri Hussain Peer, Circle Inspector of Police, Rly. Kodur, Sri.J.P.Reddaiah, Secretary, Bar Association, Sri.B.Venkataramana, Treasurer, Bar Association, Sri.Sankar, Member, Bar Association were the Special Invitees of the programme.

- **International Students Day** was celebrated on 17-11-2014. On this occasion a group discussion on "Quality education is a powerful tool for eradication of poverty in India" was conducted and students have actively participated in the group discussion and expressed their views. Ms.K.Sreelekha and K.Shashank Roy of 3rd year were selected as best speakers.
- Dr. K.Gopal, Associate Dean, HC&RI, Anantharajupeta conducted national symposium as the organing secretary on "Plant health for sustainability in the field and Horticultural crops". The symposium was organized jointly by Indian Society of plant pathologists and Dr. YSR Horticultural University during 18th to 20th November, 2014 at Citrus Research Station, Tirupati.



Dr. B.M. C. Reddy Honorable Vice-Chancellor and other University officers, Dr. Y.S.R.H.U. visiting the Exhibition organized on the occasion.

Cultural programmes organized on the occasion by students of HC&RI, Anantharajupet

- On the occasion of "Silver jubilee celebrations of National Academy of Agricultural Sciences" (NAAS) organized a cycle rally in Kodur town on 4th March, 2015.

➢ **International women's day** was organized at HC&RI, Anantharajupet on 8th March, 2015. Dr.K.Gopal, Associate Dean addressed the gathering of women staff working in the campus.

Efforts were made in utilization of faculty exchange. The following guest faculty from adjunct colleges and research institutions were invited to give lectures for the benefit of students

Date	Name of the guest faculty	Topic of Lecture
18-08-2014	Er.V.Sreedhar, Researcher, Geobiology	Geobiology
01-02-2015 to 28-02-2015	Faculty from Enrich Foundation, Tirupati	Quantitative Aptitude and Reasoning
02-03-2015	Dr. P.Lavanya Kumari, Assistant professor, Statistics, RARS, Tirupati	Statistical Designs and Analysis of Experimental Data for presentation of results in an efficient way.
10-03-2015	E.Eshwar Prasad, Ph.D Scholar, Dr.YSRHU, V.R.Gudem	Vegetable science
10-03-2015	Shaik Firoz Hussain, PhD Scholar, Dr. YSRHU, V.R.Gudem	Pomology
11-03-2015	Sri P.Bhargav, Ph.D Scholar, IIHR, Bangalore	Floriculture
16-03-2015	Sri.S.Mallesh, M.Sc, Arabavi , UHS, Bagalkot	Vegetable science
24-03-2015	Dr.B.Srinivasulu, Sr.Scientist (Hort.), HRS, Ananthapur	Pomology
25-03-2015	Dr.C.Venkata Ramana, Scientist (Hort.) HRS, LAM, Guntur	Vegetable science
27-04- 2015 to 30-04-2015	Smt.Radha, SMART Series- Ignite minds - Bangalore	Personality development training

➢ **Farewell** for the Final Year B.sc. (Hons.) (2010 admitted batch) students was organized by third year (2011 admitted batch) students on 9th May, 2014.


Inauguration of the programme and cultural activities performed by the students

- **Field visit to Final year Students:** All the final year B.Sc. (Hons.) students (2011 admitted batch) were taken to field visit during their ELP semester. The students visited commercial nurseries located near Kadiayapu lanka, East Godavari district, protected units with cultivation of high value crops located near Eluru and Nuzvid and Indian Institute of Oil Palm Research, Pedavegi from 24th to 27th April, 2015 to gain practical orientation on various horticultural crops cultivation.

Visit to Kadiyapulanka nurseries near Rajahmundry, East Godavari District


Nursery & ATIC visit at IIOPR Pedavegi, West Godavari District

Horticultural Polytechnic, Ramachandrapuram

Celebrated college day on 29.04.2014 and conducted different games, sports competitions and cultural events and prizes were distributed to the winning students.

Horticultural Polytechnic, Madakasira

- Fresher's day was celebrated on 20.10.2014, Dr.M.V.Ramana, Associate Dean, College of Agricultural Engineering, Madakasira was invited as chief guest, Dr.M.Ramakrishna, Principal presided over the function followed by cultural programmes by the students.
- College day was celebrated on 4th April, 2015. Sports and games competitions like volley ball, cricket, running 100m, 200m and 400m, cultural events and singing, essay writing and elocution competitions were conducted. Prizes were distributed to winners.

Fresher's day at HPT, Madakasira

Prize distribution by the chief guest

Girl students performing cultural programmes

Students participation in sports & games

Horticultural Polytechnic, Kalikiri

S.No.	Activity	Venue	Date	No. of Students from H.P.K.	Prizes won
1.	Sports, games and cultural activities	Horticulture Polytechnic, Adilabad	09.04.2014 to 11.04.2014	20	15

Horticultural College & Research Institute, Venkataramannagudem

Development of entrepreneurship skills through Experiential Learning Programme (ELP)

A total of 94 students registered the Experiential Learning Programme during 2014-15 and attempted two modules i.e. 1. ELP-402: Protected cultivation of high value horticultural crops and 2. ELP-403: processing of fruits and vegetables for value addition.

Protected cultivation of high value horticultural crops

- Faculty allotted to this module were Mrs. T.Suseela, Assistant Professor (Hort.), Dr. V. Suchitra, Assistant Professor (Hort.), Dr.N.Emmaneul, Assistant Professor (Ento.), Dr.R.V.Sujatha, Assistant Professor (Econ.), Er.B.Chennakehavulu, Assistant Professor (Engg.) and T.Sowmya, Teaching Associate (Pathology).
- Forty seven students were involved in this group and got trained in raising cucumber, tomato, muskmelon, capsicum and some high value flower crops like rose, gerbera and gladiolus under naturally ventilated poly house & Fan and Pad poly house with an objective to promote profes-sional skills marketing skills and to develop enterprise management capabilities.

Final year students showing the products under ELP to Dr. S. Ayyappan, Director General, ICAR

Protected cultivation of vegetables

- Training methods *viz*., umbrella method and trellies system in cucumber, Y system of training in capsicum, single stemmed training in tomato were followed to gain the knowledge and experience in cultivation of vegetables in polyhouses.
- Various pruning techniques (like desuckering, cluster thinning, defoliation) were practiced in tomato to improve the fruit size and quality. Crown bud and side shoot removal techniques were practiced in capsicum. Deblossoming upto 6th node and older leaf removal was practiced in cucumber.

Protected cultivation of cucumber

Protected cultivation of tomato

Protected cultivation of Flowers

Under protected cultivation, high value flower crops, *viz.,* rose, gerbera and gladiolus were grown. Special practices were also adopted in rose i.e. bending at 2nd and 3rd five pair leaf stage at 4th node, disbudding, use of bud caps to improve the quality of bloom. Special practices used in gerbera were budding, removal of young flower buds arised before the plant reaching 16th to 17th leaf stage to improve vegetative growth and plant vigour. Removal of older leaves at frequent intervals was done to maintain the better plant growth.

Protected cultivation of gerbera

Protected cultivation of rose

Plant Protection

Integrated Nutrient Management, Integrated Pest Management and Integrated Water Management practices were adopted to avoid the pest and disease problems in the above crops grown under protected structures.

Economics

Challenging tasks were given to the students to prepare bankable business plans/ project proposals on protected cultivation of high value vegetables and flowers to establish their own enterprise. Calculation of Benefit Cost Ratio for cultivation of high value crops under naturally ventilated poly house & Fan and Pad poly houses. Finally the

students arrived at a Benefit Cost Ratio of 1.61: 1 for cucumber and 1.46 for cultivation of marigold with plastic mulching and drip irrigation system.

Agricultural Engineering

Students learned about the cost of installation of polyhouses, drip irrigation system, plastic mulches and their maintenance.

Processing of fruits and vegetables for value addition

Faculty allotted to this programme were Dr. Sudha Vani, Assistant Professor (Hort.), Dr. R.V.Sujatha, Assistant Professor (Econ.), Dr.N.Emmaneul, Assistant Professor (Ento.) and Er.B.Chennakehavulu, Assistant Professor (Engg.).

Forty seven students were trained in preparation of RTS beverages like jams, juices, squashes, curry leaf powder, chilli powder, spice powders, ginger garlic paste, various pickles, packing and marketing aspects.








Five students of HC& RI, Venkataramannagudem were selected in Agricultural Research Service (ARS) through All India Agricultural Scientists Recruitment Board (ASRB) during this year. Thirty three PG students have been qualified in National Eligibility Test (NET) conducted by ASRB and 87 graduates got admissions in PG programmes in different SAUs through ICAR (JRF & SRF).

Final year students showing the ELP Products to Dr. S. Ayyappan, Director General, ICAR

Horticultural College & Research Institute, Anantharajupeta

Experiential Learning Programme students HC&RI, Anantarajupet were taken on exposure visit to various commercial nurseries *viz.,* Rayalaseema Nursery, Andhra Fruit Nursery and Govt. Horticulture Nursery in and around Railway Kodur along with commercial nurseries located near Kadiayapulanka, West Godavari district and protected cultivation units with cultivation of high value crops (rose, gerbera, carnation, cut chrysanthemums and capsicum) located near Eluru, Nuzvid and Indian Institute of Oil Palm Research, Pedavegi near Eluru, West Godavari district.

Student Academic Excellence

Horticultural College & Research Institute, Venkataramannagudem

Five students of HC & RI, Venkataramannagudem campus were selected in Agricultural Research Service (ARS) through All India Agricultural Scientists Recruitment Board (ASRB) examination during 2014-15. Thirty three Post Graduate students have been qualified in NET conducted by ASRB. Eighty seven graduates got admitted in PG programmes in SAUs through ICAR (JRF & non- JRF).

Placements

Thirty eight students from HC&RI, Venkataramannagudem have joined as Horticultural Officers in Department of Horticulture, Government of Andhra Pradesh. The other students got placements in various private institutions dealing with horticultural crops as detailed below

Name of the Institutions	No. of students	Designation
Coramandel Fertilizers Pvt., Limited	18	Marketing Officers
Mandelez India Foods Pvt., Limited	1	Technical executive
Ruchi Soya Industries Pvt., Limited	2	Field Officers
Hytasu Company	1	Technical Field Advisor

Thirty eight students from HC& RI, Venkataramannagudem have joined as Horticultural Officers in Department of Horticulture, Government of Andhra Pradesh and 22 students got placements in various private institutions dealing with horticultural crops.

Horticultural College & Research Institute, Anantharajupet

Two Students have joined as Horticultural Officers and 12 joined in other private institutions.

University toppers in U.G. & PG Programmes

Timmareddygari Samatha **(**I.D.No.RH/2011-57) received **"Smt. Anne Shikhamany Memorial Gold Medal"** for having secured the highest OGPA in B.Sc (Hons.) Horticulture degree.

The university top rankers of PG programme in department of fruit science, vegetables, floriculture and landscape architecture and plantation, spices, medicinal and aromatic crops in Dr.YSRHU is furnished hereunder.

S.No.	Department	Student name	ID No.	Year of admission	OGPA	Remarks
1.	Fruit science	Ms.Sameena Begum Shaik	RHM/2012-09	2013-14	9.09	University topper
2.	Vegetables science	Mr.J.N.Ravi Kumar	VHM/2013-16	2013-14	8.96	University topper
3.	Floriculture and landscape architecture	Ms.M.Sanghamitra	VHM/2013-18	2013-14	8.93	University topper
4.	Plantation, spices, medicinal and aromatic crops	Ms.G.Sharon Rose	RHM/2013-10	2013-14	8.76	University topper

IV. RESEARCH

1. Thrust areas of research

- Increasing productivity
- Sustaining productivity under biotic and abiotic stresses
- Improving nutritive value
- Environment protection
- Increasing profitability to the farmers
- Export promotion
- Minimization of post harvest losses
- Processing and value addition

2. Research Stations

Sl. No.	Horticultural Research Stations	Research Crops	AICRP on
1.	Horticultural Research Station, Kovvur, West Godavari District.	Banana, elephant foot yam, colocasia, diascorea	Banana, elephant foot yam
2.	Horticultural Research Station, Ambajipeta, East Godavari District.	coconut, cocoa	Coconut
3.	Horticultural Research Station, Pandirimamidi, East Godavari District.	Fruits, vegetables, palmyrah, rubber, passion fruit	Palmyrah
4.	Horticultural Research Station, Venkataramannagudem, West Godavari District	Sapota, jack, betelvine, medicinal & aromatic plants, tapioca	Sapota, jack, papaya, betelvine, medicinal plants, tapioca
5.	Horticultural Research Station, Chintapalle, Visakhapatnam District.	Spices, flowers, coffee, pine-apple, ginger,	Black pepper, turmeric, ginger
6.	Post harvest Technology Research Station, Venkataramannagudem, West Godavari District.	Mango, sweet orange	
7.	Horticultural Research Station, Lam, Guntur District.	Chilli, vegetables, spices	Chilli, vegetables, grain spices
8.	Horticultural Research Station, Darsi, Prakasam District.	Sweet orange, vegetables	-
9.	Mango Research Station, Nuzvid, Krishna District	Mango	-
10.	Cashew Research Station, Bapatla, Guntur District.	Cashew	Cashew

11.	Horticultural Research Station, Vijayarai, West Godavari District.	Oil Palm, vegetables	Oil palm
12.	Citrus Research Station, Tirupati, Chittoor District.	Citrus, sweet orange	Sweet orange, acid lime
13.	Horticultural Research Station, Anantapuramu, Anantapuramu District.	Arid fruit crops	Pomegranate aonla
14.	Horticultural Research Station, Anantharajupeta, Kadapa District.	Fruit crops, vegetables	-
15.	Horticultural Research Station, Mahanandi, Kurnool District	Vegetables	-
16.	Citrus Research Station, Petlur, Nellore District.	Citrus	-

3. Seasonal Weather/Climatic Conditions and Crop Performance

WEATHER CONDITIONS (2014-15)

South-West Monsoon: The South-West monsoon is crucial for the Agriculture sector in Andhra Pradesh. During S.W. monsoon i.e, from 1st June to 30th September, 2014 the average rainfall of 375.7 mm was received as against the normal rainfall of 554.1mm which is deficient (-32%). The South-West Monsoon has been withdrawn from the State on 18-10-2014.

North-East monsoon: During the North East monsoon period i.e. from 1st October to 31st December, 2014, the average rainfall received in the state was 171.5 mm as against the normal of 297.5 mm which is deficient (-42%).

Winter Period: During the Winter period from 1st January to 13th January 2015, the average rainfall received in the state was 2.5 mm as against the normal of 6.5 mm which is scanty (-68%).

From 1st June, 2014 to 13th January, 2015, deficient rainfall was recorded in the state. i.e., Rayalaseema (-44%), North Coastal (-27%), and South-Coastal (-43%). The overall average rainfall received in Andhra Pradesh from 1st June, 2014 to 13th January, 2015 was 549.7 mm as against the normal of 859.3 mm which is deficient by (–36%).

Monsoon	Normal	2012	2013	2014	% deviation	Status
South-West Monsoon (June to Sept.,14)	554.1	597.7	492.5	**375.7**	-32%	Deficient
North East Monsoon (1st Oct.-31st Dec,14)	297.5	364.7	375.4	**171.5**	-42%	Deficient
Winter Period (1st Jan. to 13th Jan. 2015)	6.5	0.00	0.00	**2.5**	-68%	Scanty
Total	**858.1**	**1062.4**	**867.9**	**549.8**	**-36%**	**Deficient**

District wise Rainfall: The district wise rainfall for South-West monsoon, North-East monsoon and winter period from 01.06.2014 to 13.01.2015 is presented below. Status and deviation of rainfall during North-East monsoon for the period from 01.10.2014 to 31.12.2014 is shown below.

S.No.	Districts	No. of districts	Status & deviation
1	Vizianagaram, Visakhapatnam	2	Normal (+19% to -19%)
2	Srikakulam, Krishna, Guntur, Prakasam, Nellore, Kurnool, Kadapa, Anantapuramu, Chittoor	9	Deficient (-20% to -59%)
3	East Godavari, West Godavari	2	Scanty (-60% to -99%)

Source : *http://apagrisnet.gov.in*

Crop performance

Performance of fruit crops, tapioca, betelvine and medicinal plants was satisfactory at Venkataramannagudem. Chilli crop at HRS, Lam suffered with severe drought during flowering and fruit development stage from December, 2014 to April, 2015. High humidity levels in the atmosphere resulted in increased incidence of powdery mildew with less fruit set in mango. Fruit borer infestation was also more in mango in traditional mango growing areas of Krishna district. Delayed flowering was observed in cashew due to unfavorable climatic conditions. Incidence of panama wilt was severe in Amruthapani variety of banana in Kadapa district. High dry root rot incidence and longitudinal bark splitting were noticed from March to May in citrus.

Weather prevailed in Anantapuramu district during July-October months favoured the incidence of mealy bug, fruit borers and sucking pests in most of dry land fruit crops. High incidence of bacterial blight was observed in pomegranate due to erratic rains coupled with high temperatures. Growth and development of pomegranate, ber, aonla, tamarind and custard apple was impaired due to dry spells during July-September & October.

Severe incidence of papaya ring spot virus was observed with reduced yield. Crop duration was restricted to 9-12 months. Severe incidence of leaf miner, fruit fly and downy mildew was observed in muskmelon in summer.

Salient achievements

- A new chilli variety, LCA-620 with bold pods, medium length, medium pungency and excellent colour value has been recommended for release as national variety during XXXII Annual Group Meeting of AICRP on Vegetable Crops held at Raipur during June, 2014.
- A fenugreek variety, LFC-103 was identified for release and recommended for cultivation in Andhra Pradesh and Telangana states during XXV Workshop of AICRP on Spices held at UBKV, Pundibari, West Bengal during September, 2014.
- The coconut hybrid, Vasista Ganga (GBGD X PHOT) was found promising and proposed for release in Andhra Pradesh and Karnataka states by the central sub-committee and notified in its 23rd meeting held at IIHR, Bangalore on 7th April, 2015.
- In cassava, maximum tuber yield per hectare was recorded in TCa 14-8 (50.6t/ha) which was on par with TCa 14-3 (44.9 t/ha) and Sree Athulya (43.1 t/ha). Highest starch content was observed in Sree Athulya (28.5 %) which was on par with TCa 14-2, TCa 14-6 and Local. Minimum amount of HCN (ppm) was recorded in TCa14-10 (79.4 ppm).
- Release proposals for high yielding chilli variety, LCA-625 and paprika varieties, LCA-424 and LCA-436 developed under Chillies Improvement Scheme were submitted for the state release.

- Sapota cv. Kalipatti supplied with nutrients @ 100% RDF given at different stages of growth during June (NPK as 25-100-25), August (NPK as 50-0-50) and October (NPK as 25-0-25) recorded higher yields per tree (130.70 kg) and yield/ha (13.07 t/ha).
- Application of Potassium phosphonate (0.3%) as foliar spray + Soil application of *Trichoderma harzianum* (10^8 CFU) 50 g/vine with 1.0 kg of Neem cake three times, i.e., before onset of Monsoon (May 2nd fortnight), during monsoon (July 1st week) and after monsoon (September 1st fortnight) is recommended for the management of Phytophthora foot rot in black pepper (MTCC-5179).
- Drip irrigation once in a day at 80% PE recorded maximum yield (49.9 t/ha) followed by drip irrigation once in two days at 80% PE (49.5 t/ha) which were on par with each other and significantly superior to surface irrigation at 5 cm, 0.9 IW/CPE (45.0 t/ha) in sweet orange.
- Soil application of 75 % RDF along with *Arbuscular mychorrhiza* at 500 g/plant+ PSB at 100 g/plant + *Azospirillum* at 100 g/plant and *T. harzianum* at 100 g/plant was found to be a sustainable solution for increased production as well as fruit quality in sweet orange. The treatment has also given the highest benefit cost ratio (2.25) there by reducing the fertilizer input cost.
- Irrigation schedule with 80% evoporation rate uniformly during all the growth stages recorded significantly maximum number of fruits (210 fruits/plant), fruit weight(202.33 g), fruit yield (42.36 kg/plant) and better quality fruits (0.55% acidity and 13.17 ^{0}Brix) in sweet orange.
- Bio control based integrated disease management package (application of 50g of *Trichoderma viride* + 5 kg need cake/tree, removing and destroying dead trees and basin irrigation) showed significant reduction of both vertical and horizontal spread of basal stem rot disease in coconut under field conditions.
- Spinosad (0.25ml/l) followed by flubendiamide (0.4 ml/L), rynaxypyr (0.4 ml/L) and lamda cyhalothrin (1ml/l) were found effective against pod borer in chilli.
- Triazophos (1.25 ml/l) and rynaxypyr (0.4ml/l) were found effective against chilli blossom midge
- Highest per cent (81.25 %) recovery of dry root rot infected plants was recorded by treating the plants with mancozeb (0.2%) soil drenching + application of *Trichoderma reesei* (100g/tree) (10^7) + *Pseudomonas fluoroscens* (100g/plant) (10^8)+ 2 kg neem cake + FYM 25 kg/tree after 15 days of drenching in sweet orange.
- Tebuconazole 50% + trifloxystrobin 25% WG @ 0.5 g/l was found to be superior in controlling the purple leaf blotch in onion and recorded low disesase incidence (19.36 %), and more yield (21.72 t/ha) and CB Ratio (1:1.50).

A. CROP IMPROVEMENT

FRUITS

BANANA

Horticultural Research Station, Kovvur

Collection, conservation, characterization and maintenance of banana germplasm

107 accessions are being maintained in banana germplasm. Characterization for 102 accessions as per descriptors developed by IPGRI – INIBAP/CIRAD for banana in plant and ratoon crops was completed. Among different genomic groups, Namarai (AA) (14.5kg), Valia kunnan (AB) (22.67 kg), KBS-8 (AAA) (35 kg), Sugandham (AAB) (24 kg), KBS-5 (ABB) (25 kg), FHIA-17 (AAAA) (18.5 kg) and PA- 03-22 (AAAB) (14 kg) have recorded higher yields.

Table-1: Yield characters of banana germplasm

Clones (Genome wise)	Bunch weight (kg)	No. of hands/ bunch	No. of fruits/ 2nd hand	No of fruits/ buch	Days to harvest
1	2	3	4	5	6
AA					
Matti	14.00	10.50	19.00	150.25	345
Pisang Lilin	4.00	5.00	12.00	45.00	220
Pisang Mas	8.50	6.33	15.50	88.66	275
Calcutta 4	4n .00	9.50	11.00	75.00	270
Cultivar Rose	6.60	6.20	12.60	67.00	245
Pisang Jaribuya	11.50	6.75	16.00	95.75	295
Sanna Chenkadali	11.40	8.65	16.60	123.60	340
Namarai	14.50	15.00	16.00	145.00	370
Mitli	12,17	8.66	16.00	119.66	340
AB					
Kappu Kadali	16.00	9.33	17	138.00	335
Agniswar	13.00	7.71	12.71	81.57	328
Ney Pooovan	13.00	9.25	14.75	118.50	315
Tatilla Kunnan	20.20	7.20	13.40	84.40	292
Valia Kunnan	22.67	10.66	16.66	165.33	405
Kunnan	7.50	6.50	11.00	58.50	390
Yelakkibale	13.00	10.00	15.00	135.00	374
Njali Poovan	9.50	8.50	15.00	114.00	315
MC 94 - 02	12.00	8.00	16.00	115.00	310
BB					
Musa balbisiana	16.50	9.00	15.50	145.00	490

Attaikol	12.50	8.50	16.00	95.00	392
AAA					
Tella Chakkerakeli	6.00	4.00	14.00	47.00	290
Gros Michel	19.00	8.33	17.00	114.00	310
KBS 4	9.00	5.25	12.50	52.25	295
Amrit Sagar	10.50	5.66	12.66	65.166	275
Yangambi Km 5	15.86	8.85	19.42	142.00	365
Robusta	21.60	8.40	15.80	121.80	310
Dwarf Cavendish	20.67	8.66	17.33	139.33	323
Grand Naine	21.75	9.50	18.25	144.25	327
GCTCV 215	14.00	8.50	16.00	101.00	341
GCTCV 119	13.67	7.00	14.33	92.33	365
Valery	21.00	8.60	19.40	134.00	305
Williams	23.80	8.00	16.60	121.80	328
Sri Manthi	18.00	7.00	17.00	108.00	285
Red Banana	17.50	7.50	14.50	82.45	426
Manoranjitham	10.00	5.50	15.50	72.50	367
Poyo	20.25	8.75	17.76	136.75	287
KBS 8	35.00	12.50	18.00	200.00	295
AAB					
Nendran	10.45	6.00	12.50	70.00	290
Pisang Nangka	21.00	7.00	14.50	95.00	365
Karpura Chakkerakeli	21.50	9.50	18.00	139.00	305
Pisang Ceylon	17.00	10.33	16.66	140.83	305
Sugandham	24.00	10.00	19.00	167.50	320
Eleswaram Bukkisa	15.17	6.66	13.66	79.33	287
Motta Poovan	14.00	10.00	16.33	150.00	295
H 2 12.33	7.50	16.33	106.00	305	
Amritapani	8.00	4.66	10.50	41.83	355
Rashthali	15.00	7.50	14.00	105.00	320
Ayaranka Rashthali	22.50	9.50	16.00	190.00	405
Malbhog	17.00	7.00	14.00	85.00	395
Mortomon	20.67	8.33	16.00	126.33	390
Sonkela	8.00	6.00	12.00	80.00	340
Dudhsagar	19.00	8.00	14.00	105.00	342

Pisang Rajabulu	19.17	9.16	17.66	133.00	324
Alpan	15.67	9.16	16.16	121.66	360
CO 1	14.00	6.66	13.16	76.66	338
Sirumalai	12.71	6.00	11.71	60.14	327
Virupakshi	13.00	6.5	12.61	72.16	305
Krishna Vazhai	13.00	6.5	14.00	77.28	325
Lady Finger	11.67	6.5	13.50	79.66	322
KBS 1	12.28	6.0	12.00	65.00	284
Wather	11.83	6.66	12.33	71.50	310
Kallar	7.08	6.33	12.33	63.33	317
Nendra Padathi	19.00	7.42	14.00	89.28	297
Pachanadan	10.71	6.42	13.14	72.57	289
Rajapuri	5.20	5.20	13.20	57.40	320
Kalibow	19.17	7.50	14.00	95.00	327
Pisang Rajah	17.50	8.50	15.00	110.00	385
Pisang Seribu	17.00	8.00	18.00	118.00	450
ABB					
Pacha Bontha Batheesa	18.40	12.00	12.00	135.00	376
Kovvur Bontha	19.00	6.50	12.50	72.40	345
Bluggoe	19.50	7.00	14.00	82.00	321
KBS 5	24.00	9.00	12.50	85.20	302
Saba 13.00	6.00	12.00	70.50	329	
Burro Cemsa	17.67	6.33	13.00	72.67	341
Booditha Bukkisa	20.00	12.00	18.00	152.00	397
Simla	10.00	7.00	12.50	90.00	454
Booditha Bontha Batheesa	17.50	7.50	13.00	90.50	310
Monthan	18.40	6.50	11.00	65.00	324
Nepali Chinia	17.20	9.50	16.20	110.20	402
NRCB -03	17.40	16.50	16.50	190.50	465
KBS 2	18.30	8.50	16.00	140.00	375
Karpuravalli	21.67	10.33	17.67	133.67	427
Chinia	20.50	11.00	16.00	174.50	395
Bharata Ratnavali	21.50	16.00	16.00	195.00	410
Komarada Bukkisa	8.70	7.00	16.50	90.00	405
KBS 9 (Kanchikela)	19.20	7.00	11.50	85.50	420

Nepali Vannan	14.00	6.67	14.67	82.67	423
Gowria	15.60	6.20	12.60	75.00	302
KBS 3 (MC 92-02)	16.50	12.00	16.00	150.00	407
NRCB 01	17.00	7.00	13.00	89.00	390
Nookala Bontha	21.00	12.00	16.00	150.00	395
Jillellagudem Collection	14.00	7.00	16.00	101.00	452
MC 93-02	6.50	6.50	12.00	85,50	465
Uthiran	17.33	7.67	14.00	93.33	320
Sri Sailam Collection	15.33	6.67	13.33	78.33	310
Selection 79	11.00	11.00	16.00	154.00	390
Jurmony	21.00	12.00	14.50	135.00	375
AAAA					
FHIA 17	18.50	11.50	16.00	110.00	386
FHIA 23	14.00	12.00	18.00	162.00	335
AAAB					
PA 03-22	14.00	7.00	16.50	100.00	395
PV 03-44	12.00	6.00	14.67	78.33	420
FHIA 01	13.50	6.50	12.00	75.00	370
AABB					
FHIA 03	16.00	6.50	14.00	76.00	390
ABBB					
Assam Wild	32.00	12.00	16.00	180.00	478
Wild					
Musa laterita	-	-	--	-	-

Clonal selection in commercial banana varieties

Table-2: Growth and yield characters of TC Keli clone in banana (Plant crop)

Genomic Group	Cultivars	Green leaves	Total hands	2nd hand fruits	Total fruits	Bunch weight (kg)
AAA (Cavendish Group)	Tella Chakkera keli clone	8.00	8.00	17.00	106.00	14.00
	TC keli (Check)	7.00	5.50	14.00	77.00	9.50

Among different genomic groups, KBS-8 under AAA group recorded highest bunch weight of 36 Kg. In ratoon crop also KBS-8 recorded highest bunch weight of 38 Kg with an yield of 76.0 t/ha.

Tella Chakkera keli clone recorded an average bunch weight of 14.0 Kg with an yield potential of 35 t/ ha.

Evaluation of promising clones of banana

Among different genomic groups, KBS-8 under AAA group recorded highest bunch weight of 36 kg. In ratoon also KBS-8 recorded highest bunch weight of 38 kg with an yield of 76.0 t/ha. Similarly, under AAB monthan group the cultivar NRCB-08 recorded higher bunch weight of 24.0 kg as compared to other cultivars.

Table-3: Growth and yield characters in different promising clones in banana (Ratoon 2014)

Genomic Group	Cultivars	Green leaves	Total hands	Total fruits	Bunch weight (kg)	Yield (t ha-1)	Duration (days)
AAA(Cavendish group)	KBS-8	13.67	13.00	211.33	38.00	76.00	370.0
AAB (Poovan group)	H531	6.33	7.33	86.67	12.00	24.00	345.67
	K.C.Keli	9.67	11.67	139.67	20.67	41.33	363.00
AAB (Plantain group)	Manjeera Nendran II	4.33	5.67	67.67	11.67	23.33	371.00
AAB (Monthan group)	Kovvur Bontha	11.00	7.00	80.00	23.33	46.67	355.33
	NRCB -08	7.33	8.33	103.33	24.00	48.00	350.00
	BCB-2	7.00	16.33	172.00	21.00	42.00	366.67
	NRCB-07	13.00	7.00	76.33	19.00	38.00	339.67
AAB (Pisang Awak group)	BCB-1	5.00	9.33	119.00	14.67	29.33	395.00
	Budubale	5.33	9.67	149.33	16.00	32.00	445.00
	SE(m)	0.51	0.55	3.41	1.13	2.26	5.29
	C.D.	1.52	1.64	10.20	3.38	6.76	15.83

MANGO

Horticultural Research Station, Pandirimamidi

Observational trial on the performance and quality in mango var. Alphonso in coastal districts of A.P.

The fruit samples collected from HRS, Pandirimamidi recorded a score of 3 for spongy tissue occurrence. Fruits treated with 500 ppm ethephon showed good per cent of color development than others. The pulp color was golden yellow with a TSS of 17° Brix. The spongy tissue was less in early pickings than in later pickings. Fruits harvested in the last week of May recorded higher per cent of spongy tissue (43.5° C).

Studies on the effect of interstock on performance and fruit quality in mango var. Alphonso.

Among ten inter stocks grafted with alphonso, only 43 per cent of flowering was observed. Mixed panicles were observed. In mixed branched panicles fruit setting was less compared to the un-branched panicles. Imam Pasand recorded highest spongy tissue (with a score of 3) compared to other variety inter stocks.

Mango Research Station, Nuzvid

Varietal evaluation of mango varieties and hybrids under high density planting

Among the varieties tested, Totapuri recorded significantly highest fruit yield of 92.51 kg/tree and among hybrids, Neeleshan recorded highest fruit yield of 91.68 kg/tree under high density planting.

SAPOTA

Horticultural Research Station, Venkataramannagudem

AICRP on Fruits:

A total of forty varieties/germplasm lines of sapota are being maintained including six new collections which were evaluated for their performance. Among different accessions planted, cultivar Kirti Barthi has recorded maximum plant height (7.73 m), whereas canopy volume was higher in DHS-2 (464.14 m^3). Higher number of fruits $tree^{-1}$ was recorded in PKM-1 (6010) and fruit yield (331.41 kg $tree^{-1}$ and 33.14 $t.ha^{-1}$) in Tagarampudi. Highest cumulative yield (2001-2014) was recorded in Virudhnagar (117. 62 t./ha).

To create wide genetic base in Pala sapota, selfing was done in Pala variety of sapota and half sibs were raised. The seedlings were planted in 2x2 m distance during kharif season of 2014.

JACK FRUIT

Horticultural Research Station, Venkataramannagudem

A total of thirty varieties were collected and planted for evaluation including newly collected varieties *viz.,* Konkan Prolific Jack, Tubegere, Gumless-2, Kadiyam Selection and Swarna. Data revealed that maximum plant height was recorded in Ainipala Jack (10.16 m), while canopy volume was maximum in Tanjavur (596.48 m^3), number of fruits (98.0) was maximum in Gumless and yield was maximum in Palur-1 (495.8 kg/tree). However, average fruit weight was maximum in Singapore (12.37 kg).

Varietal trial on jackfruit indicated that maximum plant height (7.29 m) was recorded in Penchiparai-1 and maximum canopy volume (370.03 m^3) was recorded in Muttam Varikka. Yield was maximum in Palur-1 (423.95 kg / tree and 42.39 t/ha) However, average fruit weight (10.32 kg) was maximum in Singapore Jack.

Studies on evaluation of different rootstocks for jackfruit revealed that minimum plant height and canopy volume were recorded in Pechiparai on monkey jack (4.54 m; and 82.78 m^3) while minimum plant spread (5.1 m NS and 5.42 m EW) was recorded in Singapore on Ainipala. Highest yield was obtained from Singapore on monkey jack (32.3 kg per tree).

SWEET ORANGE

Citrus Research Station, Tirupati

Collection, characterization, conservation, evaluation and utilization of germplasm

A total of 117 citrus germplasm accessions comprising of sweet orange (13), sour orange (5), pummelo (7), grape fruit (3), rough lemon (5), trifoliate orange and hybrids (4), mandarins (9), acid lime (48), lemons (2) and other species (19) are being maintained for evaluation and characterization. During 2014-15, eight kinnow mandarin accessions budded on Rangpur lime root stock were planted in randomized block design replicated thrice. During the period under report in most of the citrus germplasm accessions high to severe greening and rust mite infestations were recorded. One pummelo, one sweet orange and one *Citrus madaraspatna* accessions have been identified for *insitu* evaluation.

Evaluation of sweet orange germplasm accessions

Table-4: Performance of sweet orange accessions (2014-15)

Date of planting: 12-09-2005

S. No.	Name of the accession	Plant height (m)	Scion girth (cm)	Canopy spread(m)		Canopy volume (m^3)	No. of fruits
				EW	NS		
Sweet orange (*Citrus sinensis* (L) osbeck)							
1	Valencia	2.4	36.50	2.50	2.75	6.48	60-80
2	Excelsor malta	2.55	19.15	2.60	2.90	7.55	45-60
3	Jaffa	2.15	19.50	1.35	1.30	1.48	18-41
4	Pinapple	1.40	21.00	1.50	1.35	1.11	50
5	Egypt sweet orange	2.80	44.00	2.70	2.70	8.02	40
6	Paperind sweet orange	3.00	47.50	2.80	2.50	8.25	40
7	S/CM sweet orange	2.25	35.00	2.65	2.55	5.97	-
8	Enter prise 8718	1.60	22.00	1.60	1.50	1.51	20
9	Parson brown	2.75	38.00	2.95	2.70	8.60	27
10	Mediterranean sweet orange	3.60	46.00	3.60	3.40	17.30	30
11	Queen sweet orange 8763	2.15	36.50	2.40	2.20	4.46	25
12	Madam venus	2.55	38.50	2.60	2.50	6.51	--
13	Cadenarafine	2.20	35.00	2.55	2.50	5.51	20

Data presented on growth parameters (Table-4) of thirteen sweet orange accessions revealed that maximum vegetative growth was observed in Mediterranean sweet orange (plant height 3.60m, canopy volume 17.30m^3) followed by Parson brown (plant height 2.75m, canopy volume 8.60 m^3) and Paperind (plant height 3.00m, canopy volume 8.25 m^3). Maximum fruit weight (200g) was in Mediterranean sweet orange and good TSS and acid blend (21.05) were noticed in Queen sweet orange (Table-5)

Table-5: Physico - chemical parameters of sweet orange accessions

Name of the accession	Wt. of fruit (g)	No. of segments	TSS Brix (^{0})	Acidity (%)	TSS/Acid
Valencia	195	10-14	13.20	0.81	14.37
Excelsor malta	165	10-14	12.70	0.62	20.45
Jaffa	195	10-12	12.70	0.75	16.61
Pinapple	145	10-12	12.00	0.53	22.00
Egypt sweet orange	198	10-14	11.40	0.59	19.50
Paperind sweet orange	170	10-12	11.50	0.80	14.38
Enter prise 8718	160	10-14	12.80	0.52	24.50
Parson brown	175	10-14	12.00	0.56	22.30
Mediterranean sweet orange	200	10-14	12.50	0.68	21.05
Queen sweet orange 8763	148	10-14	12.00	0.50	25.00
Cadenarafine	154	10-12	11.50	0.44	21.51

Evaluation of sour orange, trifoliate and mandarin germplasm accessions

In sour orange group, Herale sour orange recorded maximum plant height (3.15m) and canopy volume (13.44 m^3) followed by Australian sour orange (canopy volume 10.04 m^3). Troyer citrange (canopy volume 3.80 m3) among trifoliate hybrids and Willow leaf (canopy volume 12.26 m^3) and Rangatra (canopy volume 3.42m^3) among mandarins were highly vigorous (Table-6).

Table-6: Performance of sour orange, trifoliate and mandarins

Date of planting: 12-09-2005

S. No.	Name of the accession	Plant height (m)	Scion girth (cm)	Canopy spread(m)		Canopy volume (m^3)	No. of fruits
				EW	NS		
Sour orange (*C. aurantium* (L) osbeck)							
1	Herale sour orange	3.15	55	3.15	3.45	13.44	80
2	Australian sour orange	2.90	40.50	3.15	2.80	10.04	50
3	Sour Dig	2.75	43.50	3.00	2.75	8.91	40
4	Sour orange-8751	2.60	43.00	3.10	2.90	9.18	30
5	Chinnato	1.90	25.00	1.90	1.80	3.40	-
Trifoliate oranges *(Poncirus trifoliata)*							
1	Troyer citrange	2.20	44.00	2.00	2.20	3.80	--
2	Carrizo citrange	3.05	29.00	1.75	1.80	3.77	--
Mandarin group							
1	Willow leaf	3.25	47.50	3.05	3.15	12.26	30
2	Dancy tangerine *Citrus tangerina*	3.40	35.50	2.55	2.40	8.17	25
3	Rangatra mandarin						
	Citrus reticulata	2.70	55.50	3.45	3.35	12.25	--
4	Unshiu mandarin						
	Citrus unshiu	2.80	22.00	1.30	1.50	2.14	80
5	Calamondin						
	C. madurensis	3.10	38.00	2.50	2.35	7.15	45
6	Kinnow	2.35	24.50	1.70	1.50	2.35	--
7	Cleopatra	2.00	27.50	1.75	1.60	2.20	--
8	Mermaloid	2.00	30.40	1.80	1.90	2.50	--

Clonal selection in sweet orange

Performance of seven year old sweet orange clonal selections under Tirupati conditions revealed that (Table-7&8), TS6 clone showed significantly highest plant growth parameters (Plant height (2.45 m), scion girth (35.25 cm) and canopy volume (9.62 m^3)) while, yield performance with respect to number of fruits (107 fruits /plant), average fruit weight (204.67 g) and yield per plant (21.93kg) was maximum in Sathgudi clone followed by TS6 clone (Number of fruits-99 /plant, average fruit weight-196 g and yield-19.41 kg/plant).

Table-7: Performance of sweet orange clones

Clones	Plant height (m)	Scion Girth (cm)	Canopy spread(m)		Canopy Volume (m^3)	Fruits/ tree	Fruit weight (g)	Fruit yield (kg/ tree)
			EW	NS				
TS 1	1.50	23.50	1.68	1.93	2.57	56	172.33	9.75
TS 2	1.83	29.75	1.95	2.15	4.00	71	195.67	13.98
TS 3	2.23	25.25	2.28	2.50	6.63	68	182.67	12.51
TS 4	2.08	26.75	2.28	2.33	5.78	75	173.33	13.01
TS 5	1.80	29.00	2.38	2.38	5.38	82	184.67	15.23
TS 6	2.45	35.25	2.65	2.75	9.62	99	196.00	19.41
TS 7	2.00	33.75	2.63	2.63	7.508	107	204.67	21.93
CD@5%	0.45	7.09	0.31	0.43	3.06	9.83	7.96	2.32
SEm±	0.150	2.639	0.105	0.143	1.023	3.157	2.555	0.744
CV %	15.12	16.32	9.25	12.06	34.53	6.834	2.366	8.52

TS 1 : Venkata Reddy Gari Palle, Tadipatri (mandal) Ananthapur; TS 2 : Ammavaripeta, B.K. Samudram (mandal) Ananthapur; TS 3 : Madugula, Tipparthi (mandal) Nalgonda, TS 4 : Peddavura village & mandal, Nalgonda; TS 5 : Veligandla (village & mandal), Prakasam; TS 6 : Cheruvukomuu- palem, P.C. Palle (mandal), Ananthapur; TS 7 : Sathgudi (Check)

Further, TS 1 clone has recorded minimum plant growth parameters (plant height (1.50 m) and canopy volume- 2.57 m^3 and low yield (9.75 kg/plant)). Maximum juice percentage was noticed in TS 6 clone (51.50%).

Table-8: Evaluation of sweet orange clones for fruit quality at Tirupati

Clones	Juice (%)	TSS (^{o}Brix)	Acidity (%)
TS 1	48.33	11.17	0.64
TS 2	52.33	10.60	0.61
TS 3	50.33	10.10	0.65
TS 4	51.33	10.83	0.59
TS 5	52.17	10.63	0.62
TS 6	51.50	11.67	0.58
TS 7	43.67	11.00	0.57
CD@5%	1.27	NS	NS
SEm±	0.41	0.31	0.11
CV %	1.57	2.82	4.21

Evaluation of promising clones of sweet orange

Biometrical observations on four year old sweet orange promising clones revealed that maximum plant height (1.76m) was recorded in M3, maximum scion girth (24.17cm) and canopy volume (2.39m^3) were observed in M4, whereas minimum canopy volume (1.17m^3) was recorded in Shamouti Orange clone followed by M8 (Table-9).

Table-9: Growth characters of sweet orange promising clones

Name of the clone	Plant height(m)	Scion Girth (cm)	Canopy spread(m)		Canopy Volume (m^3)
			E-W	N-S	
Phule Mosambi	1.68	21.00	1.51	1.59	2.37
M3	1.76	22.33	1.71	1.66	2.96
M8	1.41	19.50	1.24	1.30	1.84
M4	1.73	24.17	1.67	1.78	3.16
Kodur Sathgudi	1.70	23.67	1.57	1.59	2.83
Blood Red Malta	1.66	22.17	1.54	1.47	2.54
Shamouti Orange	1.45	19.17	1.12	1.13	1.17
Sathgudi (Check)	1.61	22.75	1.46	1.58	2.12
CD@5%	NS	NS	NS	NS	NS
SE(m)±	0.17	2.18	0.20	0.23	0.78
CV %	17.95	17.26	22.92	25.88	56.73

PUMMELO AND GRAPE FRUIT

Citrus Research Station, Tirupati

Evaluation of pummelo and grape fruit germplasm accessions

Pummelo 31-1-13 (canopy volume 16.36 m^3) among Pummelos and Japanese Summer (canopy volume 13.24 m^3) among grape fruits were highly vigorous.

Evaluation of promising clones of Pummelo

NRCC Pummelo-2 clone recorded maximum plant height (1.87 m) followed by NRCC Pummelo -1 (1.62 m) during the third year after planting. NRCC Pummelo -1 clone has recorded maximum scion girth (18.33cm) and canopy spread (EW: 1.13m & NS: 1.03m).

ACID LIME

Citrus Research Station, Tirupati

Evaluation of lemon and other species of citrus germplasm accessions

Among rough lemons, rough lemon 8779 (plant height 4.20 m and canopy volume 16.82 m^3), followed by Emmikai puli *(Citrus medica)* (plant height 3.25m and canopy volume 12.06 m^3) were highly vigorous (Table-10).

Table-10: Performance of rough lemon and other species of citrus

Name of the accession	Date of planting	Plant height (m)	Scion girth (cm)	Canopy spread(m)		Canopy volume (m^3)	No. of fruits
				EW	NS		
Rough lemon (*Citrus jambhiri* Lush)							
1 Soh Myndong	12-09-2005	2.60	43.00	2.75	2.85	8.00	45
2 Rough lemon 8779	12-09-2005	4.20	45.00	3.40	3.00	16.82	--
3 Rough lemon Rahuri	20-01-2010	3.50	38.00	2.50	2.15	7.39	--
4 Jambheri Assam	20-01-2010	3.35	41.50	2.65	2.50	8.72	--
5 Rough lemon Assam	20-01-2010	1.45	21.00	1.25	1.20	0.85	--
Limes & Lemon (*Citrus limon*)							
1 PKM-1	20-01-2010	3.05	25.50	1.85	1.85	4.10	--
2 Nagapur lemon	12-09-2005	1.70	22.00	1.40	1.55	1.45	20
Other species							
1 *C. depressa*	12-09-2005	1,70	12.90	1.02	1.07	0.72	--
2 Sunkokon	12-09-2005	2.85	48.00	2.50	2.60	7.27	20
3 Pectinofera	12-09-2005	1.80	25.00	1.80	2.10	3.56	--
4 *C. hystrix*	12-09-2005	1.80	19.50	1.60	1.40	1.58	40
5 *C. moi*	12-09-2005	2.45	27.50	2.00	2.00	3.85	30
6 Kum quat- *Fortunella sps*	12-09-2005	1.85	26.50	2.75	2.15	4.30	75
7 Kukudai	12-09-2005	2.25	33.00	2.20	2.10	4.08	45
8 Emekai puli-*Citrus medica*	12-09-2005	3.25	49.00	3.15	3.00	12.06	65
9 CRH-47	12-09-2005	3.50	54.00	3.30	3.10	14.06	--
10 Kitchili-*C madaraspatana*	20-01-2010	3.00	30.00	1.70	1.70	3.40	35
11 Gajanimma-*C. limettioides*	20-01-2010	2.45	29.00	2.00	1.70	3.27	20
12 *C. macrophylla*	20-01-2010	2.50	28.50	2.00	2.15	4.22	--
13 Citron-*Citrus medica*	20-01-2010	2.50	47.00	2.50	2.70	6.63	45

Evaluation of acid lime cultivars under different agro climatic conditions:

Among Acid lime cultivars planted during 2011, Vikram was found more vigorous followed by Balaji and Jaidevi (Table-11). Highest plant height, stem girth, plant spread (N-S) and canopy volume were recorded in Vikram (2.42 m, 30.50 cm, 2.39 m and 7.51 m^3).Whereas, minimum growth was noticed in Pramalini and Sai Sharbathi cultivars.

Table-11: Growth performance of acid lime cultivars

Name of the clone	Plant height(m)	Scion Girth (cm)	Canopy spread(m)		Canopy Volume (m^3)
			E-W	N-S	
Pramalini	1.68	19.68	1.66	1.76	2.97
Vikram	2.42	30.50	2.39	2.39	7.51
Jai- Devi	2.20	25.13	2.18	2.18	5.81
Sai- Sharbathi	1.89	18.63	1.93	1.68	4.03
Balaji	2.36	25.63	2.39	2.33	6.96
CD (0.05)	NS	NS	NS	0.45	NS
SEm±	0.179	2.689	0.189	0.146	1.081
CV%	17.00	22.49	17.92	14.11	39.64

Clonal Selection of Acid lime

Among forty one acid lime clonal selections planted during January, 2013, thirty eight clones were established well and three clones were replanted. Vigorous plant growth was observed in RHRL-124, RHRL-49, Petlur Selection - 1 and Balaji acid lime clones. Since the plants are only two year old they have to be further studied.

Evaluation of promising clones of acid lime

Acid lime promising clonal evaluation during pre-bearing stage revealed that (Table-12) none of the clones were found significantly superior to local check Balaji (Plant height: 2.35m, Canopy spread E-W: 2.37 m and N-S: 2.52 m). While, TAL 94/14, Phule Sharbathi and NRCC Niboo-3 clones have recorded vigorous growth parameters during the year . Precocity of flowering and fruiting was observed in TAL 94/14 and Balaji clones.

Table-12: Performance of promising clones of acid lime

Name of the clone	Plant height (m)	Scion Girth (cm)	Canopy spread (m)		Canopy Volume (m^3)
			E-W	N-S	
TAL 94/14	2.32	25.17	2.28	2.18	6.65
TAL 94/13	1.80	21.50	1.80	1.78	3.04
Phule Sharbathi	1.93	24.33	2.18	2.15	5.20
Akola lime	1.17	15.67	1.10	1.13	0.69
NRCC Niboo-2	1.68	20.00	1.57	1.68	2.33
NRCC Niboo-3	2.15	22.83	2.03	2.12	5.08
NRCC Niboo-4	2.17	19.00	1.57	1.77	2.82
KL-12	1.92	21.50	2.10	2.07	4.68
Balaji (Check)	2.35	25.50	2.37	2.52	6.95
CD @ 5%	0.52	NS	0.59	0.63	NS
SE(m)±	0.17	2.36	0.20	0.21	1.30
CV %	15.35	18.83	17.92	18.53	53.95

BER

Horticultural Research Station, Anantapuramu

Germplasm collection, evaluation and maintenance of ber

The growth and development of ber germplasm was severely affected due to failure of S-W monsoon during 2014. Moisture stress coupled with hot weather conditions prevailed during the months of June – September which has resulted in poor vegetative growth and delayed flowering by 30-40 days. There was less fruit set and growth of fruits also got affected. High incidence of hairy caterpillar, fruit borer and thrips was noticed during 2014.

With regard to growth characters, among six ber collections evaluated, Gola recorded highest plant height (2.41m) which was closely followed by Kaithili (2.40 m) and Umran (2.33 m) (Table-13). Whereas, Mundia recorded lowest plant height (1.90 m). Number of branches per plant was more in Umran (7.57) followed by Kaithili (6.00). Stem girth was maximum in Umran (94.14 cm) followed by Gola (89.07 cm) and Gangaregu (88.63 cm). Gola and Umran registered more plant spread (2.98 m – EW and 2.85 m NS and 2.90 m EW and 2.64 m NS respectively) compared to other ber collections. Based on these observations, it was found that Gola and Umran put forth comparatively good growth even under unfavorable growing conditions existed during 2014.

Data on yield and fruit quality indicated that, maximum fruit yield was recorded in Gangaregu (102.5 kg/plant) followed by Umran (96.2 kg/plant). Fruit weight (25.00 g) and pulp weight (23.44 g) were observed more in Gola which was followed by Umran (18.79 g and 17.34 g). Stone weight was less in Gangaregu (0.98 g) and more in Seb (1.80 g). TSS content was high in Seb (23.20 °Brix) followed by Umran (17.50 °Brix) and Mundia (15.60 °Brix).

Table-13: Growth, yield and quality parameters of ber germplasm

(Year of Planting 1983)

Variety/ selection	Plant height (m)	No. of branches plant $^{-1}$	Stem girth (cm)	Plant spread (m)		Yield Plant $^{-1}$ (kg)	Fruit weight (g)	Pulp weight (g)	Stone weight (g)	TSS (°Brix)
				E-W	N-S					
Gola	2.41	5.33	89.07	2.98	2.85	78.3	25.00	23.44	1.56	12.83
Seb	1.96	5.13	86.63	2.44	2.29	83.2	14.13	12.33	1.80	23.20
Mundia	1.90	5.57	85.43	2.54	2.19	66.3	15.87	14.76	1.11	15.60
Umran	2.33	7.57	94.14	2.90	2.64	96.2	18.79	17.34	1.45	17.50
Kaithili	2.40	6.00	77.44	2.53	2.49	72.3	17.90	16.58	1.19	13.17
Gangaregu	2.01	5.25	88.63	2.67	2.41	102.5	9.24	8.17	0.98	11.43

The pooled data (2003-2014) on yield and quality parameters of ber collections indicated that Umran was the highest yielder (104.78 kg/plant) and suitable for growing under southern region of Andhra Pradesh. With respect to quality parameters, Umran was found superior with maximum fruit weight (34.74 g), pulp weight (31.29 g) and acceptable TSS content of 15.78° Brix (Table-14). Pulp to seed ratio was high in Kaithili (22.98) followed by Umran (17.88). The TSS content was maximum in Seb (16.85° Brix) followed by Gola (16.57° Brix) and Umran (15.7° Brix).

Table-14: Fruit yield and quality parameters of ber germplasm, Pooled data

Variety/ selection	Fruit yield (kg/ plant)	Fruit weight (g)	Pulp weight (g)	Pulp weight (g)	Seed weight (g)	Pulp to seed ratio
Gola	90.32	28.23	24.46	1.80	13.59	16.57
Seb	94.84	28.14	25.06	1.93	12.98	16.85
Mundia	91.88	27.42	23.33	1.79	13.03	13.86
Umran	104.78	34.74	31.29	1.75	17.88	15.78
Kaithili	83.54	31.83	28.49	1.24	22.98	14.63
Gangaregu	82.12	17.68	13.53	1.29	10.49	13.81

POMEGRANATE

Horticultural Research Station, Anantapuramu

Germplasm collection, evaluation and maintenance of pomegranate

Among the twenty pomegranate germplasm collections evaluated for growth characters, Virupakshi recorded maximum plant height (1.62 m) followed by Jodhpur Red (1.47 m), Alan (1.43 m) and Muscat (1.42 m). Plant spread was more in GKVK (1.19 m EW – 1.02 m NS) followed by Jalore Seedless (1.20 m EW – 0.99 m NS) and Alan (1.17 m EW – 0.97 m NS). Jalore Seedless recorded more number of branches per plant (4.60) followed by G-137 (4.22) and Jodhpur Red (4.20). Based on these observations, it was found that Jalore Seedless and Jodhpur Red were highly vigorous. (Table-15)

Table-15: Growth parameters of Pomegranate germplasm

(Date of Planting October 2013 and February 2014)

Sl. No.	Variety/ selection	Plant height (m)	Plant spread (m)		No. of branches plant^{-1}
			E-W	N-S	
1.	Ganesh	0.96	0.71	0.78	2.19
2.	G-137	1.33	0.88	0.81	4.22
3.	Muscat	1.42	0.89	0.89	3.00
4.	Jodhpur Red	1.47	0.93	0.88	4.20
5.	Jalore seedless	1.39	1.20	0.99	4.60
6.	P-23	1.28	0.82	0.73	2.71
7.	Ruby	1.23	1.06	0.92	3.40
8.	Bassein Seedless	1.30	0.93	0.99	3.25
9.	Dorasut Malagi	1.15	0.83	0.78	3.22
10.	Alan	1.43	1.17	0.97	3.44
11.	Speendanedhar	1.15	0.86	0.84	3.13
12.	Kalisherin	1.05	0.67	0.77	2.67
13.	Tabast	1.17	0.91	0.98	3.00
14.	GKVK	1.09	1.19	1.02	3.40
15.	Lupania	1.30	0.89	0.95	3.40
16.	Dholka	0.95	1.02	0.96	3.20
17.	Badana sadana	0.98	0.62	0.76	2.50
18.	Suner anar	0.84	1.08	0.78	2.33
19.	Virupakshi	1.62	0.96	0.74	2.00
20.	Phule bhagwa super	0.71	0.56	0.60	1.80

Varietal trial on pomegranate

Among five pomegranate varieties evaluated for growth and yield characters, Jalore Seedless (check) was highly vigorous in growth which recorded highest plant height (2.34 m), more number of branches per plant (6.25) and maximum plant spread (1.79 m EW and 1.69 m NS). Ruby was less vigorous with 1.25 m plant^{-1} height and 3.88 branches per plant^{-1}. With regard to fruit yield, Ganesh recorded significantly more number of fruits plant^{-1} (21.38) and yield plant^{-1} (7.07 kg) followed by Jalore Seedless (4.71 kg) and Bhagwa (4.10 kg) which were on par with each other (Table-16).

Table-16: Growth and yield parameters of pomegranate varieties

Variety	Plant height (m)	No. of branches plant^{-1}	Plant spread (m)		No. of fruits plant^{-1}	Fruit yield (kg plant^{-1})
			EW	NS		
Ganesh	1.55	5.13	1.44	1.63	21.38	7.07
Mridula	1.55	5.28	1.23	1.18	10.88	3.20
Bhagwa	1.38	5.38	1.26	1.20	12.88	4.10
Ruby	1.25	3.88	1.25	1.26	11.00	3.46
Jalore seedless (check)	2.34	6.25	1.70	1.69	11.63	4.71
Statistics						
CD at P=0.05	0.20	1.26	0.22	0.21	5.16	1.48
SE.m+	0.06	0.41	0.07	0.07	1.67	0.49
CV (%)	8.18	15.75	10.72	9.93	24.71	20.15

CUSTARD APPLE

Horticultural Research Station, Anantapuramu

Germplasm repository and improvement in custard apple

The growth and development of custard apple plants was severely affected due to moisture stress and hot conditions prevailed during March-October, 2014. Flowering was delayed by 20-25 days in all the germplasm lines. There was less flowering and more flower drop resulting in low yields during the year. Incidence of mealy bug and wilt was noticed.

In custard apple germplasm planted during 1999-2000, the highest plant height was recorded in Molakalmur S.No. 9 (2.93 m) followed by Balanagar (2.89 m) and Molakalmur S.No.12 (2.84 m). While, lowest plant height was recorded in Yengalampalli S.No. 18 (1.70 m) and Jambugumpala S.No.5 (1.76 m) (Table-18). Stem girth was observed more in Yengalampalli S.No.8 (76.33 cm) followed by Yengalampalli S.No.4 (75.22 cm) and Molakalmur S.No.7 (73.75 cm). More number of branches plant^{-1} was observed in Kadiri S.No.169 (6.0) closely followed by Molakalmur S.No.12 (5.89) and Yengalampalli S.No.1 (5.50). More plant spread was observed in Ramaphal (3.07 m EW – 2.93 m NS) which was closely followed by Molakalmur S.No.7 (2.90 m EW – 2.90 m NS). Number of fruits plant-1 was recorded high in K. Dayalauripalli S. No.13 (48.33) followed by Kadiri S.No.132 (47.50) and Yengalampalli S.No.6 (47.00). Maximum fruit yield per plant was recorded in Yengalampalli S.No.6 (9.0 kg) followed by Pithota S.No.4 (8.21 kg) and Pithota S.No.5 (7.88 kg).

Among custard apple germplasm that were planted in 2005, highest plant height was recorded in SK-6 (2.68 m) followed by DC–1 (2.60 m) and SK-2 (2.57 m). Stem girth was more in SK–2 (62.33 cm) followed by SK–4 (57.33 cm). Whereas, number of branches per plant was high in SK-4 (5.67) followed by SK-2 (5.00). Plant spread was more in SK-4 (2.20 m EW and 2.37 m NS) followed by SK-1 (2.25 m EW and 2.20 m NS). DC-3 recorded more number of fruits/ plant^{-1} (26.00) followed by SK-2 (23.33). Maximum fruit yield per plant^{-1} was recorded in DC-3 (5.46 kg) and SK-2 (4.68 Kg).

Varietal trial of custard apple

Among the six custard apple varieties evaluated, APK (Ca -1) recorded maximum plant height (2.38 m) followed by Sinhan Local (2.30 m) (Table-18). Stem girth was maximum in APK (Ca-1) (45.38 cm) followed by Balanagar (42.13 cm) and Sinhan Local (41.25 cm). Number of branches/plant was highest in Sinhan Local (4.50) followed by Arka Sahan and APK (Ca-1) (4.25). Plant spread was observed more in Arka Sahan (2.26 m EW and 2.16 m NS) followed by Sinhan Local (2.31m EW and 2.09m NS). With regard to fruit number /plant, Rayadurg recorded more number of fruits per plant (21.88) followed by APK (CA-1) (20.75). Yield per plant was highest in APK (Ca-1) (4.35 kg) followed by Rayadurg (3.94 kg) and Arka Sahan (3.82 kg).

Arka Sahan was found superior over other varieties in terms of fruit weight (212.02 g), pulp weight (146.26 g) and TSS (23.20°Brix). APK (Ca-1) was next to Arka Sahan with fruit weight of 209.34g and pulp weight of 133.11g. Apart from Arka Sahan, high TSS was recorded in Rayadurg (23.17 °Brix) and Balanagar (23.15° Brix).

Table-17: Variability in custard apple germplasm

Character		Range
Plant height (m)	:	1.76 - 2.93
No. of branches plant $^{-1}$	:	2.14 – 6.00
Stem girth (cm)	:	44.0 – 76.33
Plant Spread (m)		
East – West	:	1.40 – 3.07
North – South	:	1.50 – 2.93
No. of fruits plant^{-1}	:	48.33 – 2.50
Yield per plant (kg)	:	0.54 – 9.00

Table-18: Growth and yield parameters of Custard apple varieties

(Year of Planting 2008)

Variety	Plant height (m)	Stem girth (cm)	No. of branches plant^{-1}	Plant Spread (m)		No. of fruits plant $^{-1}$	Fruit yield (kg plant $^{-1}$)
				E W	N S		
Rayadurg	1.99	36.00	3.50	1.91	2.04	21.88	3.94
APK (Ca-1)	2.38	45.38	4.25	2.06	2.24	20.75	4.35
Red sithaphal	1.99	36.00	3.38	1.74	1.56	8.25	1.42
Arka sahan	2.14	34.88	4.25	2.26	2.16	14.75	3.82
Sinhan Local	2.30	41.25	4.50	2.31	2.09	17.13	3.46
Balanagar (check)	2.11	42.13	3.75	1.98	1.93	15.25	2.82
CD at 5%	0.39	10.47	1.50	0.44	0.40	5.45	0.57
SE.m+	0.13	3.47	0.49	0.14	0.13	2.90	0.19
CV (%)	12.18	17.69	25.32	14.14	13.34	22.46	28.94

Table-19: Quality parameters of Custard apple varieties

(Year of Planting 2008)

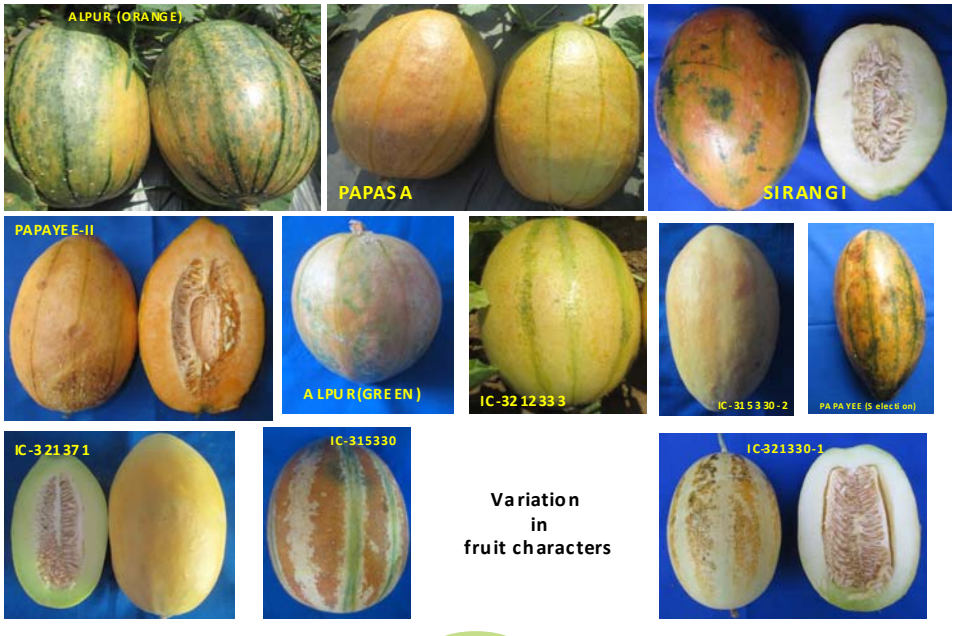
Variety	Fruit Wt. (g)	Pulp Wt. (g)	Seed Wt. (g)	TSS (°brix)
Rayadurg	186.92	102.96	15.14	23.17
APK (Ca-1)	209.34	133.11	15.92	22.40
Red Sithaphal	159.62	109.34	8.23	18.00
Arka Sahan	212.02	146.26	13.90	23.20
Sinhan Local	192.32	111.25	12.31	21.40
Balanagar (check)	160.07	90.43	13.31	23.15
CD at 5%	**28.16**	**25.76**	**3.19**	**1.77**
SE.m+	**13.21**	**12.08**	**1.5**	**0.83**
CV (%)	**10**	**14.79**	**16.13**	**5.37**

MUSKMELON

Horticultural Research Station, Anantharajupeta

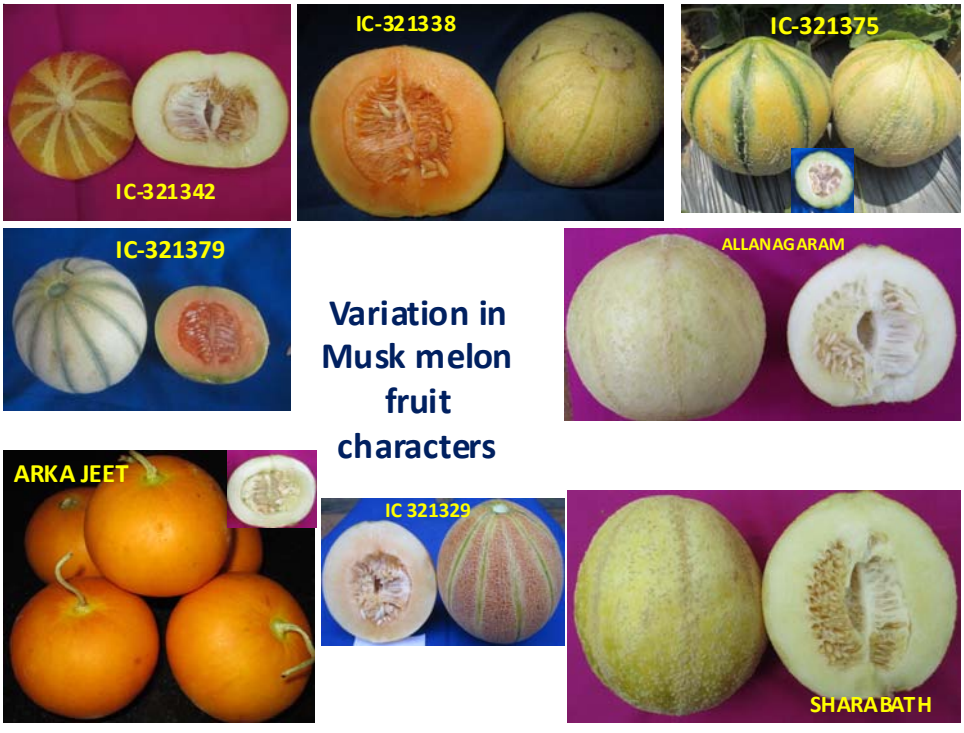
Evaluation of hybrids/varieties/germplasm lines of musk melon:

Among the local collections and accessions from public institutes tested, all accessions were andromonoecious except IC-321327 which was monoecious. The number of fruits per vine ranged from 2.92 (IC-321328) to 14.32 (Arka Jeet), yield per vine varied from 1.93 kg (IC-321343) to 16.14 kg (IC-321327), average fruit weight ranged from 237.0 g (Arka Jeet) to 2350 g (IC-321327) whereas TSS ranged from 2.00^0 Brix (IC-321367) to 11.46^0 Brix (Arka Jeet). Among the hybrids evaluated, number of fruits per vine varied from 4.26 (Amul-9) to 11.80 (Bobby), yield per vine ranged from 3.20 kg (Amul-9) to 10.15 kg (Muskan), average fruit weight varied from 751.3 (Amul-9) to 2301.9 (Muskan) and TSS ranged from 6.70^0 Brix (NMMH-24) to 14.80^0 Brix (Bobby) where as pulp thickness varied from 32.53 mm (NMMH-24) to 54.83 mm (Kundan).



Variation in leaf characters

Variation in Musk melon fruit characters



VEGETABLES

CHILLIES

Horticultural Research Station, Lam, Guntur

- In IET, ten entries were evaluated against three national checks *viz.,* LCA-334, Kasi Anmol and Sindhur. Among these entries, 2014/CHIVAR-6 recorded highest ripe and dry chilli yield (115.7 and 62.2 q/ha) followed by 2014/CHIVAR-2 (111.4 and 57.75 q/ha).
- In AVT-1, four entries were evaluated against two national checks *viz.,* Kasi Anmol and LCA-334. Among these entries, 2013/CHIVAR-2 recorded significantly highest ripe and dry chilli yield (95.8 and 41.3 q/ha) which was on par with 2013/CHIVAR-4 (84.9 and 38.1 q/ha).
- In AVT-II, seven entries were evaluated against two national checks *viz.,* KA 2 and LCA 334. Among these entries tested, 2012/CHIVAR-5 recorded highest ripe and dry chilli yield (95.8 and 53.0 q/ha) followed by 2012/CHIVAR-6 (95.4 and 52.4 q/ha).
- In IET, eight hybrids were evaluated against three checks *viz.,* BSS-453, ARCH-228 and Kasi Anmol. Among these hybrids, 2014/CHIHYB–6 recorded significantly highest yield (176.8 q/ha) which was on par with 2014/CHIHYB –2 (163.2 q/ha)
- In AVT-1, among eight hybrids evaluated against three checks *viz.,* BSS- 453, ARCH-228 and Kasi Anmol, 2013/CHIHYB-7 recorded highest ripe and dry chilli yield (151.4 and 64.7 q/ha) which was on par with check BSS-453 (140.9 and 56.5 q/ha).
- In AVT-II, among seven hybrids evaluated against two checks *viz.,* ARCH-228 and Kasi Anmol, 2012/CHIHYB-13 recorded highest ripe and dry chilli yield (209.1 and 90.9 q/ha) followed by 2012/CHIHYB-12 (195.5 and 90.9 q/ha).

COWPEA

Horticultural Research Station, Lam, Guntur

- In IET, six cowpea varieties were evaluated against 3 checks (Kasi Kanchan, Arka Garima and local). Among the entries tested, the highest yield was recorded by 2014/COPBVAR-4 (58.8 q/ha) which was on par with 2014/ COPBVAR-6 (57.3 q/ha) and Kasi Kanchan (51.8 q/ha).
- In AVT-II, among the five varieties evaluated against 3 checks (Kasi Kanchan, Arka Garima and Local), 2012/ COPBVAR-2 recorded highest yield (57.3 q/ha) which was on par with 2012/COPBVAR-3 (54.8 q/ha).

BHENDI

Horticultural Research Station, Lam, Guntur

- In IET, eight hybrids were evaluated against two resistant checks (HOK-152 and Arka Anamika) and one susceptible check (Pusa Sawani). The highest yield was recorded by 2014/ OKHYB–8 (206.5 q/ha) followed by 14/ OKHYB-5 (199.3 q/ha) and 14/ OKHYB-3 (194.2 q/ha) which were significantly superior to the checks tested except NBH-180 (183.6 q/ha).
- In AVT-1, ten hybrids were evaluated against two resistant Checks (HOK-152 and Arka Anamika) and one susceptible check (Pusa Sawani). Among the hybrids, highest yield was recorded by 13/ OKHYB –4 (176.2 q/ha)
- In AVT-II, eight bhendi hybrids were evaluated against two resistant checks (HOK-152 and Arka Anamika) and one susceptible check (Pusa Sawani). Among the entries, significantly highest yield was recorded by 12/ OKHYB-6 (226.4 q/ha) followed by 12/OKHYB-5 (220.2 q/ha) and 12/OKHYB-15 (200.2 q/ha). The incidence of YVMV was less in 2012/OKHYB-6 (4.7 %).

DRUMSTICK

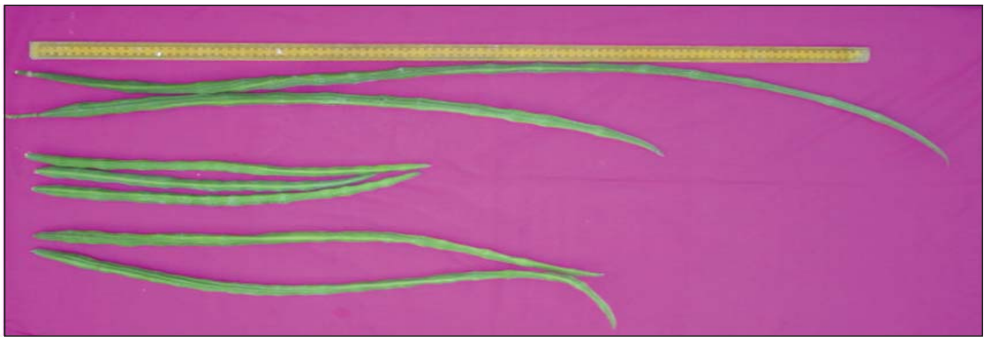
Horticultural Research Station, Anantharajupeta

Among the annual drumstick cultivars tested, maximum plant height was recorded in Bhagya (KDM-1), whereas number of pods per plant, yield per plant were higher in PKM-1 followed by PKM-2. All superior pod characters *viz.,* pod weight, pod length, pod girth, number of seeds per pod and TSS were recorded in PKM-2 followed by PKM-1. Incidence of flower and leaf webber was severe in all the cultivars during the year.

PKM -2

BHAGHYA

PKM -1



FLOWERS

TUBE ROSE

Horticultural Research Station, Pandirimamidi

Studies on the performance of different single and double type of tuberose varieties in agency tracts of East Godavari district.

- Among the single types, plant height was highest in Prajwal (92.56 cm) and the least was recorded with Phule Rajani (75.44 cm). Yield per plot and loose flower yield per plant was highest with Prajwal. Among the double type varieties, plant height was highest in Suvasini (87.05 cm) and the least was recorded in Hyderabad Double. Yield per plot and loose flower yield per plant was highest in Suvasini.

Horticultural Research Station, Anantharajupeta

- Maximum number of flower spikes per plant (3.79), yield per plant (122.07 g) and yield per hectare (135.63 q/ha) were recorded in Hyderabad Single followed by Phule Rajani (3.23, 102.61 g/plant, 114.01 q/ha). However, maximum individual floret weight per plant (1.377 g) was recorded in Prajwal followed by Hyderabad single (0.917 g).
- Among four double flower type tuberose cultivars, number of spikes (1.06), no. of spikes per hectare (1,17,901.0) were maximum in Calcutta Double which was on par with Hyderabad Double and Vaibhav. Maximum spike length (79.07 cm) and number of florets per spike were observed in Hyderabad Double whereas maximum spike girth was recorded in Vaibhav (6.53 mm) which was on par with Calcutta Double (6.07 mm).

Hyderabad Single

Phule Rajini

Prajwal

Prajwal

Phule Rajini

Hyderabad Single

GLADIOLUS

Horticultural Research Station, Anantharajupeta

Early flowering was observed in Darshan, Punjab Dawn, Bindiya, Swarnima and AC.No.7. The spike length ranged from 93.63 cm (Sadabhar) to 137.78 cm (Silvia). Maximum number of florets per spike was recorded in Punjab Dawn (15.89) and least in Dheeraj (10.12). Number of spikes produced per plot was maximum in AC.No.7 (56.0) which was on par with Swarnima (51.0). Maximum number of tillers per plant was observed in AC.No.7 (2.80) followed by Swarnima (2.55). The diameter of the floret was maximum in Bindiya (11.33 mm) which was on par with AC.No.7 (10.44 mm). Maximum vase life of flower spike was recorded in Arun (9.33 days) whereas least was recorded in Kumkum (6.33 days).

More number of corms per plant (2.5) was recorded in Arka Amar and Punjab Dawn and it was on par with AC No.7, Swarnima, Kajol and Bindiya. However, lowest numbers of corms were recorded in Golden Goddess (1.03). Weight of corms obtained from AC.No.7 was maximum (127.15 g) and it was on par with Bindiya and Arka Amar whereas minimum corm weight was noticed in Kum Kum (26.33g).


Kum Kum


Golden Gaddess


Arka Amar


Panjab Dawn

CHRYSANTHEMUM

Horticultural Research Station, Anantharajupeta

During the year, 72 accessions of chrysanthemum were collected from Floriculture Research Station, Rajendranagar for multiplication and also preliminary evaluation was done and the following observations were made.

- Early flowering was observed in Autumns eyes (82 DAP), whereas late flowering was noticed in UHFS 77 (133 DAP).
- Number of flower heads per plant ranged from 24.0 (Yellow Cherub) to 450.0 (Winter Queen).
- Maximum number of suckers per plant was observed in Statesman (28.0 g) followed by Priya (24.67).
- Number of flower heads per spray ranged from 2.0 (Priya) to 86.0 (Winter Queen).
- Individual flower diameter ranged from 21.11 mm (Local Button) to 77.23 mm (Autumns eyes).
- Individual flower weight ranged from 0.47 g (Local Button) to 6.358 g (HYDC-18).


Winter Quees


Red Stone


Local Button


Yellow Cherub


Autumns Eye


Hydc-18

HELICONIA

Horticultural Research Station, Anantharajupeta

Among 23 types of Heliconia collections planted under shade of red sanders trees, only 7 types *viz., H.lobster* cv claw red, *H.rubra c*, *H.mars* cv de loose, *Lady die*, *H.parakeet, H.lobster* claw and *Heliconia wagnirina* came to flowering. Maximum plant height was recorded in *Heliconia wagnirina* (120.33 cm) followed by H.claw (117.33 cm), whereas least plant height was observed in *H.latis patha* A/C (51.50 cm). Number of leaves per plant was maximum in *H.cinnamonam* twist (10.00) and lowest in *H.golden torch* (4.67). Maximum leaf length (62.67 cm) was recorded in H. claw and *Heliconia wagnirina* and minimum was recorded in *H.Rostrata* (18.67 cm). It was observed that H. golden torch was performing well interms of growth and flowering as intercrop in drumstick than under the shade of Red sanders.


H. Golden Torch


H. Claw


H. Labstar Claw


H. Wagnirina

ORCHIDS

Horticultural Research Station, Chintapalli

Evaluation of cut flower varieties of orchid cultivars under high altitude zone of Visakhapatnam district along with local germplasm:

Among the four commercial orchid species evaluated *Dendrobium* spp. cultivar Sonia-17 recorded maximum plant height (43.28 cm), number of shoots per plant (5.0), highest number of spikes per plant (8.85), length of spike (39.33 cm) and number of florets per spike (10.35) and longevity of spike (40 days).

TUBER CROPS

ELEPHANT FOOT YAM

Horticultural Research Station, Kovvur

Collection, conservation, cataloguing and evaluation of genetic resources of elephant foot yam

Total number of entries being maintained are 41 (Non acrid type -26; Acrid type-15). Among 26 non acrid types, Gajendra has recorded highest yield (57.11 t/ha) followed by AM 62 (50.22 t/ha) whereas among the acrid types, AC 36 has recorded the highest yield (42.96 t/ha)

Multi locational trial on Amorphophallus

Under multi location trial on elephant foot yam, pooled data for two years revealed that the entry AC 14 has recorded the highest yield (49.21 t/ha) which was on par with Gajendra (48.30 t/ha).

Table-20: Multi locational trial on Amorphophallus Pooled analysis

Name of the entry	2014-15		Pooled data	
	Yield /plant(kg)	Yield t/ha	Yield /t/ha (Kg)	Yield t/ha
Ac-14	2.11	46.89	2.23	49.29
Appakkudal local	1.08	24.06	1.14	25.50
BCA 3	1.7	37.78	1.73	37.03
Gajendra	2.20	48.94	2.21	48.30
Local	1.05	23.36	1.18	26.26
CD	0.44	9.855	0.21	5.67
SEM	0.14	3.163	0.90	1.94
CV	17.71	17.57		

IET on greater yam (2012)

The two years pooled analysis indicated that among all the entries, TGY12-3 has recorded significantly highest yield of 62.7 t/ha followed by Sree Karthika with an yield of 51.84 t/ha.

Table-21: Growth and yield of greater yam in IET - Pooled data (2013-14& 2014-2015)

Entries	Plant Height (m)	Stem girth (cm)	No of tillers	No of leaves	No of tubers / plant	Yield / plant (kg)	Tuber length (cm)	Tuber diameter (cm)	Yield t/ha
TGY-12-1	4.354	3.478	3.137	96.817	2.87	2.87	35.292	41.742	30.18
TGY-12-2	4.448	3.345	3.22	122.05	3.518	3.518	28.522	36.822	35.55
TGY-12-3	4.553	3.735	3.165	126.067	6.078	6.078	42.708	47.108	62.7
TGY-12-4	4.473	3.25	3.11	122.583	3.005	3.005	35.642	38.583	31.37
TGY-12-5	4.618	3.385	3.053	125.233	3.228	3.228	34.733	31.692	33.46
TGY-12-6	4.262	3.493	2.943	116.417	2.327	2.327	29.875	31.772	24.10
TGY-12-7	4.047	3.302	2.665	121.167	11.832	1.794	30.417	31.558	18.45
TGY-12-8	4.202	3.392	3.165	121.483	9.777	2.794	32.693	37.042	28.83
TGY-12-9	4.855	3.708	2.803	127.2	7.623	2.572	33.593	38.372	27.03
Sree karthika	4.055	3.43	2.553	127.25	5.092	5.092	31.468	41.047	51.84
Local	4.337	3.523	2.805	121.8	2.781	2.781	33.825	38.058	29.21
CD	4.354	3.478	3.137	96.817	2.87	0.634	4.78	5.99	6.5
SEM	4.448	3.345	3.22	122.05	3.518	0.221	1.67	2.09	2.27

COLOCASIA

Horticultural Research Station, Kovvur

Collection, conservation, cataloguing and evaluation of genetic resources

Ninety nine accessions of colocasia germplasm were evaluated. Among the short duration group, CA-25 has recorded the highest cormel yield of 34.96 t/ha followed by IG Col E 7 (32.59 t/ha). In the medium duration group, CA-49 has recorded highest cormel yield of 44.98 t/ha while among long duration group KCS-2(45.45 t/ha) has recorded highest cormel yield followed by CA-12 (34.57 t/ha).

DIOSCOREA

Horticultural Research Station, Kovvur

Collection, conservation, cataloguing and evaluation of genetic resources

A total of 27 accessions of dioscorea germplasm were evaluated. Among the greater yam entries under evaluation, Chintapalli has recorded highest tuber yield of 43.84 t/ha followed by Yellow flesh with 41.47 t/ha.

CASSAVA

Horticultural Research Station, Venkataramannagudem

AICRP on Tuber crops

A total of 81 entries of cassava are being maintained as gene bank for crop improvement of cassava. During 2014-15, six entries were collected from High Altitude and Tribal (HAT) Zone and North Coastal Zone (Srikakulam and Vizianagaram districts). The passport data has been sent to NBPGR for allotment of IC numbers.

URT on short duration cassava lines at Venkataramannagudem was initiated with 8 entries. Significant differences were observed between the treatments. Maximum tuber yield per hectare was recorded in TCa12-9 (46.3 t/ha) followed by Sree Jaya (36.0 t/ha) which was on par with TCa12-7 and TCa12-5. Highest starch content was observed in Sree Jaya (27.3 %) which was on par with Local (26.00 %) and TCa12-7 (26.3 %). Minimum amount of HCN (ppm) was recorded in TCa-12-10 (66.7 ppm).

Under MLT on Cassava mosaic resistant lines, 4 entries with 3 checks were evaluated in 5 locations during *Kharif,* 2014-15. The entries *viz.,* TCMS-5 and TCMS-7 recorded maximum tuber yield (42.6 and 41.3.9 tons/ha) with a starch content of 23.7% and 25.4% respectively.

SPICES

HOT PEPPER

Horticultural Research Station, Lam, Guntur

Chillies Improvement Scheme

- A total of 155 working germplasm lines were evaluated. The selections were made within lines and the selected plants were selfed and multiplied for evaluation during 2015-16.
- In Advanced Hybrid Yield Trial, 19 superior combinations were selected and the seed was produced in 2013-14 which were evaluated in 2014-15 for yield and yield components along with a check Indam-5. Among the hybrids, LCH 08-64 recorded highest dry pod yield (7255 kg/ha) followed by LCH 09-9 (6843 kg/ha) and LCH 08-59 (6778 kg/ha) over the check, Indam-5 (5849 kg/ha).
- Single plants were selected from segregating material of F_2, F_3, F_4, F_5 and F_6 for further generation advancement and evaluation. Promising single plants selected in F_6 generation will be evaluated in observational yield trial and used in hybridization.

Generation	No. of crosses grown	No. of plants/ progeny in each cross	No. of single plants selected
F_2	27	150	120
F_3	20	80	30
F_4	10	80	10
F_5	20	80	22
F_6	20	80	25

- In Replicated Row Yield Trial, 21 entries were evaluated against check, LCA-334. The entry RRYT–T_{19} recorded significantly highest dry pod yield (6286 kg/ha) followed by RRYT -T_9 (5983 kg/ha) over the check LCA-334 (4650 kg/ha).
- In Preliminary Yield Trial, 15 entries were evaluated against check variety, LCA-334. The entry LCA-647 recorded significantly highest dry pod yield of 7250 kg/ha followed by LCA-686 (6972 kg/ha) over the check, LCA -334 (620 kg/ha).
- In Preliminary Yield Trial for green chilli, 16 entries were evaluated against check variety CA 960. The entry LCA- 655 recorded significantly highest green pod yield (36.8 t/ha) with considerable amount of vitamin 'C' content (134.48 mg/100g) followed by LCA-616 (34.53 t/ha) and LCA-643 (34.50 t/ha) over the check CA-960 (25.53 t/ha). The entry LCA-655 also recorded significantly highest dry pod yield (6250 kg/ha) over check CA-960 (4250 kg/ha) indicating the suitability of LCA-655 for dual purpose.
- In Advanced Yield Trial, 15 entries were evaluated against check , LCA-334. The entry LCA- 639 recorded significantly highest dry pod yield of 6584 kg/ha with 387 pods per plant, followed by LCA-613 (6513 kg/ha), LCA-657 (6042 kg/ha) over the check, LCA-334 (5467 kg/ha).

PAPRIKA

Horticultural Research Station, Lam, Guntur

- In Paprika chilli, 40 germplasm lines were collected over the years and were evaluated. The selections were made within lines and the selected plants were selfed and multiplied for evaluation during 2015-16. The lines which shown variability during 2015-16 will be evaluated as per the descriptive blank keeping LCA- 436 as check.

- In Preliminary Yield Trial, 16 entries along with check entry LCA-436 were evaluated. The entry LCA- 470 recorded significantly highest dry pod yield (6508 kg/ha) followed by LCA-482 (6417 kg/ha) and LCA-466 (6355 kg/ha) over the check, LCA-436 (5250 kg/ha).
- In Advanced Yield Trail, 16 entries along with check entry LCA-436 were evaluated. The entry LCA-445 recorded highest dry pod yield (6479 kg/ha) followed by LCA-442 (6167 kg/ha) and LCA-498 (6084 kg/ha) over the check, LCA-436 (4913 kg/ha).

CORIANDER

Horticultural Research Station, Lam, Guntur

AICRP on Spices

- Sixty one germplasm lines were evaluated with six checks. Among the entries evaluated, LCC-291 (5.52 g/plant), LCC-304 (5.42 g/plant) and LCC-282 (5.21 g/plant) were found significantly superior in yield over the best check, AD-1 (4.34 g/plant).
- Among sixty coriander germplasm lines received from six different coordinated centres evaluated, RD-387 (6.37 g/plant), NDC-14 (6.09 g/plant), NDC-31 (5.86 g/plant), LCC-144 (5.66 g/plant), LCC-170 (5.66 g/plant) and DH-240 (5.49 g/plant) were found significantly superior in yield over the check, AD-1 (4.50 g/plant).
- In IET, among 8 entries evaluated, LCC-268 recorded highest yield (1293.9 kg/ha) followed by LCC-275 (1252.6 kg/ha) and LCC-276 (1243.9 kg/ha) which were significantly superior to the best check, Suguna (1080.7 kg/ha).
- In IET on coriander (leaf), among ten entries tested, LCC-310 recorded highest herbage yield (13.0 t/ha) followed by LCC-309 (12.97 t/ha) which were significantly superior to the best check, Suguna (11.7 t/ha).
- In CVT, among the 21 entries tested, COR-46 recorded highest yield (1295.2 kg/ha) followed by COR-47 (1270.4 kg/ha) and COR-48 (1140.2 kg/ha) which were significantly superior to the best check, AD-1 (1058.3 kg/ha).
- In mutation breeding, 144 lines (mutant and F_4 lines) along with 6 checks were evaluated. Among the material evaluated, only four entries (S-101, S-16, S-138 and S-56) recorded significantly higher yield over the best check, APHU Dhania-1. Several selections were made to advance the populations.

FENUGREEK

Horticultural Research Station, Lam, Guntur

- In fenugreek, 124 germplasm lines along with four checks were evaluated. The first five promising entries for yield i.e. LFC-18 (7.56 g/plant), LFC-19 (7.08 g/plant), LFC-123 (6.87 g/plant), LFC-78 (6.70 g/plant) and LFC-34 (6.44 g/plant) were significantly superior to the check APHU Methi-1 (2.22 g/plant).
- In fenugreek , 7 lines in IET, 14 lines in CVT were evaluated and results showed that LFC-90 (1163.2 kg/ha), LFC-72 (1154.6 kg/ha), LFC-78 (1153.7 kg/ha), LFC-118 (1152.8 kg/ha) and LFC-85 (1143.6 kg/ha) in IET, FGK-47 (1640.3 kg/ha), FGK-48 (1579.6 kg/ha) and FGK-43 (1528.0 kg/ha)in CVT recorded significantly higher yield over checks.

AJOWAN

Horticultural Research Station, Lam, Guntur

- In Ajowan, 77 germplasm lines were evaluated. Among the entries, highest yield was recorded in AA-12 (476.9 kg/ha) followed by S-18-2-1-1 (396.3 kg/ha), AA-67 (386.9 kg/ha), S-4 (351.3 kg/ha) and AA-2 (341.9 kg/ha) which were found significantly superior in yield over the best check, LTa-26 (210 kg/ha).
- In IET, 10 promising selections along with two checks were evaluated. LS-14-3 (727 kg/ha), LS-14-8 (713.1 kg/ha), LS-14-7 (710.3 kg/ha) and LS-14-6 (710.3 kg/ha) were found promising and significantly superior to the best check, GA-1 (557.4 kg/ha).

Chilli- LCA-620
(Bold poded variety with high colour value)

Chilli- LCA 655
(Dual purpose variety)

Fenugreek- LFC-103

BLACK PEPPER

Horticultural Research Station, Chintapalli

Germplasm collection, characterization, evaluation and conservation in Black Pepper

Among 26 pepper germplasm lines evaluated, Panniyur -1 and Cu-5308 recorded the highest yield. Severe drought affected the crop during April, May, June and July months of 2014. HUDHUD cyclone hit the Visakhapatnam district on 12th October, 2014 and destroyed the shade trees (Silver oak) and black pepper gardens. The catastrophic storms uprooted the silver oak trees and aggravated the phytophthora foot rot disease resulting in very poor yield.

Ten varieties of black pepper *viz.,* PRS-88, HB-20052 (Panniyur-8), Acc-33, Acc-53, Acc-57, Acc-106, C-1090, HP-39, Panniyur-1 and Karimunda were planted during the year. Maximum plant height was noticed in HB20052 and Panniyur-1. All vines were found susceptible to phytophthora foot rot disease. Among the ten accessions, C1090 recorded maximum fresh berry yield (2066.7g) during the third year of bearing.

TURMERIC

Horticultural Research Station, Chintapalli

Coordinated Varietal Trial in Turmeric

Among the 12 genotypes evaluated, maximum plant height was recorded in PTS-55 (127.33 cm) followed by PTS-12 (125.66 cm), PTS-8 (124.0 cm) which were on par. Maximum leaf area was recorded in PTS-8 (639.6sq.cm). All the entries recorded eight months of crop duration. In terms of yield parameters, maximum rhizome yield per plant was observed in NDH-98 (590.0 g/plant) followed by NDH-8 (390.0 g/plant). Maximum fresh rhizome yields were recorded from the selections of Kumarganj Centre i.e., NDH-98 (33.03 t/ha) and highest dry rhizome recovery was recorded in NDH-98 (23.4 %) and PTS -8 (23.2 %). Higher fresh rhizome yield was recorded in NDH-98 (30.33 t/ha) with life saving irrigations under rainfed cultivation during prolonged drought (climate change conditions).

CARDAMOM

Horticultural Research Station, Chintapalli

Observational trail on suitability of different improved cardamom cultivars in high altitude zone of Visakhapatnam

Observations revealed that, highest plant height (295.3 cm), maximum number of tillers per plant (21.3) and maximum number of leaves per tiller (16.87) were recorded in Mudigere -2. Mudigere -2 recorded highest yield (183 g/plant) compared to other cultivars.

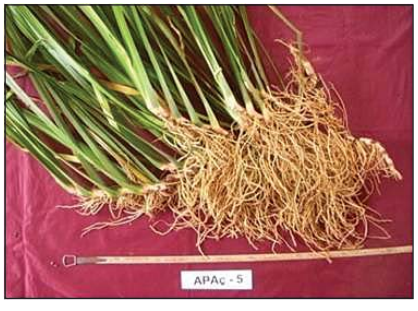
MEDICINAL & AROMATIC PLANTS

AICRP ON MAP & BETELVINE

Horticultural Research Station, Venkataramannagudem

Sweet flag

Twenty eight accessions of *Acorus calamus* which includes three new collections from Kodaikanal, Bengaluru and Pandirimamidi were evaluated for their performance. APAc-3 recorded highest plant height (97.83 cm) followed by APAc-2 (90.33 cm). Leaf length was highest in APAc-7 (66.83 cm) and leaf width was highest in APAc-5(2.67 cm). Highest rhizome weight was recorded in APAc–5 (210.8 gm/pl) followed by APAc–2 (196.4 g/pl) and rhizome yield was also highest in APAc-5 (116.18 q/ha) followed by APAc–2 (108.02 q/ha). Ploidy analysis was done using flow cytometry at DMAPR, Anand. The report revealed that the accessions maintained were diploid except one accession, APAc-6 (Damaramadugu).



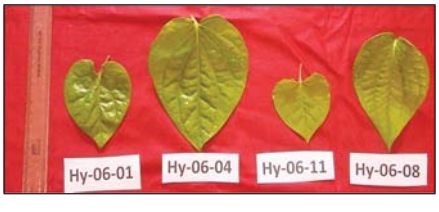
Kamanchi/Black Night Shade

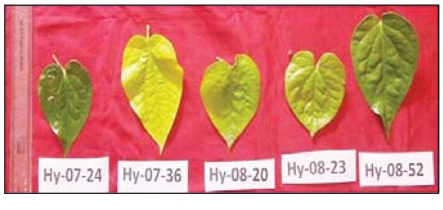
Forty five accessions of *Solanum nigrum* are being maintained and evaluated for their morphological and agronomical traits. A new accession APSn-32 collected from Pandirimamidi was added to the germplasm during 2014-15. Among forty five accessions, APSn-23 recorded highest herbage yield (9.62 kg/plot) followed by APSn-6 (9.05 kg/plot). Ploidy analysis was done using flow cytometry at DMAPR, Anand. The report revealed that wide variations were exhibited by the collected accessions.

In a Multi Locational Trial on *Solamum nigrum* highest herbage yield was recorded in TNSn-19 (15.80 t/ha) which was on par with TNSn-45 (greens), APSn-4, APSn-7 and MG-8.

Betelvine

Among 13 hybrids, Tellaku Ponnuru recorded highest plant height (171.00 cm) which was on par with Swarna Kapoori (162.83 cm) and GN Hybrid (162.83 cm). GN Hybrid recorded highest yield (38.33 leaves per plant) which was on par with Swarna Kapoori (35.67 leaves per plant) at Venkataramannagudem in MLT on betelvine.





Sixty-one betelvine clones collected from different states were evaluated for growth and yield parameters. Among all the genotypes under study, Tellaku Ponnuru recorded higher leaf yield (40.50 leaves/plant). Among hybrids, GN Hybrid recorded highest leaf yield (47.3 leaves/plant) during the year

The new Coconut hybrid Vasista Ganga (GBGD X PHOT) was found promising and proposed for release in Andhra Pradesh and Karnataka by the central sub-committee and notified in its 23rd meeting held at IIHR, Bengaluru.

PLANTATION CROPS

COCONUT

Horticultural Research Station, Ambajipeta

Collection, conservation and evaluation of local germplasm of coconut

Thirteen local elite germplasm accessions were collected from traditional coconut growing districts *viz.,* Srikakulam, East and West Godavari districts of AP and raised the seedlings. The experiment was laid out as per the technical programme during February 2013. Five accessions viz Pillalakodi green (CRP 745), Pillalakodi brown (CRP 746), Jonnalarasi brown (CRP 748) , ECT green (CRP 750) and Gang Bondam (CRP 749) were planted in RBD with 4 replications @ 4 palms/replication and remaining eight accessions viz. Jonnalarasi green (CRP 747), ECT Brown (CRP 751), Itikulagunta ECT Big (CRP 754), Itikulagunta ECT Small, Saradapuram ECT (CRP 753), Srikakulam ECT (CRP 752), Vemulapalli ECT Big, Vemulapalli ECT Small were planted as an observational trial @ 6 palms per accession and are in vegetative stage. Observations on growth attributing characters were recorded and no significant differences were noticed among different germplasm accessions.

Evaluation of selections from germplasm

Inter se crossed seed nuts of Verrikobbari tall, St.Vincent tall, Guam-II tall, Zanzibar tall, Straits, Kenya tall and East Coast tall were received from CPCRI, Kasaragod during May 2014 and the nursery was raised. The seedlings are healthy and the experiment will be laid out in 2015.

Production and evaluation of new cross combinations in coconut

The experimental results revealed that significant differences were observed among the hybrids evaluated. Significantly highest number of bunches (14.1 per palm), nut yield (132.5 per palm/year), copra output (23.6 kg/palm) and oil yield (16.5 kg/palm) was recorded in GBGD X LCOT cross combination over hybrid check ECT X GBGD (Table 22).

Table-22: Performance of coconut cross combinations with regard to yield and yield attributing characters

Cross combinations	Functional leaves on the crown	No. of bunches / Palm	No. of nuts harvested / Palm	Copra content (g/ nut)	Copra Output (Kg/palm)	Oil content (%)	Estimated oil yield (kg/palm)
ECT X MGD	32.25	11.2	110.5	138.25	15.26	62.1	9.62
GBGD x ECT	31.75	9.87	105.75	142.50	14.99	60.0	9.00
GBGD x FJT	32.50	9.00	109.25	142.0	15.54	61.0	9.44
GBGD x PHOT	32.00	14.12	123.25	190.50	23.44	69.0	16.19
GBGD x LCOT	34.00	12.87	132.50	168.00	22.25	68.0	15.10
ECT x GBGD	34.00	10.62	116.50	160.75	19.01	66.0	12.54
SE(m)	1.39	0.83	4.80	4.97	0.73	3.10	0.73
CD (P=0.05)	NS	2.52	14.62	15.12	2.24	NS	2.23
CV (%)	8.52	14.74	8.30	6.33	8.02	9.65	12.28

Evaluation of new coconut hybrids of location specific cross combinations

Oservations revealed that the cross, CRP509 X Double Century recorded highest plant height (294.75cm) and leaf length (179.90cm).However the number of functional leaves (10.82) was highest in CRP 509 X Kalpa Pratibha. The maximum leaflet length (71.27 cm) and leaflet breadth (3.82 cm) was recorded in Double Century X Gauthami Ganga cross combination (Table-23). Due to Helen and Phailin cyclones during October and November 2013, some of the accessions have died. Gap filling was done during the month of February 2014 and the experiment is in establishment stage and the seedling growth is satisfactory.

Table-23: Growth attributing characters of new coconut hybrids

Treatments	Plant height (cm)	Total no of leaves	Leaf length (cm)	Leaflet length (cm)	Leaflet breadth (cm)
CRP 509 X Kalpa Pratibha	191.00	10.82	121.60	62.52	3.27
Gauthami ganga X Kalpa Pratibha	231.95	9.50	131.92	61.32	2.70
CRP 509 X Double Century	294.75	9.25	179.90	63.35	3.72
Gauthami ganga X Double Century	215.20	10.50	110.25	65.12	2.95
Double Century X Gauthami ganga	245.80	9.80	154.12	71.27	3.82
CRP 509 X Gauthami ganga	227.25	9.45	162.57	63.3	3.17
S E(m)	29.19	0.97	22.17	3.90	0.27
CD (P=0.05)	N.S	N.S	N.S	N.S	N.S

Evaluation of released varieties in coconut

Among different hybrids and varieties evaluated, significant differences were recorded for yield and yield attributing characters. Significantly highest yield of 101.36 nuts /palm was recorded in Godavari Ganga followed by Keraganga (96.42 nuts/palm) (Table-24).

With regard to nut characters, highest fruit weight (1233.33 g) was recorded by Chandralaksha and it was on par with VHC-II (1219.66 g). Copra content was significantly highest in Chandralaksha (176.86 gram/nut) (Table -25&26).

Table-24: Growth and yield attributing characters of the coconut hybrids and varieties

Treatments	Functional leaves on the crown	No. of bunches /palm	Nut yield/ palm/year
Chandrasankara (COD x WCT)	29.16	9.24	77.20
Lakshaganga (LCT x GBGD)	30.76	10.72	85.25
Keraganga (WCT x GBGD)	32.03	10.63	96.42
Chandralaksha (LCOT x COD)	31.20	11.93	70.91
VHC-I (ECT x MGD)	30.30	10.95	72.06
VHC-II (ECT x MYD)	31.26	9.7	75.59
LCOT	32.94	9.22	78.25
PHOT	28.43	10.54	85.23
Godavari ganga (ECT x GBGD)	32.03	14.01	101.36
S E(m)	1.04	0.86	5.36
CD (P=0.05)	N.S	2.62	16.21

Table-25: Fruit component traits of different coconut hybrids and varieties

Treatments/Entries	Fruit l ength (cm)	Fruit breadth (cm)	Fruit weight (g)	Dehusked fruit weight (g)	Shell weight (g)	Kernel weight (g)
Chandrasankara (COD x WCT)	20.76	16.83	1127.667	536.66	143.33	236.66
Lakshaganga (LCT x GBGD)	22.16	14.76	1064.66	565.0	183.66	231.33
Kera ganga (WCT x GBGD)	20.06	15.36	700.00	372.66	125.33	147.33
Chandralaksha	21.0	17.86	1047.66	470.00	138.66	181.33
VHC-I (ECT x MGD)	18.98	13.83	970.00	444.00	104.00	190.00
VHC-II (ECT x MYD)	24.13	16.16	1219.66	583.33	260.66	172.66
Chandrakalpa (LCOT)	23.53	15.60	1233.33	520.00	164.66	205.33
PHOT	20.16	17.10	1073.66	438.66	122.33	216.33
Godavari ganga (ECT x GBGD)	24.00	15.56	1100.00	630.33	160.33	220.00
S Em +	1.066	0.729	34.53	16.93	17.63	10.64
CD at 5%	3.22	2.206	104.41	51.22	53.31	32.17

Table-26: Fruit component traits of the coconut hybrids and varieties

Treatments	Copra content (g/nut)	Oil content (%)	Copra Output (kg/palm)	Estimated oil yield
Chandrasankara (COD x WCT)	130.20	65.60	9.97	6.54
Lakshaganga (LCT x GBGD)	120.40	62.80	10.21	6.34
Keraganga (WCT x GBGD)	105.60	64.06	7.47	4.89
Chandralaksha	176.86	65.03	17.02	10.91
VHC-I (ECT x MGD)	120.16	60.80	8.68	5.18
VHC-II (ECT x MYD)	168.46	69.80	12.68	8.70
Chandrakalpa	128.00	62.03	9.98	6.13
PHOT	148.60	64.66	12.44	7.76
Godavari ganga (ECT x GBGD)	149.80	64.73	15.22	10.20
S Em +	7.67	2.73	0.95	1.32
CD at 5%	23.19	N.S	2.89	3.93

Evaluation of Tall x Tall coconut hybrids

The observations revealed that the tall x tall hybrids showed non significant differences for total number of leaves, leaf length, leaflet length and leaflet breadth. However significant differences were observed with regard to plant height. LCOT x ADOT recorded significantly highest plant height of 286.90 cm and is on par with BGR x ADOT (284.35 cm) (Table-27). Due to Helen and Phailin cyclones in 2013, some of the accessions have died. Gap filling was done during February 2014 and the plants are in vegetative stage.

Table-27: Growth attributing characters of Tall x Tall hybrids of coconut

Treatments	Plant height (cm)	Total no of functional Leaves	Leaf length (cm)	Leaflet length (cm)	Leaflet breadth (cm)
LCOT x ADOT	286.90	8.95	156.37	65.77	3.45
ADOT x ECT	204.42	7.22	121.07	86.50	2.87
BGR x ADOT	284.35	10.47	179.55	70.10	4.15
ECT x LCT	218.77	8.82	122.12	66.77	3.02
WCT x TPT	187.62	8.45	121.42	65.10	2.75
ECT x ECT	217.97	8.30	109.77	83.25	3.00
S Em +	17.12	0.66	7.24	10.70	0.20
CD at 5%	52.10	N.S	N.S	N.S	N.S

Evaluation of location specific Tall x Tall coconut hybrids

The seed nuts of cross combinations viz., Java Tall x ECT, PHOT x ECT, Fiji Tall x ECT, Laccadive Ordinary x ECT, ECT x Java Tall, Cochin China x ECT, ECT x Fiji Tall were received from CPCRI and raised the nursery and the experiment was planted in August 2011. Observations on growth attributing traits, showed non-significant difference among T x T hybrids except leaflet length. Due to Helen and Phailin cyclones in the year 2013, mortality was recorded in some of the accessions. Gap filling was taken up during the month of February, 2014 and the plants are in vegetative stage (Table-28).

Table-28: Growth attributing characters of Tall x Tall hybrids of coconut

Treatments	Plant height (cm)	Total no of functional Leaves	Leaf length (cm)	Leaflet length (cm)	Leaflet breadth (cm)
JAVA x ECT	398.60	14.23	300.06	82.53	5.03
PO x ECT	395.56	13.83	296.96	77.83	4.30
FIJI x ECT	258.30	11.73	165.13	66.56	3.76
LO x ECT	384.16	13.26	275.76	92.33	4.50
ECT x JAVA	296.90	12.60	198.56	73.13	4.30
COC x ECT	318.06	11.86	207.26	70.43	4.20
ECT x FIJI	403.80	11.70	280.10	73.73	4.26
ECT x ECT	285.46	10.90	194.43	67.76	3.80
S Em +	57.57	1.16	47.21	5.08	0.47
CD at 5%	N.S.	N.S	N.S.	15.58	N.S

Evaluation of Dwarf x Dwarf coconut hybrids in different agro climatic conditions

Data collected on vegetative characters revealed that, Konkan Bhatye hybrid -1 recorded maximum plant height (520.2 cm), total number of leaves (20.1) leaf length (341.2 cm), leaflet length (95.8 cm) and leaflet breadth (4.5 cm). However, due to Helen and Phailin cyclones in the year 2013, some of the accessions recorded mortality. Gap filling was taken up during the month of February.2014 and the plants are in vegetative stage (Table-29).

Table-29: Growth attributing characters of released varieties of coconut

Treatments	Plant height (cm)	Total no of functional Leaves	Leaf length (cm)	Leaflet length (cm)	Leaflet breadth (cm)
Kalyani Coconut -1	326.2	12.4	207.9	71.3	3.6
Gautami Ganga	173.0	10.7	117.8	54.4	3.8
Konkan Bhatiye hybrid	520.2	20.1	341.2	95.8	4.5
Kera Keralam	279.3	9.5	179.3	73.4	3.7
Kera Bastar	266.6	10	167.1	71.2	4.5
Kahi Kuchi Hybrid	134.2	8.1	7.5	40.1	1.72
Kalpa Prathiba	231.3	11.8	143.9	85.9	4.1
Kalpa Mitra	241.8	9.3	144.8	57.8	3.7
Kalpa Raksha	187.5	9.9	124.4	58.2	3.9
Kalpa Dhenu	227.9	9.0	145.9	59.9	3.14

PALMYRAH

Horticultural Research Station, Pandirimamidi

AICRP ON PALMS (PALMYRAH)

Survey, collection and evaluation of palmyrah germplasm

Survey and collection of palmyrah germplasm was done to collect dwarf and superior palmyrah genotypes for high neera and nungu yield. The joint survey was conducted in Puri and Khurdha districts of Odisha, from 20th August 2014 to 25th August 2014 with the scientists of Agricultural College and Research Institute, Killikulam. Potential palm growing areas of Puri and Khurda districts of Odisha were covered and 6 germplasm lines were collected and planted at Agricultural College and Research Institute, Killikulam as well as at Horticultural Research Station, Pandirimamidi.

Performance of palmyrah germplasm accessions

- Among the 13 accessions planted during 1991, plant height was maximum in accession 4/91 (10.78 m) followed by Acc 2/91 (10.14 m). Maximum Stem girth of 1.99m was recorded in Accession- 4/91 followed by accession 13/91 (1.83m). Maximum number of leaves was produced by Acc.7/91. Flower initiation started in the month of November and was continued up to March. The data recording is in progress for neera and nungu yields.
- Among the accessions of 1993 planting, maximum palm height was recorded in accession 4/93(8.29 m). Accession 8/93 recorded a maximum stem girth of 1.41m. Maximum number of leaves produced by Acc.9/93. Flower initiation started in the month of November and was continued up to March. The data recording is in progress for the neera and nungu yields.
- Of the 14 accessions of 1994 collection, maximum plant height was recorded in accession 4/94 and the highest number of leaves was recorded with accession 3/94. Stem girth was recorded maximum in accession 5/94. Flower initiation was observed in the month of November.
- Among 13 accessions of 1995 collection, accession 1/95 has recorded higher value for palm height as well as total number of leaves and stem girth. The petiole length and leaf breadth was found highest in 4/95 accession. Flower initiation was observed in the month of November and data recording is in progress.

- Maximum palm height in 1998 accessions was recorded with accession 5/98. Maximum Stem girth was observed in 7/98 where as maximum leaf number was recorded in 8/98.
- Among 8 accessions of 1999, palm height was highest in accession 6/99. Number of leaves produced was highest in accession 3/99 and the highest stem girth was observed in accession 4/99.
- Among the 18 accessions of 2000, palm height was highest with accession 14/00. Number of leaves produced was highest in accession 15/00.
- Of the 45 accessions of 2001 collection, plant height was highest in 20/01 and the number of leaves produced was highest in accession 38/01. The highest petiole length and leaf breadth was recorded in accession 43/01.
- Among the 18 accessions collected from Nalgonda district, plant height and number of leaves produced was highest in 6/02 and highest number of leaves and petiole length was observed in accession number 13/02. Of the 16 accessions collected from Tamil Nadu, palm height was highest in 11/02 and the maximum number of leaves and other leaf parameters were recorded in accession 2/02.
- The results from the data collected from 2003 planted accessions showed that maximum mean palm height and highest number of leaves was recorded with accession 1/03 and the lowest plant height was recorded with Accession 5/03.
- Among the 2004 planted germplasm, accession 1/04 has recorded the highest values in terms of palm height, number of leaves and leaf length.
- The germplasm collected and planted during 2006 has recorded highest palm height with accession 10/06 and the highest number of leaves was produced by accession 6/06.
- The germplasm collected and planted during 2007 has recorded highest palm height with accession 5/07 and the highest number of leaves was produced by accession 3/07.
- Among the germplasm accessions collected during the year 2008, highest palm height was recorded with accession 1/08 and the highest number of leaves were recorded in the accession 3/08.
- The highest palm height and maximum number of leaves among the 2009 planted accessions was recorded with accession 2/09.
- Among the germplasm accessions collected during the year 2010, the maximum palm height and highest number of leaves was recorded with the accession number 5/10.
- Among the germplasm collection of the year 2011, maximum palm height was recorded with the accession 8/11 and the maximum number of leaves was recorded with accession 9/11.

CASHEW

Cashew Research Station, Bapatla

- Among the 40 germplasm lines evaluated, the nut yield per tree at 13th harvest was found highest in Priyanka (25.30 kg/tree)
- Among different hybrids planted during 1997, the annual nut yield per tree was recorded maximum in H-36 (24.2 kg/tree) followed by H-61 (16.15 kg/tree) at 12th harvest.
- Among the different hybrids planted during 1999, the highest mean annual nut yield was recorded in H-165 (9.90 kg/tree) followed by H-170 (9.60 kg).
- Among the different hybrids of 2000, the annual nut yield per tree was maximum in H-218 (15.80 kg/tree) followed by H-197 (8.80 kg/tree).
- Among the different hybrids of 2007, the highest mean nut weight was recorded in H-420 (11.26 g) followed by H-382 (9.08). The mean annual nut yield was highest in H-410 (10.0 kg/tree) followed by H-415 (9.65 kg/tree).
- Among the 13 genotypes studied, with respect to the screening of germplasm for cashew apple, the total soluble solids ranged from 9.6° to 12.9° Brix. However, the highest TSS was recorded in Priyanka (12.9° Brix) whereas lowest tannins and acidity was recorded in Priyanka (3.15° Brix and 0.47% respectively).

OILPALM

Horticultural Research Station, Vijayarai

Evaluation of new crops combinations in oilpalm (Gen-8C)

Among ten crosses evaluated, no significant difference was observed for all the vegetative parameters except leaflet width and petiole depth. Among yield parameters, no significant difference was observed for number of male inflorescences, number of female inflorescences, number of bunches and average bunch weight. FFB yield was highest in NRCOP-4 (174.03 kg/palm/year) which was on par with NRCOP-5 (138.90 kg/palm/year).

Evaluation of new cross combinations in oilpalm (Gen-8D SET I)

Among ten hybrid combinations evaluated, highest plant height was recorded in NRCOP-32 (603.86A) which was on par with NRCOP-35 (565.83 cm) and NRCOP-34 (55.55 cm). Least plant height was recorded in NRCOP-38 (474.70 cm). Rachis length was highest in NRCOP-32 (370.00) which was on par with NRCOP-35 (369.33 cm), NRCOP-34 (364.42 cm), NRCOP-33 (343.34 cm) and NRCOP-31 (333.44 cm). Remaining vegetative parameters were non significant for different crosses. The crop is at pre-bearing stage.

Evaluation of new cross combinations in oilpalm (Gen-8D Set II)

Eleven crosses with one check was evaluated for dwarf characters. Among all the crosses,NRCOP-50 recorded lowest plant height of 182.30 cm which was on par with NRCOP-51 and NRCOP-45 which recorded 196.76 and 197.87cm respectively.

Number of leaves per plant also varied among the crosses, NRCOP-41 recorded highest number of leaves (19.92) which was on par with NRCOP-44 and NRCOP-46 (17.74 and 17.13 respectively leaves per palm per year).

Among ten hybrids evaluated in Gen-8D set-I highest plant height was recorded in NRCOP-44 (258.08 cm), which was on par with NRCOP-41 (249.14 cm) and NRCOP-42 (238.51 cm), whereas least plant height was recorded in NRCOP-50 (182.30 cm). Number of leaves per palm was highest in NRCOP-41 (19.92) which was on par with NRCOP-44 (17.74), NRCOP-46 (17.12) and NRCOP-43 (16.55). Least number of leaves was recorded in NRCOP-50 (13.42) which was on par with all other crosses except NRCOP-41, NRCOP-44 and NRCOP-46. Rachis length was highest in NRCOP-44 (189.52 cm) which was on par with NRCOP-41 (186.44 cm) NRCOP-42 (175.90 cm), Control (175.61 cm) and NRCOP-47 (161.12 cm). No significant difference among various crosses was observed for palm girth, no. of spindles, no. of leaflets, leaflet length, leaf let width, leaf area, leaf dry weight, specific leaf weight, petiole width and petiole depth.

Performance of cocoa varieties as an inter crop under oilpalm

Among fourteen cocoa varieties evaluated as an intercrop in oil palm, no significant difference was observed for vegetative parameters. The crops are at pre bearing stage.

FOREST PRODUCE

TAMARIND

Horticultural Research Station, Anantapuramu

Collection, evaluation and maintenance of tamarind germplasm

- In tamarind, forty one germplasm accessions (sixteen germplasm accessions planted during 1999 and twenty five germplasm accessions planted during 2000) were evaluated for growth parameters during 2014.
- Among sixteen tamarind lines planted during 1999, highest plant height was recorded in Pollachi-11 (5.13 m) followed by Bommidi–163 (4.70 m) and Salem–102 (4.70 m). whereas, Vrigam recorded lowest plant height (2.43 m). Stem girth was more in Pollachi-11 (101.67 cm) followed by PKM-1 (93.00 cm) and Salem–163 (89.67 cm). With regard to number of branches per plant Pollachi–11, ATPS–1 and Bommidi–163 produced more branches (9.00, 7.80 and 7.67 respectively). Plant spread was more in PKM–1 (7.31 m EW- 7.52 m NS) followed by Bommidi-163 (6.77 m EW and 6.57 m NS) and ATPS–2 (6.62 m EW- 6.39 m NS). The plants of Pollachi–11 and Bommidi–163 were highly vigorous with more plant height, maximum stem girth and more number of branches plant $^{-1}$. Plant spread was more in PKM – 1.

- Of the twenty five Punganur selections planted during 2000, PU-25, PU-24 and PU-19 produced taller plants (5.00m, 4.55m and 4.47m respectively) while, PU-27 (1.30 m) PU-22 (2.65m) and PU-18 (2.74 m) were dwarf in nature. Stem girth was more in PU-13 (80.25 cm) and PU-14 (80.20 cm) which was closely followed by PU-2 (79.00 cm). PU-6 recorded higher number of branches per plant (7.75) followed by PU-2 (7.00). The plant spread was more in PU-21 (6.55m EW–6.00m NS) and PU-12(6.22m EW–5.70 m NS).

Varietal trial of tamarind

- Due to prolonged dry spells and high temperatures during March – October, 2014, flowering was delayed in all the tamarind varieties. Incidence of fruit borer was observed in Ajanta.
- The data on growth and yield characters of tamarind varieties revealed that significant differences were observed among varieties for all the characters studied.
- Among five tamarind varieties, PKM-1 (check) recorded highest plant height (2.94 m) followed by Dharwad Selection-1 (2.84 m) and Pratistan (2.74 m) while, Ajanta was dwarf in nature with a plant height of 2.09 m and plant spread of 2.00 m EW – 1.9 m NS. Number of branches per plant (5.13), plant spread (2.93 m EW and 2.95 m NS) and stem girth (56.88 cm) were also more in PKM-1 (check) compared to other varieties. Fruit yield per plant was highest in Ajanta (39.28 kg) followed by Dharwad Sel-1 (28.40 kg).

AONLA

Horticultural Research Station, Anantapuramu

Collection, evaluation and maintenance of aonla germplasm

- On account of failure of South-West monsoon and prevalence of high temperatures during June-October months, the growth and development of aonla plants was severely affected. The flowering was normal which occurred during January-February months. But, there was more fruit drop due to inclement weather. Aphid incidence was noticed during flowering and fruiting periods. Low yields were recorded during 2014.
- Among eleven germplasm lines of aonla, highest plant height was recorded in Local (6.63 m) which was followed by Lucknow (5.40 m), PD (4.87 m) and ATPS-2 (4.90 m). Whereas, lowest plant height was recorded in Chakaiya (2.10 m) and ATPS-1 (2.80 m). Number of branches per plant was more in Local (7.0) closely followed by Kanchan (6.75). The Local accession attained maximum stem girth (117.00 cm) followed by Lucknow (100.00 cm) and PD (96.33 cm). The plant spread was more in Amrit (7.20 m EW and 6.70 m NS) and Local (5.95 EW and 6.10 m NS) and it was less in Chakaiya (2.20 m EW and 2.40 m NS) and ATPS-1 (2.80 m EW and 2.70 m NS).
- Of all the aonla germplasm collections evaluated, Local collection was highly vigorous in growth whereas Chakaiya and ATPS-1 were less vigorous. Fruit yield plant-1 was highest in NA-6 (Amrit) (39.96 kg) followed by Kanchan (25.92 kg).
- With regard to fruit quality parameters, maximum fruit weight (30.84 g) and pulp weight (29.38 g) were recorded in NA-6 (Amrit), followed by ATPS-2 (25.62 g and 24.81 g). Lowest seed weight was recorded in Chakaiya (0.98 g) whereas highest seed weight was recorded in NA-6 (Amrit) (1.26g). Pulp to stone ratio was high in Kanchan (24.12) followed by NA-6 (Amrit) (23.31). High TSS was observed in Local (14.6° Brix) followed by NA-7 (Neelam) (13.19°Brix) and Kanchan (12.99° Brix). Acidity content was maximum in Local (2.87%) followed by Chakaiya (2.10%).

Varietal trial of Aonla

- Aonla plants were affected due to hail storm and gales occurred on 04-03-2014 and 05-03-2014. Replanting of uprooted plants was done immediately by taking up all necessary measures.
- Five aonla varieties were evaluated during 2014 for growth and yield characters. BSR-1 recorded maximum plant height (2.5 m) followed by Chakaiya (2.38 m) (Table-30). Stem girth was more in BSR-1 (50.0 cm) followed by NA-10 (Balwant) (37.0 cm). Number of branches per plant was high in BSR-1 (8.0) followed by NA-10 (Balwant) and Chakaiya (3.75). The plant spread was more in BSR–1 (3.50 m EW and 3.60 m NS) followed by NA-10

(Balwant) (2.30 m EW and 2.29 m NS). Based on the growth parameters data it was found that BSR-1 was highly vigorous compared to other varieties. The variety NA-7 (Neelam) recorded significantly highest fruit yield plant^{-1} (7.10 kg) followed by NA-10 (Balwant) (5.10 kg).

- Significant differences were observed among varieties for all the quality parameters (Table-31). NA-10 (Balwant) recorded maximum fruit volume (20.9 ml), fruit weight (25.32 g) and pulp weight (22.94g). TSS content was high in BSR-1 (13.93 °Brix) followed by NA-7 (Amrit) (7.55 °Brix) and NA-10 (Balwant) (7.48 °Brix). Acidity content was high in Chakaiya (2.10%) followed by BSR-1 (2.01 %).

Table-30: Plant growth and yield parameters of Aonla varieties

(Year of Planting: 2010)

Variety	Plant height (m)	Stem girth (cm)	No. of branches plant^{-1}	Plant Spread (m)		Fruit yield (kg plant^{-1})
				EW	NS	
NA-7 (Neelam)	2.10	34.75	3.50	1.60	1.89	7.10
NA-10 (Balwant)	2.25	37.00	3.75	2.29	2.29	5.10
BSR-1	2.50	50.00	8.00	3.00	3.60	0.64
CHES-1	1.19	19.75	2.50	1.10	1.18	2.58
Chakaiya	2.38	35.75	3.75	1.80	1.94	2.48
CD at P=0.05	**0.87**	**14.80**	**1.95**	**0.87**	**0.79**	**1.94**
SE.m+	**0.40**	**6.80**	**0.90**	**0.40**	**0.37**	**0.91**
CV (%)	**26.97**	**27.11**	**29.50**	**28.85**	**23.74**	**31.42**

Table-31: Fruit quality parameters of Aonla varieties

(Year of Planting: 2010)

Variety	Fruit Volume (ml)	Fruit Weight (g)	Pulp Weight (g)	Seed Weight (g)	TSS (°brix)	Acidity (%)
NA-7 (Neelam)	14.83	20.91	18.69	1.88	7.55	1.98
NA-10 (Balwant)	20.9	25.32	22.94	2.1	7.48	1.92
BSR-1	10.58	11.38	10.2	1.18	13.93	2.01
CHES-1	16.51	18.52	16.29	2.12	4.63	1.89
Chakaiya	16.85	18.53	16.9	1.43	5.05	2.10
CD at 5%	**3.52**	**1.97**	**1.77**	**0.42**	**0.96**	**0.24**
SE.m+	**1.62**	**0.91**	**0.81**	**0.19**	**0.44**	**0.11**
CV (%)	**14.37**	**6.76**	**6.76**	**15.58**	**8.12**	**11.32**

MINOR FRUITS

DRY LAND HORTICULTURE

Citrus Research Station, Petlur

- Among 40 tamarind clones only two clones are in bearing stage. Compared to last year this year yield was very less and in most of the varieties flowering was very low and very le ss fruiting was recorded in PTS-18, PTS-24.
- Among 10 wood apple clones PWAS-2, PWAS-5 and PWAS-9 yielded better.

B. CROP PRODUCTION

FRUITS

BANANA

Horticultural Research Station, Kovvur

Validation of fertilizer adjustment equation in banana cv. Martaman

Among different treatments in plant crop, no significant difference was observed in growth parameters except plant height. However, bunch characters *viz.*, number of hands, number of fruits in second hand, total fruits and per hectare yield significantly differed. The yield was highest in T_8 and it was on par with T_5, T_1 and T_2. The percent deviation was positive only in case of T_2 i.e., 34 t/ha target.

Table-1: Response of different treatments on growth parameters at shooting (plant crop)

Treatments	Plant height (cm)	Girth (cm)	Suckers	Green leaves	Dry l eaves	Total leaves	Leaf length (cm)	Leaf width (cm)
Blanket application (T_1)	337.17	67.08	3.17	12.00	16.75	28.08	231.33	75.33
34 t/ha target*(T_2)	321.47	66.67	4.58	12.28	17.92	30.19	243.36	73.81
38 t/ha target*(T_3)	327.92	66.28	4.78	12.81	16.25	28.22	239.78	73.94
42 t/ha target*(T_4)	343.19	56.42	4.81	11.19	18.19	29.31	233.47	72.17
46 t/ha target*(T_5)	332.08	68.20	4.64	11.33	16.42	27.75	249.69	73.27
50 t/ha target*(T_6)	337.08	68.25	3.75	13.50	15.67	29.17	230.83	75.17
54 t/ha target*(T_7)	327.42	68.25	4.92	14.67	20.33	28.92	234.92	71.00
58 t/ha target*(T_8)	319.17	67.92	4.83	12.92	20.92	32.58	228.5	74.33
SE(m)	**6.38**	**3.91**	**0.83**	**1.45**	**2.14**	**1.48**	**8.00**	**1.38**
CD 19.29	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	

Table-2: Response of different treatments on yield and yield attributing parameters (plant crop)

Treatments	Green leaves at harvest	Sucker at harvest	Hands/ bunch	2nd hand fruits	Fruit length (cm)	Fruit width (cm)	Total fruits	Bunch weight (kg)	Yield/ ha (t/ha)	% deviation over targeted yield
Blanket application (T_1)	4.83	3.58	8.33	18.00	14.75	12.5	132.17	18.92	37.83	0.00
34 t/ha target*(T_2)	4.75	4.64	8.89	16.92	14.89	12.56	132.64	18.89	37.77	11.09804
38 t/ha target*(T_3)	5.11	5.29	8.83	17.39	14.00	12.06	137.44	17.00	34.00	-10.5263
42 t/ha target*(T_4)	4.82	5.36	8.44	16.44	13.81	11.58	139.83	17.92	35.83	-14.6825
46 t/ha target*(T_5)	5.11	4.44	8.56	17.11	14.33	12.22	138.78	19.28	38.55	-16.1884
50 t/ha target*(T_6)	4.45	4.78	8.22	16.11	14.33	12	131.78	18.33	36.67	-26.6667
54 t/ha target*(T_7)	5.00	4.61	8.61	17.28	13.61	12.56	137.72	18.44	36.89	-31.6914
58 t/ha target*(T_8)	4.94	4.83	8.39	18.11	14.11	11.5	142.67	20.11	40.22	-30.6552
CD N.S.	**N.S.**	**0.70**	**1.68**	**N.S**	**N.S**	**3.87**	**1.30**	**2.59**	**N.S.**	
SE(m)	**0.47**	**0.91**	**0.23**	**0.55**	**0.55**	**0.37**	**1.26**	**0.42**	**0.85**	

However, bunch characters *viz.,* number of hands, number of fruits in second hand, total fruits and per hectare yield significantly differed. The yield was highest in T_8 and it was on par with T_5, T_1 and T_2. The percent deviation was positive only in case of T_2 i.e., 34 t/ha target.

Table-3: Response of different treatments on growth parameters at shooting (Ratoon crop, 2014-15)

Treatments	Plant height (cm)	Girth (cm)	Suckers	Green leaves	Dry leaves	Total leaves
Blanket application (T_1)	323.80	70.97	4.41	11.22	15.44	26.66
34 t/ha target*(T_2)	324.57	70.44	4.55	11.58	17.66	29.25
38 t/ha target*(T_3)	322.91	70.25	4.75	12.02	15.39	27.41
42 t/ha target*(T_4)	325.00	73.11	4.16	12.11	15.22	27.33
46 t/ha target*(T_5)	332.91	73.91	3.25	10.33	18.41	28.75
50 t/ha target*(T_6)	321.80	73.66	4.11	11.86	17.25	29.11
54 t/ha target*(T_7)	317.64	71.36	4.00	11.83	16.44	28.44
58 t/ha target*(T_8)	338.89	70.16	4.66	10.72	18.00	28.72
SE(m)	**9.65**	**1.34**	**0.24**	**0.62**	**0.93**	**0.79**
CD NS	**NS**	**NS**	**NS**	**NS**	**NS**	

Table-4: Response of different treatments on yield and yield attributing parameters (Ratoon crop, 2014-15)

Treatments	Green leaves at harvest	Hands/ bunch	2nd hand fruits	Fruit length (cm)	Fruit width (cm)	Total fruits	Bunch weight (kg)	Yield/ha (t/ha)
Blanket application (T_1)	5.50	7.66	14.94	14.64	12.16	101.83	15.11	30.22
34 t/ha target*(T_2)	6.08	7.44	15.75	14.36	12.19	96.72	15.00	30.00
38 t/ha target*(T_3)	6.00	7.33	15.47	13.16	11.94	93.94	14.33	28.66
42 t/ha target*(T_4)	5.50	8.00	16.33	13.66	11.50	119.5	12.66	25.33
46 t/ha target*(T_5)	6.11	7.86	16.33	14.19	11.89	98.22	15.11	30.22
50 t/ha target*(T_6)	5.27	7.77	16.25	13.44	12.50	87.22	14.05	28.11
54 t/ha target*(T_7)	4.91	7.41	15.78	13.19	12.11	106.52	14.16	28.33
58 t/ha target*(T_8)	4.11	7.33	16.11	12.33	11.55	114.11	13.33	26.66
SE(m)	**0.56**	**0.38**	**0.43**	**0.51**	**0.50**	**11.78**	**0.85**	**1.71**
CD NS	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	

In ratoon crop, no significant difference was observed among growth, yield parameters and yield among different treatments. The present deviation was negative in all the treatments.

Standardization of organic nutrient schedule in banana cv. Robusta/Grand Naine

The highest yield (43.05 t/ha) was recorded in inorganic treatment and it was on par with all the organic treatments. However, among organic treatments, i.e. FYM @15 kg/pl, neem cake @ 1.875 kg/pl, vermicompost @ 7.5 kg/pl and wood ash @ 2.625 kg/pl recorded highest yield of 42.50 t/ha, higher shelf life and TSS as compared to the rest of the treatments. The BC ratio was highest (2.32) in treatment receiving (N0 + K0 + Triple green manuring with sunhemp (saline soils)/dhaincha (acidic soils) + cow pea + cow pea as inter-crop(45+10+30+10+30+10 days).

Macropropagation technique for banana

Macro propagation was taken up in two cultivars viz., Karpura Chakkerakeli and Tella Chakkerakeli. Among two cultivars early bud initiation was observed in TC keli (14.68 days) with application of the sawdust + VAM (30 g) + BAP (4 ml) + *Bacillus substilis* (30 g) (T_6). However T_5 (Sawdust + BAP (4 ml) + *Bacillus substilis* (30 g)) has produced more number of plantlets (31.38 and 20.00 plantlets in Tella Chakkarakeli and Karpura Chakkarakeli cultivars respectively) compared to other treatments.

Standardization of spacing and nutrient requirement for tissue culture banana cv. Yangambi Km 5 Plant crop

Among fertilizer levels viz., 150:50:150 g NPK/pl, 200:50:200 g NPK/pl and 250:50:250 g NPK/pl shown no significant difference for various parameters studied. Whereas among different spacings, significant differences were noticed with regard to plant height, green leaves, fruits/ bunch and yield/ ha.

Among three spacings *viz.,* 1.8X1.8 m, 1.8X1.5 m, 1.5X1.5 m. tried, significantly higher plant height was recorded at closer spacing (1.5m x 1.5m) whereas the number of green leaves was higher at wider spacing (1.8 m x 1.8 m). Similarly, significantly higher number of fruits/ bunch (122.8) was recorded in 1.8 m x1.5 m spacing. In case of bunch weight no significant difference was recorded among different spacings and fertilizer levels. However, the bunch yield (51.14 t/ha) was significantly higher in 1.5 m x 1.5 m spacing followed by 1.8 m x1.5 m spacing.

The interaction effect between fertilizers and spacings was found to be non significant for growth and yield parameters.

First ratoon crop

Among fertilizer levels in ratoon crop, no significant difference was observed for growth and yield parameters. Similarly, among spacings no significant difference was observed in growth parameters except plant height whereas per hectare yield was highest in 1.5 m x1.5 m spacing.

Second ratoon crop

Among fertilizer levels and spacings, no significant difference was observed in respect of growth parameters except plant height. However, the number of hands per bunch was higher in wider spacing (1.8 mx1.8 m). No significant difference was observed in bunch weight among spacings and fertilizer levels. The yield was significantly highest in 1.5 mx1.5 m spacing and among fertilizer levels no significant difference was observed. The interaction effect was non-significant between spacings and fertilizer levels.

Studies on stage wise (sub cultures) proliferation efficiency of different banana cultivars (AAA, AAB and ABB) in micro propagation

Among different cultivars kept for initiation, Grand Naine and Dwarf Cavendish started proliferation at C1 subculture stage whereas in Martaman and Karpura chakkerakeli proliferation was noticed from C3 subculture stage and highest proliferation was observed in Grand Naine (2.58) and Dwarf Cavendish (2.08).

Influence of crop cycle and age of sucker on productivity of tissue culture banana cv Grand Naine

Among different aged sucker (explants) and sucker source (plant/ratoon), no significant difference was observed in plant height, pseudostem girth and number of suckers. However, with respect to leaves/plant, significant difference was observed among suckers and source of sucker. Similarly, early shooting (204.6 days) was observed in suckers collected from ratoon crop.

In respect of yield parameters, among different aged suckers, 3 months old sucker recorded highest bunch yield (21.06 kg and 56.84 t/ha). Similarly, the suckers collected from plant crop recorded significantly higher bunch yield than the suckers collected from ratoon crop. However, the interaction between different aged suckers (explants) and source of sucker (plant/ratoon) was found to be non significant.

Effect of different weedicides on growth and yield of banana

The trail was laid out with the treatments viz., T_1- Butachlor (1-2 days immediately after planting) + Glyphosate (40, 80,120 days after planting) 1kg ai/ha ; T_2- Phenoxaprop ethyl (40, 80,120 days after planting) 56 g ai/ha ; T_3- Quizalofop ethyl (40, 80,120 days after planting) 50 g ai/ha ; T_4: Propaquizafop (40, 80,120 days after planting) 50 g ai/ha ; T_5- Phenoxaprop ethyl, 56 g ai/ha (40 DAP) + Quizalofop ethyl 50 g ai/ha (80 DAP) + Propaquizafop, 50 g ai/ha (120 DAP); T6- Control (No weeding); T_7- Butachlor (1-2 days immediately after planting) + Manual weeding at 40 days interval up to 6 MAP ; T_8- Complete manual weeding.

In Plant crop, no significant difference was observed in growth parameters with application of weedicides at all stages of growth. However, at shooting stage higher girth was observed in T_5 and it was on par with other treatments except T_3 and T_6. Similarly with regards to leaf width, T_5 recorded higher values and it was on par with other treatments except T_1, T_3, T_4 and T_6. The yield was significantly highest in T_1.

In ratoon crop, no significant difference was observed in growth, yield and yield parameters except number of suckers.

MANGO

Horticultural Research Station, Darsi

Testing of promising varieties of mango

Eight varieties viz., Banganapalli.Totapuri, Imam Pasand, Suvarnarekha, Ratna, Navaneetham, Chinnarasam, Peddarasam and Ulavapadu mango were planted during 2012. Among all the varieties Toatapuri recorded more plant height (2.15 m), stem girth (20.75 cm) and more canopy spread (1.75 m-NS and 1.75 m-EW) followed by Cherukurasam

Mango Research Station, Nuzvid

Significantly highest number of fruits/tree (77.00), highest yield/tree (38.65 kg/tree), lowest incidence of thrips (2.9 thrips/panicle), hoppers (4.45 hoppers/panicle) and anthracnose (6.25%) were recorded when trees were centre opened, lightly pruned up to 2nd node followed by clipping of fruit stalks after harvest.

Two percent K_2SO_4 spray 30 days before harvest recorded highest fruit weight after 5 (206.33 g), 10 (190.06g) and 15 (180.23 g) days after harvest, lowest physiological loss of weight (PLW) after 5 (4.08), 10 (11.64) and 15 (16.12) days after harvest and lowest anthracnose infestation of 9.97 % at 15 DAH. Highest TSS (21.20^o Brix), total sugars (15.33 %), reducing sugars (3.98 %), non reducing sugars (11.35 %) and lowest titrable acidity (0.23 %) were also recorded in the same treatment i.e. spraying of 2% K_2SO_4 at 30 days before harvest of mango fruits cv. Kesar.

Two percent K_2SO_4 spray thrice starting from peanut stage followed by spraying at 15 days interval in Baneshan variety of mango recorded significantly highest number of fruits/tree (79.25), fruit weight (282.22 g), fruit yield (21.47 kg / tree),. TSS (21.15^o Brix), total sugars (14.65 %), reducing sugars (3.55 %), non reducing sugars (11.20 %) and lowest titrable acidity (0.08%)

Data on using low temperature to enhance shelf life in mango revealed that significantly highest initial fruit weight (354.2 g), fruit weight at 10 DAH (348.80 g), TSS (21.73^0 Brix), total sugars (12.09 %), reducing sugars (1.67%) and non reducing sugars (10.42%) and significantly lowest PLW (1.52 %) were recorded in treatment i.e. fruits harvested at maturity grown under organic farming. Significantly highest number of days for degreening (23.46 days) was recorded in organically grown fruits harvested at 6-7^0 Brix.

Horticultural College & Research Institute, Anantharajupeta

Standardization of stage wise irrigation schedules in mango cv. Baneshan

Table No.5 : Different stages of crop growing period and potential evaporation

State	Period	Stage wise water replenishment (% PE)					
		T_1	T_2	T_3	T_4	T_5	T_6
Stage-1	June-July	80	75	25	80	80	0
Stage-2	August-September	60	50	50	60	0	60
Stage-3	October-November	40	25	75	0	40	40
Stage-4	December-January	60	50	50	60	0	60
Stage5	February	80	75	25	80	80	0
Stage-6	March	40	25	75	0	40	40
Stage-7	April	80	75	25	80	80	0
Stage-8	May	40	25	75	0	40	40

Note: During different stages of crop growing period different % PE (% potential evaporation) losses are replenished. All schedules together with all water schedules for the entire stages together considered as one treatment. Like that five treatments are there.

Yield data pertaining to 2013-14 revealed that significant differences were noticed in fruit parameters. The drip schedule T_5 recorded maximum of all parameters viz., number of fruits per plant (134.67), average fruit weight (268.67 g), fruit yield (36.22 Kg/pl) and fruit yield (21.75 q/ac) followed by T_1. T_5 was found to be significantly superior over all other treatments followed by T_1. T_5 (23.25^o Brix) was found to be significantly superior over all other treatments followed by T6 (22.55^o B) with regard to quality of the fruits in terms of TSS.

Citrus Research Station, Petlur

Among the hybrids maximum number of fruits (243 / tree) was recorded in Swarna Jahangir weighing 90 kg closely followed by Neeleshan which yielded 216 fruits per tree. Among table varieties evaluated, Baneshan recorded 186 fruits per tree weighing 57 kg per tree. Pulihora yielded 305 fruits per tree and Banglora yielded 88 fruits per tree. No fruiting was observed in A.U.Rumani.

ACIDLIME

Horticultural Research Station, Darsi

Performance of Acid lime selections/varieties at HRS, Darsi

Six varieties *viz.*, Pramalini, Balaji, Petlur Selection-1, TAL 94/13, TAL-94/14 and RHRL-124 were planted during the year -2012. Among the acid lime varieties planted, TAL-94/14 recorded more plant height (1.97 m), stem girth (16.15 cm) and more canopy spread (1.95 m -NS and 1.75 m-EW) followed by TAL-94/13. The crop is at prebearing stage.

GUAVA

Horticultural Research Station, Darsi

An experiment was initiated to standardise training and pruning practices in hedge row planting. Two varieties *viz.*, Allahabad Safeda and Lalith were planted during the year 2010 and 2011 respectively. During this year, highest fruit yield of guava was recorded in H2 M3 i.e. plant height of 150 cm and pruning of 50 % current growth in the month of June and November (23.68 t/ha and 16.05 kg/plant) followed by H2 M4 i.e. plant height of 150 cm and pruning of 50 % current growth in the month of July and December (20.74 t/ha and 12.96 kg/plant) and lowest yield was observed in control (3.42 t/ha and 12.36 kg/plant).

SAPOTA

Horticultural Research Station, Venkataramannagudem

AICRP on Fruits

- Integrated nutrient management of sapota trees revealed that there were no significant difference in growth characters for all the treatments, while the plants receiving 10 kg vermicompost along with 350+160+450 g NPK/ plant/year recorded maximum number of fruits (2996), yield (210.10 kg/tree and 21.01 t/ha) and cumulative yield from 1999-2014 (117.2 t/ha).

Fertigation studies on sapota revealed that the plant height and canopy volume were non-significant in trees supplied with 300 g+338 g of N+K through fertigation (75% RDF)) while, significantly higher fruit number (1350), yield per tree (89.4 kg/tree and 32.64 t/ha) and maximum cumulative yield from 2006 to 2014 (32.64 $t.ha^{-1}$) was recorded in trees given with 100% recommended dose of N & K_2O ie. 400 g N +450 g K_2O through fertigation and P_2O_5 @ 200 g/plant/year through soil application.

Residual and cumulative effect of nutrients in sapota showed that maximum plant height (3.10 m), NS spread (3.3 m) and canopy volume (18.61 m^3) were recorded in trees given $1/8^{th}$ of RDF for 1 to 8 years while, trees supplied with $1/10^{th}$ of RDF for 1 to 10 years) resulted in maximum EW spread (3.18m).

Studies on stage wise supply of nutrients revealed that growth parameters were not significantly differing for different treatments. But 100% RDF, 25% N,100% P_2O_5 & 25% K_2O during June, 50% N & 50% K_20 during August, remaining 25% N & 25% K_2O during October application recorded maximum number of fruits (1889.8) and yield (130.7 kg/tree and 13.07 t/ha).

RAMBUTAN

Horticultural Research Station, Venkataramannagudem

Rambutan grafts of varieties CHES-1 and CHES-2 were collected from CHES, Chettalli to evaluate their performance under coastal climate (West Godavari conditions) of Andhra Pradesh and were planted during 2014.

PAPAYA

Horticultural Research Station, Venkataramannagudem

Different papaya varieties released from different institutes, were evaluated to know the performance and data revealed that maximum number of days (80) taken for flowering was observed in TFCP-1. Minimum number of days (68) taken for flowering was observed in TFCP-3 and TFCP-4. Maximum height at first bearing (66.52 cm) was observed in TFCP-2. Minimum height at first bearing (47.38 cm) was observed in TFCP-3. Maximum girth at first bearing (13.35 cm) and highest number of leaves (11.65) were observed in Red Lady. Minimum girth at first bearing (9.46cm) and number of leaves (8.65) were observed in TFCP-1. Highest yield/plant and fruits/plant were obtained in check Red Lady (341.45 kg). Among the varieties tested, TFCP-2 and TFCP-1 recorded highest fruit number (169) and yield (167.08 Kg/ tree) respectively.

Horticultural College & Research Institute, Anantharajupeta

Evaluation of papaya *(Carica papaya)* varities

The yield characters revealed that maximum yield (98.68 kg/plant) was obtained in Red Lady variety where as the minimum was with Arka Surya. The quality parameters like TSS (14.21^0 Brix), ascorbic acid (21537 mg/100g) and total sugars (13.15%) were highest in Red Lady ,but Arka surya also produced better quality fruits competent with Red Lady.

SWEET ORANGE

Horticultural Research Station, Darsi

Organic cultivation of sweet orange

Nine treatments were imposed and the trial was initiated during the year 2012. No significant difference was observed among different treatments in vegetative characters. However more plant height (1.95m) was observed in T_2 (Transported soil +RDF), T_5 (Application of 100 % Vermicompost) and T_9 (20% FYM+20% vermicompost+20% Neem cake+20% fly ash+20% Karanja cake) and more stem girth (15.95 cm) was noticed in T_8 (Application of Enriched coir).

Citrus Research Station, Tirupati

Orchard efficiency analysis in sweet orange

Ninety five sweet orange orchards of YSR Kadapa district, Nalgonda, Nellore and Ananthapuramu districts in Andhra Pradesh were surveyed from 2009-10 to 2013-14 and the data regarding yield and fruit quality along with the soil nutrient analysis data has been compiled and submitted to NRCC, Nagpur during 2014-15 to develop DRIS norms for sweet orange growing orchards.

Table-5: Partitioning of fruit yield in relation to different soil properties (n=95)

Fruit Yield (t/ha)	pH	Ec (dS/m)	OC (%)	P_2O_5 (kg/ha)	K_2O (kg/ha)
6-11 (n=13)	8.29	0.42	0.51	26.53	304.46
12-17 (n=32)	8.12	0.70	0.57	21.37	251.25
18-23 (n=20)	7.94	0.58	0.63	25.20	243.75
24-29 (n=19)	7.71	0.45	0.74	35.89	415.68
30-35 (n=10)	7.82	0.60	0.82	31.90	354.40
36-41 (n=1)	7.40	0.70	1.20	42.00	320.00
Fruit Yield (t/ha)	Fe (mg/kg)	Zn (mg/kg)	Mn (mg/kg)	Cu (mg/kg)	
6-11 (n=13)	7.28	0.75	15.03	1.93	
12-17 (n=32)	11.89	1.26	18.77	2.14	
18-23 (n=20)	14.70	1.98	21.52	2.15	
24-29 (n=19)	23.11	1.79	25.00	1.89	
30-35 (n=10)	25.05	1.89	24.25	1.82	
36-41 (n=1)	29.00	1.78	25.00	1.62	
Fruit Yield (t/ha)	Weight (g/fruit)	Juice (%)	TSS (%)	Acidity (%)	
6-11 (n=13)	171.38	35.00	9.73	1.18	
12-17 (n=32)	176.78	37.34	10.21	1.06	
18-23 (n=20)	181.35	37.50	11.04	1.03	
24-29 (n=19)	172.57	37.78	10.26	0.84	
30-35 (n=10)	190.40	39.00	11.36	0.89	
36-41 (n=1)	200.00	35.00	10.60	0.90	

Irrigation schedule with 80% evaporation rate uniformly during all the growth stages recorded significantly maximum number of fruits (210 fruits/tree), fruit weight (202.33 g.), fruit yield (42.36 kg/plant) and better quality fruits (0.55% acidity and 13.17^0 Brix) in sweet orange.

The soil test values in low yielding orchards were pH: of 8.24, EC: of 1.08 ds/m, OC: of 0.34%, P_2O_5 16.24 kg/ha, K_2O 211 kg/ha, Fe 3.97 mg/kg, Zn 0.46 mg/kg, Mn 13.28 mg/kg and Cu 1.5 mg/kg with a fruit yield of 8.35 t/ha, fruit weight of 170.93 g, 36.43 % juice, 9.44^o Brix TSS and 1.45% acidity. These values were contrastingly different in high yielding orchards with 0.74 % OC, 30.60 kg/ha P_2O_5, 348.89 kg/ha K_2O, 21.73 mg/kg Fe, 1.90 mg/kg Zn, 23.60 mg/kg Mn and 1.89 mg/kg Cu with a fruit yield of 25.36 t/ha, fruit weight of 181.35g, 38.25% juice, 10.65^o Brix TSS and 0.97% acidity (Table-6 & 7).

Table-6: Partitioning of different soil properties in relation to fruit yield

Yield Class (tons/ha)	Yield (t/ha)	Soil Properties								
		pH	Ec (ds/m)	OC (%)	P_2O_5 (kg/ha)	K_2O (kg/ha)	Fe (mg/kg)	Zn (mg/kg)	Mn (mg/kg)	Cu (mg/kg)
Low (<9.5)	8.35	8.24	1.08	0.34	16.24	211.00	3.97	0.46	13.28	1.5
Optimum (9.6-18)	14.16	8.04	0.65	0.59	21.83	255.58	10.90	1.20	18.05	2.13
High (>18.1)	25.36	7.78	0.51	0.74	30.60	348.89	21.73	1.90	23.60	1.89

Table-7: Partitioning of different fruit quality parameters in relation to fruit yield

Yield Class (tons/ha)	Soil Properties				
	Weight (g)	Juice (%)	TSS (^{o}Brix)	Acidity (%)	Yield (t/ha)
Low (<9.5)	**170.93**	**36.43**	**9.44**	**1.45**	**8.35**
Optimum (9.6-18)	**178.51**	**37.64**	**10.19**	**1.09**	**14.16**
High (>18.1)	**181.35**	**38.25**	**10.65**	**0.97**	**25.36**

DRIS-based soil nutrient norms predicted the optimum values of 0.70-0.92 % OC, 27.46-41.96 kg/ha P_2O_5, 232.51-303.11 kg/ha K_2O, 13.13-25.80 mg/kg Fe, 0.95-1.18 mg/kg Zn, 18.13-29.22 mg/kg Mn and 1.12- 2.13mg/kg Cu in relation to optimum fruit yield of 21.23-39.15 t/ha. These values in order to obtain a fruit yield of 39.16-58.29 t/ha as high yield, different soil test values would be required to be maintained. These values comprises of 0.93-1.18 % OC, 41.97-54.10 kg/ha P_2O_5, 301.12-457.10 kg/ha K_2O, 25.81-41.32 mg/kg Fe, 1.19-2.11 mg/kg Zn, 29.23-41.45 mg/kg Mn and 2.14- 3.16 mg/kg Cu (Table-8). A soil testing program, thus, can identify areas which are either under or over-fertilized to enable more efficient use of fertilizers.

Distribution of soil fertility constraints in sweet orange orchards was surveyed and compared with DRIS norms developed for Sathgudi sweet orange (Citrus sinensis (L) osbeck) revealed that 22.11 % of the surveyed orchards were deficient in zinc, 20 % of the orchards were deficient in Iron, and 18.95% were deficient in organic carbon.

Table-8: Soil fertility norms (derived from DRIS based analysis) developed for Sathgudi sweet orange (*Citrus sinensis* (L) osbeck) orchard in Andhra Pradesh

Parameter	DRIS norms				
	Deficient	Low	Optimum	High	Excess
OC (%)	< 0.42	0.42 -0.69	0.70-0.92	0.93-1.18	> 1.18
P2O5 (kg/ha)	< 16.12	16.12- 27.45	27.46-41.96	41.97-54.10	>54.10
K2O (kg/ha)	< 181.10	181.10-232.50	232.51- 303.11	301.12- 457.10	> 457.10
Fe (mg/kg)	< 6.02	6.02- 13.12	13.13-25.80	25.81-41.32	> 41.32
Zn (mg/kg)	< 0.68	0.68- 0.94	0.95- 1.18	1.19-2.11	> 2.11
Mn (mg/kg)	< 11.02	11.02-18.12	18.13- 29.22	29.23-41.45	> 41.45
Cu (mg/kg)	< 0.89	0.89- 1.11	1.12- 2.13	2.14-3.16	> 3.16
Fruit Yield (t/ha)	< 11.10	11.10-21.22	21.23-39.15	39.16-58.29	> 58.29

The frequency distribution of soil fertility constraints were diagnosed, which revealed 22.11% of the surveyed orchards were deficient in zinc, 20% of the orchards were deficient in Fe, 18.95 % of the orchards were deficient in K_2O and 17.90% of the orchards were deficient in organic carbon. On the other hand, 72.63% of the orchards displayed optimum level of Cu followed by 64.21% of the orchards optimum in Mn, 45.26% of the orchards optimum in Fe, 33.69% of the orchards optimum in P_2O_5 and 32.64% of the orchards optimum in organic carbon. Such soil fertility indexing would serve as a ready reckoner with regard to soil fertility evaluation and establishing the fertilizer doses (Table-9).

Table-9:Frequency distribution of soil fertility constraints in Sathgudi sweet orange *(Citrus sinensis* (L) osbeck) orchards in Andhra Pradesh

Parameter	Percentage frequency distribution				
	Deficient	Low	Optimum	High	Excess
OC (%)	17(17.90)	39(41.05)	31(32.64)	5(5.26)	3(3.15)
P2O5 (kg/ha)	11(11.58)	43(45.26)	32(33.69)	8(8.42)	1(1.05)
K2O (kg/ha)	18(18.95)	9(9.47)	29(30.53)	30(31.58)	9(9.47)
Fe (mg/kg)	19(20.00)	23(24.21)	43(45.26)	10(10.53)	0(0.00)
Mn (mg/kg)	2(2.10)	29(30.53)	61(64.21)	03(3.16)	0(0.00)
Cu (mg/kg)	0(0.00)	0(0.00)	69(72.63)	21(22.11)	5(5.26)
Zn (mg/kg)	21(22.11)	11(11.58)	2(2.10)	48(50.53)	13(13.68)
Fruit Yield (t/ha)	13(13.68)	49(51.58)	33(34.74)	0(0.00)	0(0.00)

*Figures in the parenthesis indicate percentage

Evaluation of Promising Root Stocks in Sweet orange

Among nine root stocks evaluated, Sathgudi sweet orange (Table-10) on rough lemon showed favorable growth characters (plant height 1.50 m, scion girth 19.67 cm and NS: 1.36m) followed by Rangpur lime (canopy volume 1.50 m^3) and NRCC Root stock- 4(1.35 m^3).

Table-10: Performance of promising rootstocks in sweet orange

Root stocks	Plant height(m)	Scion girth (cm)	Canopy spread(m)		Canopy volume (m^3)
			E-W	N-S	
NRCC Root stock-2	1.16	14.64	1.06	1.19	0.76
NRCC Root stock- 4	1.36	18.67	1.30	1.32	1.35
NRCC Root stock- 5	1.22	13.00	0.93	0.92	0.58
NRCC Root stock-6	1.26	17.78	1.10	1.16	0.87
CRH-12*	0.80	7.33	0.63	0.60	0.16
Alemow*	0.63	7.00	0.50	0.50	0.08
Rangpur lime	1.45	18.00	1.42	1.33	1.50
Rough Lemon	1.50	19.67	1.35	1.36	1.42
Australian Sour Orange	1.47	15.78	1.37	1.14	1.23
CD (0.05)	0.32	4.27	0.30	0.35	0.72
SE(m)±	0.10	1.41	0.10	0.12	0.24
C.V.	14.98	16.68	15.94	18.93	46.63

***Recently budded (April, 2014)**

Integrated Nutrient Management in Citrus (Sweet orange): Proposed for conclusion (2006-2014)

Results indicated that there was no significant difference with respect to the vegetative growth parameters (plant height and canopy volume) with different bio-fertilizers (Table 11). However, number of fruits per plant (425 fruits/plant) and fruit yield (28.14 t/ha) recorded were highest with the inclusion of biofertilizer AM @ 500 g/plant + PSB @ 100 g/plant + *Azospirillum* @ 100 g/plant + *T. harzianum* at 100 g/plant along with 75% RDF followed by application of AM @ 500 g/plant + PSB @ 100 g/plant + *Azospirillum* @ 100 g/plant + *T. harzianum* @ 100 g/plant along with complete dose of RDF (398 fruits/plant and 23.92 t/ha). The lowest number of fruits per plant (330 fruits/plant) and fruit yield (16.15 t/ha) was obtained with soil application of 1500 g N: 350 g P_2O_5: 400 g K_2O/plant/year (100 % RDF). Soil application of 75 % RDF + AM (500 g/plant) + PSB (100 g/plant) + *Azospirillum* (100 g/plant) + *T. harzianum* (100 g/plant) also recorded the best quality fruits (Juice 40.51%, TSS 10.11° Brix and acidity 0.98%). The results clearly indicated that the biofertilizers are essential for higher yields and good quality in sweet orange along with 75% RDF.

The benefit cost ratio was higher under 75% RDF + AM (500 g/plant) + PSB (100 g/plant) + *Azospirillum* (100 g/plant) + *T.harzianum* (100g/plant) which could be attributed to increased number of fruits per plant. But the treatment 50% RDF + AM (500 g/plant) + PSB (100 g/plant) + *Azospirillum* (100 g/plant) + *T. harzianum* (100 g/plant) (2.21) has also recorded the same benefit cost ratio which is particularly attributed to reduced quantity of fertilizers (50% RDF). Sweet orange grower can get higher income per rupee invested by adopting 75% RDF + AM (500 g/plant) + PSB (100 g/plant) + *Azospirillum* (100 g/plant) + *T.harzianum* (100 g/plant) treatment at field level.

Soil application of 75 % Recommended Dose of Fertilizers along with Arbuscular mycorrhiza @ 500 g/plant + PSB @ 100 g/plant + Azospirillum @ 100g /plant and T.harzianum @ 100 g/plant was found to be a suitable solution for increased production as well as fruit quality in sweet orange. The treatment has given highest cost benefit ratio (1: 2.25) there by reducing the fertilizer input cost.

Table-11: Effect of bio-fertilizers on growth, yield and quality of sweet orange (2006-2014)

Treat-ments	Plant height (m)	Scion girth (cm)	Canopy volume (m3)	Fruits/ tree	Fruit weight (g)	Fruit yield (kg tree)	Fruit yield (kg tree)	Juice (%)	Acidity (%)	TSS (0)	BC ratio
T_1	2.77	38.03	22.24	329.76d	189.73	61.33	16.15c	41.24a	0.99	9.84c	1.51
T_2	2.76	37.15	21.62	387.17bc	187.79	73.26	21.81ab	36.73b	0.95	9.89bc	1.75
T_3	2.80	37.34	21.39	397.58b	178.98	73.07	23.92ab	37.27b	1.07	10.00ab	1.71
T_4	2.73	38.74	23.04	425.00a	178.08	79.51	28.14a	40.51a	0.98	10.11a	2.25
T_5	2.82	37.09	20.32	355.96cd	186.97	67.35	20.16bc	40.70a	1.03	9.90bc	2.21
LSD 0.05	NS	NS	NS	0.82	NS	NS	0.63	1.56	NS	0.15	–
CV%	6.54	2.90	7.32	4.63	4.04	13.03	8.88	3.93	3.89	0.80	–

T_1: Recommended dose of NPK (RDF) Control. (1500g N: 350g P2 O5: 400 g K2 O/ plant/year)

T_2: T_1+ AM (500g /plant) + PSB (100 g/plant) + *Azospirillum* (100g /plant)

T_3 : T_2+ T. harzianum (100g/plant)

T_4: 75% RDF +AM(500g /plant)+ PSB (100 g/plant)+ *Azospirillum* (100g /plant)+ *T.harzianum* (100g/plant)

T_5: 50% RDF+AM (500g /plant) + PSB (100 g/plant)+ *Azospirillum* (100g /plant)+ *T.harzianum* (100g/plant)

Proposed for conclusion and the technology is ready for recommendation

Soil application of 75% RDF along with AM @ 500 g/plant + PSB @ 100 g/plant + *Azospirillum* @ 100 g/plant and *T.harzianum* @ 100g/plant was found to be a sustainable solution for increased production as well as fruit quality in sweet orange . The treatment has also given the highest cost benefit ratio (2.25) there by reducing the fertilizer input cost.

Studies on residual and cumulative effects of nutrients in sweet orange

Individual and interaction effects of nutrient levels and nutrient doses on growth parameters of five years old Sathgudi sweet orange plants were non-significant (Table-12). During initial years, vegetative growth showed an increased response to fertilization (from A_1 to A_3).

Table-12: Effect of age wise nutrient levels on growth of sweet orange

Treatments	Plant height(m)	Scion girth (cm)	Canopy spread(m)		Canopy volume (m^3)
			E-W	N-S	
A_1B_1	1.60	18.83	1.45	1.41	1.81
A_1B_2	1.46	19.17	1.30	1.26	1.25
A_1B_3	1.54	20.50	1.53	1.63	2.02
A_2B_1	1.63	19.58	1.33	1.44	1.64
A_2B_2	1.47	37.08	1.58	1.58	1.94
A_2B_3	1.57	18.36	1.46	1.40	1.74
A_3B_1	1.55	20.00	1.42	1.51	1.76
A_3B_2	1.40	20.58	1.40	1.43	1.57
A_3B_3	1.47	20.58	1.38	1.39	1.47

Treatments	Plant height(m)	Scion girth (cm)	Canopy spread(m)		Canopy volume (m^3)
			E-W	N-S	
CD@5%	NS	NS	NS	NS	NS
SE(m)	0.11	5.09	0.15	0.10	0.32
C.V.	12.62	40.73	18.15	11.99	32.84
A_1: 1/10 of RDF for 10 years A_2: 1/8 of RDF for 8 years A_3: 1/6 of RDF for 6 years RDF: 1500:350:400g N:P2O5: K2O/plant /year			B_1: 100% RDF after 10 years B_2: 80% RDF after 8years B_3: 60% RDF after 6 years		

Standardization of stage wise requirement of nutrients in sweet orange

Stage wise application of nutrients has no significant influence on the plant growth of seven years old sweet orange plants (Table-13). The treatment 0:0:0, 30:40:0, 30:35:0, 40:25:30, 0:0:35, 0:0:35 percent RDF of N:P_2O_5: K_2O for stages I to VI, respectively, recorded maximum number of fruits (219 fruits/plant) and yield (40.14 kg/plant), whereas highest fruit weight (201g) was recorded in T_1 (0:0:0, 40:50:0, 40:50:0, 20:0:50, 0:0:25, 0:0:25).

Table-13: Effect of age wise nutrient levels on growth of sweet orange

Treatments	Plant height(m)	Scion girth (cm)	Canopy spread(m)		Canopy volume (m3)
			E-W	N-S	
A_1B_1	1.60	18.83	1.45	1.41	1.81
A_1B_2	1.46	19.17	1.30	1.26	1.25
A_1B_3	1.54	20.50	1.53	1.63	2.02
A_2B_1	1.63	19.58	1.33	1.44	1.64
A_2B_2	1.47	37.08	1.58	1.58	1.94
A_2B_3	1.57	18.36	1.46	1.40	1.74
A_3B_1	1.55	20.00	1.42	1.51	1.76
A_3B_2	1.40	20.58	1.40	1.43	1.57
A_3B_3	1.47	20.58	1.38	1.39	1.47
CD@5%	NS	NS	NS	NS	NS
SE(m)	0.11	5.09	0.15	0.10	0.32
C.V.	12.62	40.73	18.15	11.99	32.84
A_1: 1/10 of RDF for 10 years A_2: 1/8 of RDF for 8 years A_3: 1/6 of RDF for 6 years RDF: 1500:350:400g N:P2O5: K2O/plant /year			B_1: 100% RDF after 10 years B_2: 80% RDF after 8years B_1: 60% RDF after 6 years		

Standardization of stage wise requirement of nutrients in sweet orange

Stage wise application of nutrients has no significant influence on the plant growth of seven years old sweet orange plants (Table-14). The treatment 0:0:0, 30:40:0, 30:35:0, 40:25:30, 0:0:35, 0:0:35 percent RDF of N:P_2O_5: K_2O for stages I to VI, respectively, recorded maximum number of fruits (219 fruits/plant) and yield (40.14 kg/plant), whereas highest fruit weight (201g) was recorded in T_1 (0:0:0, 40:50:0, 40:50:0, 20:0:50, 0:0:25, 0:0:25).

Table-14: Effect of stage wise application of nutrients on growth and yield of sweet orange

Treatment	Plant height (m)	Stem girth (cm)	Canopy spread (m)		Canopy volume (m3)	Fruits /plant	Fruit weight (g)	Yield (kg/ tree)	Yield (t/ha)
			E-W	N-S					
T_1	2.52	33.32	3.06	3.15	12.88	156.60	201.00	31.43	8.71
T_2	2.55	34.65	3.01	3.13	12.92	146.40	187.60	27.44	7.60
T_3	3.00	41.07	3.31	3.45	18.22	219.40	183.20	40.14	11.12
T_4	2.45	36.80	3.04	2.99	11.79	170.00	191.60	32.47	9.00
CD@5%	**NS**	**NS**	**NS**	**NS**	**NS**	**47.37**	**7.81**	**8.52**	**2.36**
SE(m)±	**0.142**	**1.867**	**0.154**	**0.124**	**1.638**	**15.203**	**2.506**	**2.734**	**0.757**
CV%	**12.10**	**11.45**	**11.12**	**8.71**	**26.24**	**19.639**	**2.937**	**18.598**	**18.581**

T_1 = 0:0:0, 40:50:0,40:50:0,20:0:50,0:0:25,0:0:25

T_2= 0:0:0,30:40:10,30:35:10, 20:25:30, 10:0:25,10:0:25

T_3=0:0:0,30:40:0,30:35:0,40:25:30,0:0:35,0:0:35 Percent RDF

T_4= Control RDF (1500 N:350 P2O5 : 400 K2O g/plant)

Fruit quality parameters were non-significant at all the stages (Table-14). While, maximum TSS (10.50^0 Brix), juice (41.40%) and low acidity (0.64) were recorded in the treatment 0:0:0, 30:40:0,30:35:0,40:25:30,0:0:35,0:0:35 percent RDF of N:P_2O_5: K_2O for stages I to VI.

Table-15: Effect of stage wise application of nutrients on fruit quality of sweet orange

Treatments	TSS (0 Brix)	Juice (%)	TSS/ Acid	Acidity (%)
T_1	9.80	40.40	0.69	14.67
T_2	10.06	39.20	0.68	14.90
T_3	10.50	41.40	0.64	16.83
T_4	10.14	40.80	0.67	15.29
CD@5%	**NS**	**NS**	**NS**	**NS**
SE(m)±	**0.169**	**0.718**	**0.13**	**0.813**
CV%	**2.041**	**4.067**	**6.193**	**7.889**

Organic production of sweet orange

The results (Table-15) revealed that non significant differences were recorded for different organic packages with respect to growth parameters of 3 year old Sathgudi sweet orange budlings.

Table-16: Effect of organic manures and bio-agents on plant growth of Sweet orange

Treatments	Plant height(m)	Scion girth (cm)	Canopy Spread (m)		Canopy volume (m^3)
			EW	NS	
T_1	1.43	19.92	1.34	1.45	1.51
T_2	1.38	20.33	1.28	1.40	1.33
T_3	1.31	20.34	1.37	1.43	1.42
T_4	1.38	19.92	1.31	1.44	1.36
T_5	1.36	20.67	1.50	1.53	1.66
CD@5%	**NS**	**NS**	**NS**	**NS**	**NS**
SE(m)±	**0.082**	**1.392**	**0.094**	**0.136**	**0.276**
CV%	**11.91**	**13.76**	**13.91**	**18.71**	**37.87**

T_1: Control (750N: 350P_2O_5:400 g K_2O + 40 Kg FYM + 8 kg Neem cake /plant/year) + Inorganic plant protection. T_2: 100 % Vermicompost (On N-equivalent basis of RDF). T_3: 75 % Vermicompost (On N-equivalent basis of RDF) + *Trichoderma harzianum* (30 - 40 ml/plant) + Azadirachtin (1% at 3 - 4 ml/litre as spray). T_4: T_3+ *Pseudomonas fluorescence* (30 - 40 ml/plant). T_5: 50% Vermicompost (On N-equivalent basis of RDF) + *Trichoderma harzianum* (30- 0 ml/plant) + Azadirachtin (1% at 3-4 ml/litre as spray) + *Pseudomonas fluorescence* (30-40 ml/plant) + *Azotobacter chroococcum* (30 - 40 ml/plant).

The soil samples collected during 2012-13were sent to NRRC, Nagpur to develop crop and location specific microbes

Native isolate counts were as follows:

Azotobacter chroococcum : 6 x 106 (cfu/ml)

Pseudomonas flourescens : 98 x 106 (cfu/ml)

Trichoderma harzianum : 12 x 106 (cfu/ml)

Identification of critical stage of water requirement in sweet orange

It is evident that the irrigation schedules (Table-16&17) has not significantly influenced the plant growth of eight years old sweet orange during 2014-15. Irrigation at 80% ER uniformly during all the growth stages (T_7) recorded significantly maximum number of fruits (210 fruits/plant), fruit weight (202.33 g) and fruit yield (42.36 kg/plant, 11.73 t/ha) and better quality fruits (0.55 % acidity and 13.17^0 Brix). Treatment T_4 (30 % ER at IV stage) was effective as T_7 for yield (9.37 t/ha), fruit number (196 fruits/plant) and fruit quality (0.54 % acidity and 12.17 0 Brix).

Table-17: Effect of water requirement at critical stages on growth and yield of Sweet orange

Treatments	Plant height (m)	Scion girth (cm)	Canopy volume (m^3)	Fruits /tree	Fruit weight (g)	Fruit yield (kg/ tree)	Fruit yield (t/ha)
T_1	2.65	43.50	18.79	162.07	176.00	28.52	7.90
T_2	2.95	45.63	22.38	161.50	183.67	29.66	8.21
T_3	2.81	42.63	20.74	141.67	184.33	26.12	7.23
T_4	2.75	43.31	19.87	172.83	195.67	33.82	9.37
T_5	3.02	42.38	25.68	158.67	173.00	27.44	7.60

Treatments	Plant height (m)	Scion girth (cm)	Canopy volume (m^3)	Fruits /tree	Fruit weight (g)	Fruit yield (kg/ tree)	Fruit yield (t/ha)
T_6	2.87	41.77	21.29	167.73	184.33	30.86	8.55
T_7	2.77	43.94	21.49	209.67	202.33	42.36	11.73
CD @ 5%	**NS**	**NS**	**NS**	**32.71**	**6.13**	**6.07**	**1.68**
SE(m)±	**0.146**	**2.277**	**2.357**	**10.50**	**1.97**	**1.95**	**0.54**
CV%	**10.349**	**10.517**	**21.964**	**10.84**	**1.84**	**10.79**	**10.78**

T_1 (30-80-80-80-80-80% ER), T_2 (80-30-80-80-80-80% ER), T_3 (80-80-30-80-80-80% ER), T_4 (80-80-80-30-80-80% ER), T_5 (80-80-80-80-30-80% ER), T_6 (80-80-80-80-80-30% ER) and T_7 (80-80-80-80-80-80% ER)

Table-18: Effect of water requirement at critical stages on fruit quality of sweet orange

Treatments	TSS (0 Brix)	Juice (%)	TSS/ Acid	Acidity (%)
T_1	39.60	0.59	10.28	17.46
T_2	38.93	0.63	9.67	16.12
T_3	39.10	0.59	10.75	18.15
T_4	41.27	0.54	12.17	23.04
T_5	37.33	0.77	10.00	13.02
T_6	38.60	0.66	11.10	17.74
T_7	40.60	0.55	13.17	24.18
CD@5%	**NS**	**NS**	**1.78**	**4.649**
SE(m)±	**0.85**	**0.23**	**0.57**	**1.492**
CV%	**3.80**	**8.72**	**5.11**	**10.21**

T_1 (30-80-80-80-80-80% ER), T_2 (80-30-80-80-80-80% ER), T_3 (80-80-30-80-80-80% ER), T_4 (80-80-80-30-80-80% ER), T_5 (80-80-80-80-30-80% ER), T_6 (80-80-80-80-80-30% ER) and T_7 (80-80-80-80-80-80% ER)

Standardization of stage wise water requirement in sweet orange

Stage wise water application has no significant influence on plant growth of eight years old sweet orange at Tirupati (Table-18). Irrigation at 80% ER (T_4) for all the six stages is recommended for higher fruit yield (188 fruits/ plant, 10.05 t/ha) with good quality parameters (Juice 42.75%, TSS 12.5° Brix with minimum acidity 0.63 %) followed by treatment T_3 (60-80-60-80-60-80% ER). The reduction in irrigation from 80% ER to 30% ER during any stage resulted in reduction in yield from 10.05 t/ha to 6.56 t/ha.

Table-19: Effect of stage wise application of irrigation water on growth, yield and quality of sweet orange

Treat ment	Plant height (m)	Stem girth (cm)	Canopy volume (m^3)	Fruits /tree	Fruit weight (g)	Fruit yield (t/ha)	Juice (%)	TSS (0Brix)	Acidity (%)
T_1	2.38	38.24	14.85	153.04	174.60	7.41	39.50	10.50	0.77
T_2	2.81	41.48	18.23	158.81	181.60	7.99	40.75	10.75	0.74
T_3	2.55	37.33	15.99	165.00	196.10	8.93	41.25	11.50	0.68
T_4	2.82	40.33	16.94	187.69	193.60	10.05	42.75	12.50	0.63
T_5	2.69	43.84	17.03	138.19	171.10	6.56	38.00	10.50	0.86
CD @ 5%	**NS**	**NS**	**NS**	**29.60**	**10.01**	**1.41**	**NS**	**NS**	**0.47**
SE(m)±	**0.11**	**2.68**	**1.77**	**9.50**	**3.21**	**0.45**	**0.72**	**0.49**	**0.15**
CV%	**8.12**	**13.34**	**21.36**	**13.44**	**4.54**	**0.64**	**3.67**	**5.09**	**6.19**

T_1 : 30-40-30-40-30-40 % ER, T_2 : 40-60-40-60-40-60% ER, T_3 : 60-80-60-80-60-80% ER, T_4 : 80-80-80-80-80-80 % ER and T_5 : 30-30-30-30-30-30% ER

Nutrient management under High Density Planting in sweet orange

The interaction effect of spacing and nutrition was significant on the growth parameters of seven years old sweet orange plants (Table-19). Treatment S3L1 with spacing (6x4m) and 75% N from inorganic source along with 25% N from organic source (FYM) and 2.2 kg SSP and 0.75 kg MOP per plant per year recorded maximum plant height (2.73 m), canopy volume (12.06 m^3)and highest fruit yield (35.85 kg/plant, 14.91 t/ha) against control S_1L_3 with the spacing of 6x6 m and 100 % RDF(canopy volume 5.95 m^3 and fruit yield-21.49 kg/plant).

Table-20: Effect of different spacings and nutrient levels on growth and yield and yield attributes of Sweet orange

Treat ments	Plant height (m)	Stem girth (cm)		Scion Girth (cm)	Canopy Volume (m^3)	Fruits / tree	Fruit weight (g)	Fruit yield (kg/tree)	Fruit yield (t/ha)
		E-W	N-S						
T_1 (S_1 L_1)	2.42	2.79	2.89	37.25	10.33	142	167.33	23.65	6.55
T_2 (S_1 L_2)	2.28	2.87	3.00	36.17	10.29	165	165.67	27.26	7.55
T_3 (S_1 L_3)	2.39	2.90	2.96	38.33	10.75	128	169.67	21.49	5.95
T_4 (S_2 L_1)	2.08	2.23	2.28	30.92	5.60	142	177.67	25.14	8.37
T_5 (S_2 L_2)	2.45	2.41	2.37	33.25	7.38	135	180.00	24.16	8.04
T_6 (S_2 L_3)	2.18	2.20	2.38	33.25	5.97	120	178.67	21.31	7.09
T_7 (S_3 L_1)	2.73	2.89	2.89	36.58	12.06	187	192.67	35.85	14.91
T_8 (S_3 L_2)	2.72	2.76	2.79	35.83	11.03	159	184.00	29.12	12.12
T_9 (S_3 L_3)	2.49	2.84	2.73	35.00	10.15	122	175.67	21.17	8.81
CD @ 5%	**0.38**	**0.29**	**0.32**	**3.14**	**3.01**	**12.64**	**10.26**	**3.12**	**1.38**
SE(m)±	**0.125**	**0.095**	**0.107**	**1.038**	**0.996**	**4.181**	**3.394**	**1.031**	**0.457**
C.V.	**8.985**	**6.202**	**6.866**	**5.112**	**18.571**	**5.013**	**3.325**	**7.014**	**8.968**

S_1- (6x6 m= 277 plants/ ha); S_2- (6x5 m= 333 plants/ha); S_3- (6x4 m= 416 plants/ha) L_1-75%N (Inorganic) + 25%N (Organic -FYM) +100% P&K inorganic; L_2-50% N (Inorganic)+ 50% N (Organic- vermicompost) +100% P&K inorganic; L_3-100% In-organic only (1500g N: 350g P2 O5: 400 g K2 O/ plant/year).

Table-21: Effect of different spacing and nutrient levels on physico-chemical properties of sweet orange fruits

Treatments	TSS (0 Brix)	Juice (%)	TSS/ Acid	Acidity (%)
Treatments	Juice (%)	TSS (° Brix)	Acidity (%)	TSS/Acid
T_1 (S_1 L_1)	30.40	10.38	0.64	16.32
T_2 (S_1 L_2)	35.40	10.58	0.60	17.75
T_3 (S_1 L_3)	32.40	10.48	0.63	16.74
T_4 (S_2 L_1)	37.57	11.08	0.58	19.23
T_5 (S_2 L_2)	33.73	10.88	0.57	19.01
T_6 (S_2 L_3)	36.73	10.65	0.61	17.48
T_7 (S_3 L_1)	39.00	10.68	0.56	19.21
T_8 (S_3 L_2)	40.40	11.48	0.53	21.82
T9 (S_3 L_3)	36.07	10.78	0.59	18.18
CD @ 5%	**1.19**	**0.007**	**0.03**	**0.213**
SE(m)±	**0.392**	**0.002**	**0.010**	**0.070**
C.V.	**1.851**	**0.022**	**0.413**	**0-481**

S_1- (6x6 m= 277 plants/ ha); S_2- (6x5 m= 333 plants/ha); S_3- (6x4 m= 416 plants/ha)

L_3-75%N (Inorganic + 25%N (Organic – FYM) +100% P&K inorganic; L_2-50% N (Inorganic)+ 50% N (Organic-Vermicompost) +100% P&K inorganic; L_3-100% In-organic only (1500g N: 350g P2 O5: 400 g K2 O/ plant/year)

Studies on Irrigation and Nutrient Interaction in sweet orange

Interaction effect of irrigation and nutrition in 8 year old sweet orange plants (Table-21) has not influenced the plant growth significantly during third year after imposing treatments. Irrigation at 90% ER and fertigation at 60 % RDF has given significantly more number of fruits (196 fruits /plant), fruit yield (11.26 t/ha) with medium TSS content (13.47° Brix). Whereas, application of 90% ER and fertigation with 80 % RDF recorded significantly highest fruit weight (212 g) with high juice (44.07 %) and TSS (13.47° Brix). Minimum growth and yield values have been recorded when plants were irrigated at 70% ER with fertigation of 60% RDF (T_1).

Table-22: Effect of irrigation schedule and fertigation on growth and yield of sweet orange

Treat ments	Plant height (m)	Stem girth (cm)	Canopy Volume (m3)	Fruits/ tree	Fruit weight (g)	Fruit yield (t/ ha)	Juice (%)	Acidity (%)	TSS (0 Brix)
T_1- I_1F_1	2.41	36.42	9.72	133.45	181.00	6.69	40.13	0.62	9.97
T_2- I_1F_2	2.66	36.53	12.81	149.15	188.67	7.80	41.73	0.51	10.58
T_3- I_1F_3	2.39	36.58	10.88	151.77	189.33	7.98	41.40	0.51	10.30
T_4- I_2F_1	2.31	35.75	9.68	164.85	199.00	9.10	42.73	0.39	11.63
T_5- I_2F_2	2.48	37.94	12.06	157.00	197.33	8.61	42.40	0.48	11.05
T_6- I_2F_3	2.58	40.03	13.39	154.91	200.67	8.63	41.40	0.44	11.40
T_7- I_3F_1	2.74	40.36	16.50	196.25	207.33	11.26	43.40	0.40	11.80

Treat ments	Plant height (m)	Stem girth (cm)	Canopy Volume (m^3)	Fruits/ tree	Fruit weight (g)	Fruit yield (t/ ha)	Juice (%)	Acidity (%)	TSS (0 Brix)
T_8- I_3 F_2	2.48	36.97	13.09	172.18	200.67	9.57	43.07	0.35	11.80
T_9- I_3 F_3	2.39	36.39	11.79	172.70	212.33	10.19	44.07	0.41	13.47
CD@5%	**NS**	**NS**	**NS**	**25.98**	**17.13**	**1.64**	**NS**	**NS**	**1.66**
SE(m)±	**0.154**	**2.205**	**1.848**	**8.59**	**5.66**	**0.54**	**0.607**	**0.258**	**0.549**
CV%	**10.22**	**6.47**	**17.20**	**9.22**	**4.97**	**10.56**	**2.595**	**11.636**	**4.844**

Table-23: Rain fall, evaporation and mean daily irrigation water applied (l/day/plant) for sweet orange under different irrigation treatments

Months	Total Rain fall(mm)	Evaporation Rate (mm/day)	Irrigation water applied (l/day/plant)		
			70% ER	80% ER	90% ER
April,2014	17	6.33	62	70	79
May, 2014	120	6.71	29	33	37
June,2014	19	8.29	82	93	105
July,2014	113	7.07	36	41	46
Aug,2014	244	5.46	--	--	--
Sep,2014	234	5.41	--	--	--
Oct, 2014	111.5	5.81	--	--	--
Nov,2014	35.8	5.08	12	14	16
Dec, 2014	81	2.68	--	--	--
Jan, 2015	0.00	3.06	31	35	40
Feb, 2015	0.00	5.08	51	59	66
Mar, 2015	61	5.30	33	38	42

Assessment of phenology, productivity, insect pests and diseases in citrus grown under varying climatic conditions (Sweet orange)

The experiment was carried out on 8 years old Sathgudi sweet orange budlings. The observations on month wise weather parameters, pest and disease incidence were recorded (Table-23). Initial flowering was slow during second fortnight of December, 2014 due to rains and flowering was sparse during January, 2015. Sweet orange pest calendar revealed that peak incidence of leaf miner was observed during November and December. Rust mite incidence was severe during May-August months. High incidence of greasy spot was noticed during October to December. High dry root rot incidence was noticed from March to May. The best fruit quality parameters were recorded during October (51% Juice and 13° Brix TSS).

Table-24: Calendar of occurrence of major pests and diseases in sweet orange

S. No	Month	Pests			Diseases		
		Leaf miner	Butterfly	Rust mite	Greasy spot	Dry root rot	Phytophthora Gummosis
1	January, 2014	**	**	Nil	*	Nil	Nil
2	February, 2014	*	*	Nil	*	*	Nil
3	March, 2014	*	Nil	*	Nil	****	Nil
4	April,2014	Nil	Nil	**	Nil	****	Nil
5	May, 2014	Nil	Nil	***	Nil	****	Nil
6	June,2014	*	*	***	Nil	***	*
7	July,2014	*	**	****	Nil	Nil	*
8	August,2014	*	**	***	Nil	Nil	**
9	September,2014	**	**	**	Nil	Nil	**
10	October, 2014	**	**	*	***	Nil	*
11	November,2014	***	*	*	***	Nil	Nil
12	December, 2014	***	*	Nil	***	Nil	Nil

*low **medium *** high ****severe

Rating	Low	Moderate	High	Severe	Very severe
Leaf miner	1-10%	11-30%	31-50%	51-75%	>75%
Rust mite	1-5%	06-10%	11-15%	20-25%	>30%
Butterfly	1-10%	11-30%	31-50%	51-75%	>75%

ACID LIME

Citrus Research Station, Tirupati

Nutrient management under High Density Planting in acid lime

The interaction effect of spacing and nutrition in four year old acid lime cv. Balaji (Table-24), indicated that the treatment 6x6 m spacing with 75% RDF (1125 g N: 450.5 g P_2O_5: 450 g K_2O/ plant/year) has recorded significantly more plant height (1.82 m), stem girth (20.67cm) and canopy volume (2.90 m^3) followed by control treatment in 6x6 m spacing with 100 % RDF (1500g N: 600g P_2O_5: 600 g K_2O/ plant/year).

Table-25: Effect of different spacing and nutrient levels on plant growth of acid lime cv. Balaji at Tirupati

Treatments	Plant height(m)	Scion girth (cm)	Canopy Spread (m)		Canopy volume (m^3)
			EW	NS	
T_1 (S_1 x L_1)	1.82	20.67	1.63	1.81	2.90
T_2 (S_1 x L_2)	1.62	18.75	1.63	1.73	2.40
T_3 (S_1 x L_3)	1.79	20.58	1.62	1.53	2.33
T_4 (S_2 x L_1)	1.48	15.56	1.32	1.34	1.41
T_5 (S_2 x L_2)	1.30	15.33	1.21	1.20	1.00

Treatments	Plant height(m)	Scion girth (cm)	Canopy Spread (m)		Canopy volume (m^3)
			EW	NS	
T_6 (S_3 x L_3)	1.37	15.44	1.28	1.36	1.24
T_7 (S_3 x L_1)	1.63	18.89	1.61	1.43	1.97
T_8 (S_3 x L_2)	1.61	20.44	1.53	1.43	2.00
T_9 (S_3 x L_3)	1.40	16.45	1.47	1.35	1.63
CD @ 5%	**0.34**	**3.79**	**NS**	**NS**	**NS**
SE(m)±	**0.11**	**1.26**	**0.15**	**0.16**	**0.45**
C.V.	**12.54**	**12.06**	**17.24**	**18.99**	**41.67**

S_1- (6x6 m= 277 plants/ ha); S_2- (6x5 m= 333 plants/ha); S_3- (6x4 m= 416 plants/ha)
L_1- 75% RDF (1125g N: 450.5g P_2O_5: 450 g K_2O/ plant/year)
L_2- 50% RDF (750g N: 300g P_2O_5: 300 g K_2O/ plant/year)
L_3- 100% RDF (Check) (1500g N: 600g P_2O_5: 600 g K_2O/ plant/year)

Studies on residual and cumulative effects of nutrients in acid lime

Individual and interaction effects of nutrient levels and nutrient doses on growth parameters of four year old acid lime plants were non-significant (Table-25). During initial years, vegetative growth showed an increased response to fertilization (from A_1 to A_3).

Table-26: Effect of age wise nutrient levels on growth of acid lime

Treatments	Plant height(m)	Scion girth (cm)	Canopy Spread (m)		Canopy volume (m^3)
			EW	NS	
A_1 B_1	2.28	29.50	2.29	2.45	7.06
A_1 B_2	2.32	28.33	2.34	2.41	7.16
A_1 B_3	2.11	26.92	2.19	2.33	6.03
A_2 B_1	2.35	29.92	2.45	2.55	7.89
A_2 B_2	2.44	31.67	2.41	2.49	7.78
A_2 B_3	2.49	30.00	2.48	2.51	8.33
A_3 B_1	2.18	28.83	2.34	2.44	6.46
A_3 B_2	2.27	28.75	2.33	2.42	7.10
A_3 B_3	2.43	30.10	2.52	2.65	8.56
CD@5%	**NS**	**NS**	**NS**	**NS**	**NS**
SE(m)±	**0.15**	**1.53**	**0.18**	**0.23**	**1.53**
C.V.	**11.53**	**9.00**	**13.20**	**15.76**	**35.82**

A_1: 1/10 of RDF for 10 years;
A_2: 1/8 of RDF for 8 years
A_3: 1/6 of RDF for 6 years
RDF: 1500:600:600 g N:P2O5: K2O/plant /year

B_1: 100% RDF after 10 years
B_2: 80% RDF after 8years
B_3: 60% RDF after 6 years

Standardization of stage wise water requirement in acid lime

Stage wise water application on 6 year old trees of acid lime seedlings (Balaji), has not significantly influenced the plant growth parameters. Maximum number of fruits (324 fruits/plant), fruit weight (41.75g), fruit yield (13.61 kg/plant), juice content (53.25%) and medium acidity (6.95%) were recorded in treatment T_4 (80% ER at all the stages) followed by treatment T_3 (60-80-60-80-60-80% ER). The irrigation treatment 30-30-30-30-30-30 PER for stage I to VI respectively has recorded minimum growth and yield.

Assessment of phenology, productivity and insect pests and diseases in citrus grown under varying climatic conditions (Acid lime)

Table -27: Incidence of major pests and diseases in acid lime during

S. No	Month	Pests						
		Leaf miner	Butterfly	Thrips	Rust mite	Canker	Dry root rot & LBW	Twig blight
1	January, 2014	**	**	***	Nil	Nil	Nil	Nil
2	February, 2014	*	*	**	Nil	Nil	*	Nil
3	March, 2014	*	Nil	Nil	*	Nil	***	Nil
4	April, 2014	Nil	Nil	Nil	**	Nil	***	Nil
5	May, 2014	Nil	Nil	Nil	***	Nil	***	Nil
6	June, 2014	*	*	*	***	*	**	Nil
7	July, 2014	*	**	*	****	***	Nil	***
8	August, 2014	*	**	*	***	****	Nil	***
9	September, 2014	**	**	**	**	****	Nil	***
10	October, 2014	**	**	**	*	****	Nil	***
11	November, 2014	***	*	***	*	****	Nil	***
12	December, 2014	***	*	***	Nil	****	Nil	***

The experiment was initiated in ten years old acid lime trees (cv. Balaji). The observations on month wise pest and disease incidence were recorded (Table-27). Flowering was observed during January and extended to March. In spite of high temperatures and irregular rainfall distribution, heavy leaf fall was noticed. Acid lime pest calendar revealed that peak incidence of leaf miner was observed during November and December. Rust mite incidence was severe during June –July months. Acid lime disease calendar revealed that bacterial canker was severe during August to December. Twig blight was high during July to December. High dry root rot and longitudinal bark and wood splitting disease (LBW) incidences were noticed during March to May. Good fruit size (45g) and best fruit quality parameters were recorded during April (6.8 %acidity and 58% juice).

Citrus Research Station, Petlur

Seventeen released and pre-released acid lime accessions have established well and are in bearing stage. Among them CRS – 1, CRS-21, Tenali were precocious followed by TAL94-14. Even though they were very high yielding, the juice content was less and less preferred.

POMEGRANATE

Horticultural Research Station, Anantapuramu

Effect of different nitrogen and water regimes on nitrogen use efficiency and water savings in pomegranate (cv.Bhagwa)

The experiment was carried out in Split plot design with three water regimes *viz.,* 0.1, 0.2 and 0.3 CPE and three nitrogen levels viz., 100%, 75% and 50% of recommended dose of nitrogen at monthly intervals. Recommended dose of N – fertilizers for 5 year old plants is 625g/plant.

Pomegranate plants in the trial were severely affected due to hail storm and gales which occurred on 04-03-2014 and 05-03-2014. Twenty nine plants were uprooted and the remaining were lodged due to this calamity. The uprooted and lodged plants were re-erected by taking up necessary measures. All the plants recovered from the shock. The treatments were imposed for hasta bahar crop. In general, the growth and development of plants was poor due to shock. No significant difference was observed among different treatments.

Effect of different mulching material on growth and yield of pomegranate (Cv. Bhaguwa)

Maximum plant height was recorded in T_3 (100 microns polythene mulch-black colour) (1.30m) closely followed by T_1 (200 microns woven polypropylene ground cover) (1.29 m). Whereas, number of branches per plant (3.69) and plant spread (1.16 m EW–1.26 m NS) were high in T_1 (200 microns woven polypropylene ground cover). The weed density was lowest (2.30 plant/m^2) in T_3 (100 microns polythene mulch-black colour) followed by T_2 (100 microns polythene mulch-silver colour) (3.60 plant/m^2 Table-28).

Table–28: Growth parameters of pomegranate Cv. Bhagwa under different mulch material

DOP – June, 2012

Treatment details	Plant height (m)	No. of branches per plant	Plant Spread (m)		Weed density (Plants per Sq.m)
			EW	NS	
T_1: 200 microns woven polypropylene ground cover	1.29	3.69	1.16	1.26	13.10
T_2: 100 microns polythene mulch (Silver colour)	1.15	3.63	1.06	0.97	3.60
T_3: 100 microns polythene mulch (black colour)	1.30	3.56	1.06	1.25	2.30
T_4: Organic mulch (groundnut shells)	1.17	3.63	1.10	1.10	8.80
T_5: Control (without mulch)	1.22	3.69	1.12	1.09	21.20
SE.m+	**0.04**	**0.21**	**0.06**	**0.03**	**0.63**
CD at 5%	**0.14**	**0.65**	**0.18**	**0.09**	**1.94**
C V %	**7.29**	**11.58**	**10.01**	**5.42**	**12.86**

CUSTARD APPLE

Horticultural Research Station, Anantapuramu

Standardization of pruning technology in custard apple (Cv. Balanagar)

Maximum number of shoots was produced with 75 % pruning intensity (5.95) at 90 days after harvest. Number of flowered shoots was high at 25 % pruning intensity (3.64) at 60 days after harvest. Maximum per cent of flowered shoots was observed in 25 % pruning intensity (80.89) at 75 days after harvest followed by 25 % pruning intensity (76.29) at 90 days after harvest. The height (2.05 m), plant spread (1.35 m EW – 1.64 m NS), stem girth (32.38 cm) and number of branches plant $^{-1}$ (3.75) were maximum with 75 % pruning intensity at 90 days after harvest of crop.

VEGETABLES

CAPSICUM

Horticultural Research Station, Mahanandi

Studies on production of capsicum under polyhouse conditions

Capsicum varieties, Indra, Bomby and Orobelle were planted on 01.10.2014, 15.10.2014 and 30.10.2014 in polyhouse. Among the combinations, the date of planting 01.10.2014 with Bomby variety recorded more plant height (127.2 cm), diameter of the stem (6.21 cm), more number of primary branches (3.30), more number of secondary branches (20.25), number of flowers per plant (54.40), fruit weight (141.50 g), number of fruits per plant (21.53) and more yield (33.83 t/ha) followed by Indra (30.25 t/ha).

DRUM STICK

Horticultural Research Station, Darsi

Performance of drum stick varieties under Prakasam district conditions

Three varieties of moringa *viz.,* PKM-1,PKM-2 and Bhagya seedlings were planted in the month of January, 2014 and among the drum stick varieties, PKM-1 recorded more number of fruits/plant(239) followed by PKM-2.

RADISH

Horticultural Research Station, Anantharajupeta

In Integrated Nutrient Management trial in radish, plants treated with Azospirillum (5 kg/ha) + P S B (7.5 kg/ha) + VAM (12.5 kg/ha) + 50 % NPK recorded significantly highest plant hight (28.55 cm), highest leaf number (19.02), more leaf area (106.74 cm2), longer roots (34.07 cm), highest root diameter (16.44 cm), highest fresh weight of root (387.22 g) and yield (52.46 t/ha). However, all these observations were minimum in control.

CAPSICUM

Horticultural Research Station, Anantharajupeta

Capsicum plants applied with 10 t/ha of well rotten farm yard manure recorded significantly maximum plant height (87.30 cm), number of leaves (163.77), number of branches (14.00), stem girth (4.85 cm), leaf length (19.04 cm) and leaf width (11.33 cm). However, higher number of fruits (25.66), fruit length (8.83 cm), fruit breadth (5.77 cm), fruit weight (58.83 g), weight of 10 fruits (663.72 g), yield (16.32 t/ha), pericarp thickness at the blossom end (1.33 cm), number of seeds per fruit (140.05), dry weight of 100 seeds (0.713 g), fruit diameter (18.25 cm), pericarp thickness at the centre of the fruit (0.81 cm) and seed weight (1.30 g/fruit) were recorded with the application of vermicompost (2.5 t/ha). Control recorded minimum values of all the above observations.

ONION

Horticultural College & Research Institute, Anantharajupeta

Testing of suitability of onion varieties for early and late kharif seasons

There were significant differences among onion varieties as well as different dates of sowing. It was observed that though the growth of Agrifound Dark Red was significantly high, the bulb yield was found maximum with Arka Kirthiman (26.78 t/ha) sown during second fortnight of June. But in late kharif it was found that Agrifound Dark Red sown during second fortnight of August produced significantly maximum crop growth as well as yield (23.37 t/ha). It was also observed that maximum TSS was recorded in Agrifound Dark Red (13.05° Brix) in both the seasons.

Horticultural Research Station, Mahanandi

Evaluation of onion varieties

Among 8 onion varieties, Agrifound Light Red recorded highest fresh weight of the bulb (176.53 g), dry weight of the bulb (147.32 g) and yield (28.93 t/ha) followed by Agrifound Dark Red (27.50 t/ha) and Bhima Red (26.57 t/ha).

Effect of different herbicides on growth and yield of onion Cv. Agrifound Light Red

Among different herbicidal treatments and hand weeding practice at 20, 40 and 60 DAT, hand weeding at 20, 40 and 60 DAT recorded more plant height (51.00 cm), stem diameter (7.30 cm), more number of leaves (13.2), polar diameter (7.13 cm) and equatorial diameter (6.39 cm), fresh weight of bulb (177.17 g), dry weight of bulb (132.88 g), more yield (23.57 t/ha) and more TSS(12.5^0 Brix) followed by herbicidal treatment with Pre-emergence spray of Pendimethalin @ 1.0 kg a.i./ha^{-1} + Post emergence spray of Quizalofop Ethyl @ 50 g a.i./ha^{-1} at 20 DAT with a plant height of 47.27 cm, polar diameter of 6.76 cm, equatorial diameter of 6.05 cm and bulb yield of 21.83 t/ha.

Effect of spacing and fertilizer dose on growth and yield of onion Cv. Agrifound Rose

Among different fertilizer dose and spacings, F_1S_1 (F_1 – 60 kg N + 32 kg P + 32 kg K per acre + S_1 – 30 cm X 10 cm) recorded more plant height (40.06 cm), more polar diameter of the bulb (7.56 cm), more equatorial diameter of the bulb (9.36 cm), more fresh weight of the bulb (112.6 g), dry weight of the bulb (90.08 g), yield (14.43 t/ha) and TSS (13.21^o Brix) followed by F_2S_1 (75 kg N + 40 kg P + 40 kg K per acre + 30 cm X 10 cm) which recorded a plant height of 39.48 cm, polar diameter of the bulb (7.50 cm), equatorial diameter of the bulb (9.24 cm), fresh weight of the bulb (105.18 g), dry weight of the bulb (84.13 g), yield (12.62 t/ha) and TSS (12.40^o Brix).

FLOWERS

GLADIOLUS

Horticultural College & Research Institute, Anantharajupeta

Evaluation of gladiolus cultivars under open field conditions for growth, yield and vase life in Southern zone of Andhra Pradesh

Gladiolus cultivars Bindya, Swarnima, Arka Amar, Arka Gold and Ac.No.7 were found superior with regard to growth and floral yield.

Horticultural Research Station, Anantharajupeta

Among different dates of planting (20th October, 20th November, 20th December and 20th January) and corms teatment with different chemicals (Thiourea 1.5%, BA 50 ppm and GA_3 150 ppm) revealed that days to corm sprouting, plant height, number of leaves per plant, days to spike emergence, leaf area, days to first floret opening, duration of flowering, spike weight, rachis length, spike length, number of spikes per plant, spike diameter, number of florets per plant, floret longevity and vase life were found maximum when the gladiolus corms were treated with GA_3 (150 ppm) and planted during 20th October.

ROSE

Horticultural College & Research Institute, Anantharajupeta

Comparative Study on suitability of commercial cut rose cultivars for dehydration technology

Among all the desiccants tried, minimum dry weight (2.05 g) and maximum moisture loss (85.13%) along with quick drying of flowers (3.53 days) was observed when the flowers were embedded with silica gel. Among rose cultivars tried Cv. Tajmahal was found to be attractive and found to be the best in retaining its original colour when compared to others viz., First Red, Gold Strike and Avalanche.

MARIGOLD

Studies on "Influence of bio-fertilizers on growth, flowering and yield in African marigold cv. Orange Bunch" revealed that plant height (45.33 cm, 69.16 cm), plant spread (53.47 cm, 53.05 cm) and stem girth (6.15 cm) were maximum in T_3 (Azotobactor seed treatment). Whereas, number of primary branches (11.25), longest primary branch (45.62 cm), number of secondary branches (24.75), number of tertiary branches (29.50), minimum days for visibility of first flower bud (27.33), lesser period for flower break (11.66 days), fewer days for 50 per cent flowering (42.91), higher count of flowers per plant (73.08), flower size (7.14 cm x 6.96 cm), flower diameter (8.31 cm), flower stalk length (3.37 cm), fresh weight of single flower (8.32 g), highest yield of fresh flowers per plant (328.09 g), number of seeds per flower (562.00), seed yield per flower (1.16 g) and weight of 1000 seeds (4.10 g) were recorded in the treatment T_2 (PSB seed treatment).

TUBER CROPS

ELEPHANT FOOT YAM

Horticultural Research Station, Kovvur

Phenology of elephant foot yam in relation to climate change

During the phenology study of elephant foot yam, various growth and yield parameters were recorded at monthly intervals. Gajendra has sprouted 3 days early as compared to local cultivar. Except plant height, culm girth, weight of main corm, number of leaflets, maximum leaflet length, leaflet width, leaf area, yield per plant and yield per hectare were found to be more in Gajendra than local cultivar.

Phenology of greater yam in relation to climate change

In greater yam, Sree Keerthi sprouted 5.33 days earlier compared to local cultivar. Yield and yield attributing characters were recorded more in Sree Keerthi cultivar than local.

Site specific nutrient management studies in elephant foot yam

It was observed that among vegetative and yield parameters the treatments T_1, T_2, T_4, T_5 were on par with each other and the treatments T_3 and T_6 has recorded low yields. Significantly highest yield was observed in T_1 (24.61 t/ha) which was on par with T_2 (20.69 t/ha) T_4 (20.28 t/ha) T_5 (20.18 t/ha) and lowest in T_3 (10.06 t/ha) which was on par with T_6 (10.31).

Table-29: Performance of elephant foot yam under site specific nutrient management (2014-15)

Treatments	Plant height(cm)	Stem girth(cm)	Canopy Spread(cm^2)	Leaf area(cm^2)	Yield per plant(kg)	Yield (t ha^{-1})
T_1-Recommended dose of NPK	63.36	13.59	94.90	8609.258	2.215	24.61
T_2-Based on soil test data	63.85	13.09	90.23	7951.544	1.8625	20.69
T_3-Zero N , P&K based on soil test	54.55	9.75	73.17	4463.455	0.9055	10.06
T_4-Zero P, N&K based on soil test	63.86	13.04	94.2	8190.449	1.825	20.28
T_5- Zero K, N&P based on soil test	63.95	13.54	92.03	7516.283	1.816	20.18
T_6-No added fertilizers	56.2	9.53	70.5	4876.723	0.9275	10.31
CD (P=0.05)	**4.788**	**1.11**	**7.843**	**1,261.27**	**0.488**	**1.781**
SEm +	**1.574**	**0.366**	**2.578**	**414.644**	**0.16**	**2.519**
CV(%)	**5.16**	**6.05**	**6.00**	**11.95**	**20.14**	**20.14**

Table-30: Pooled analysis (2012-13 to 2014-15)

Treatments	Plant height(cm)	Stem girth(cm)	Leaf area(cm^2)	Yield per plant(kg)	Yield (t ha^{-1})
T_1-recommended dose of NPK	64.65	13.592	7,489.97	1.842	29.14
T_2-Based on soil test data	67.8	13.352	6,822.45	1.623	26.09
T_3-Zero N , P&K based on soil test	59.908	12.308	6,291.65	1.239	20.95
T_4-Zero P, N&K based on soil test	62.454	12.773	6,373.09	1.534	24.42
T_5- Zero K, N&P based on soil test	65.733	13.408	6,823.16	1.607	25.84
T_6-No added fertilsers	62.313	12.133	5,113.50	1.338	19.35
C.D.	**N/A**	**N/A**	**N/A**	**N/A**	**5.49**
SE(m)	**1.774**	**0.742**	**691.007**	**0.181**	**1.72**
C.V.	**4.816**	**9.935**	**18.454**	**0.256**	**12.258**

In elephant foot yam, significantly highest yield of 29.14t/ha was obtained when recommended dose of NPK was applied which was on par with the treatment T_2 (Based on soil test data) (26.09 t/ha), T_4 (Zero P, N&K based on soil test) (25.84 t/ha) and T_5 (Zero K, N&P based on soil test). The lowest yield was recorded in T_6 (No added fertilizer) (19.35 t/ha) which was on par with T_3 (20.95) (Zero N, P & K based on soil test).

Observational trail on the performance of open pollinated seed of *Amorphophallus paeoniifolius*.

Out of 235 clones studied, the clones having more than 6 multiplication ratio were selected for further evaluation. Oxalate content was also studied and further evaluation is in progress.

Table-31: Yield parameters recorded at harvest (2014-15)

	Tuber yield(g)/ plant	No of cormels/ tuber	Tuber volume (cm^3)	Tuber diameter(cm)	Tuber height (cm)
Average	841.93	2.0	751.38	11.03	8.27
Range	75-2350	0-7	100-2220	6-22	3-22

Table-32: Quality parameters recorded (2014-15)

	Dry matter (%)	Oxalates (%)	Starch (g/100g dry weight)	Multiplication ratio
Average	24.10	0.58	31.17	5.09
Range	11.11-40.67	0.25-0.88	17.64-66.15	0-15.67

Table-33: Categorization of clones based on multiplication ratio

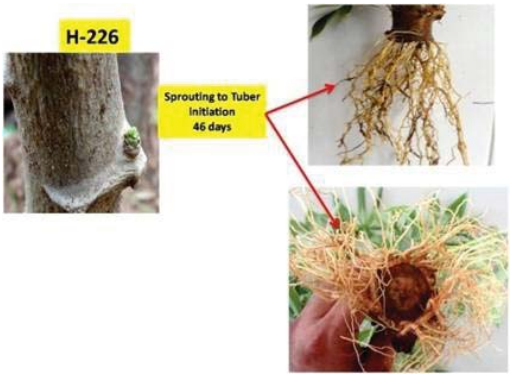
Multiplication ratio	No of clones	Name of the clone
>6 to 8	38	F 5/15, 1/32, M 5/5 B, M 4/28, F 5/13, F5/13, 2/6, F 3/19, M 1 18, M 1/2, F 3/13, M 1/18, P 5/10, F4/20, 1/36, P 1/10, F 5,17, P 5/8, M 2/13, P 3/8, 2/3, M 1/13, P 4/3, F 4/1, F 4/18, M 1/2, 4/7, F 4/1, 2/6, 1/14, 1/10, F 5/6, P 4/1, 1/39, 2/3, F 5/6, F 4, 24, M 9/9
>8 to 10	16	F 5/1, P 1/7, 1/37, M 2/4, F 3/11B, F 3/18, M 5/24, P 4/4, 2/6, 1 38, M 2/8, F 4/1, F 4/14, M 9/20, M 1/17, F 5/2
>10 to 12	14	F 5/24, 1/7, F 5/10, F 3/8, M 4/24, F 3/3, P 5/10, 3/2, 1/32, P 5 2, F 5/5 A, 1/31, P 3/28, 1/43
>12 to 14	6	F 4/1, 1/10, F 3/32, F 5/21, F 3/12, M 5/31
>14 to 16	5	1/17, 1/45, M 2/27, F 4/17, F 4/1

CASSAVA

Horticultural Research Station, Venkataramannagudem

AICRP on Tuber Crops:

Studies on Pheonology of cassava (Sree Vijaya and H-226) in relation to climate change was conducted. Tuber data at monthly interval and vegetative data at bimonthly intervals were recorded. Tuber initiation in Sree Vijaya was observed 40 days after 50 % sprouting and in H-226 it was observed at 46 days after 50 % sprouting. Growth of Sree Vijaya at initial months was rapid when compared to H-226. Maximum tuber weight was accumulated in 4th and 5th month after tuber initiation in both the cases.



Tuber root initiation in H-226

Tuber root initiation in

Site specific nutrient management (SSNM) studies on Cassava

SSNM on cassava revealed that the vegetative characters *viz.,* number of green leaves, number of fallen leaves and total number of leaves were on par in T_2 (Nutrients based on soil test data), T_4 (Zero P, N and K based on soil test) and T_5 (Zero K, N and P based on soil test). Maximum tuber yield (30.9 t.ha^{-1}) was recorded in T_2 (Nutrients based on soil test data) which was on par with T_1 (Recommended dose of NPK as per CTCRI package), T_4 (Zero P, N and K based on soil test) and T_5 (Zero K, N and P based on soil test).

Tuber development pattern at different levels of fertilizers (SSNM)

Micro nutrient studies on Cassava were initiated with 6 treatments. Significant differences were observed between the treatments. Maximum tuber yield per hectare was recorded in T_7 (29.5 t/ha) which was on par with T_6 (28.0 t/ha) followed by T_1 (25.3 t/ha). Highest starch content was observed in T_7 (28.5 %).

Treatment details

T_1: POP recommendation (NPK + FYM) specific to the location.
T_2: POP + Soil application of $MgSO_4$ @ 20 kg ha^{-1}
T_3: POP + Soil application of $ZnSO_4$ @ 12.5 kg ha^{-1}
T_4: POP + Soil application of Borax @ 10 kg ha^{-1}
T_5: POP + $FeSO_4$
T_6: POP + $MgSO_4$ + $ZnSO_4$ + Borax

T_7: POP + $MgSO_4$ + $ZnSO_4$ + Borax + $FeSO_4$

T8: Absolute control

Note: $MgSO_4$, $ZnSO_4$ and Borax were applied after top dressing of NPK fertilizers and within 2 months of planting of cassava. $FeSO_4$ was given as stake dipping for 15 minutes and foliar application (0.5% $FeSO_4$ solution), 3-4 times at weekly intervals on appearance of the symptoms.

SPICES

A new chilli variety LCA 620 with bold pods, medium length, medium pungency and excellent colour value was recommended for release as national variety during XXXII Annual Group Meeting of AICRP on vegetable crops held at Raipur.

CHILLI

Horticultural Research Station, Lam, Guntur

- Studies on the effect of NSKE and neem oil on yield and quality parameters of chilli revealed that application of neem based products once after three sprays recorded highest yield (1144.91 kg/ha) and high photosynthetic rate (22.18). Among sub treatments, control recorded higher dry chilli yield (1375 kg/ha) which was on par with NSKE 5% and NSKE 10%.
- Chilli seeds treated with carbendazim @ 2 g/kg seed + imidacloprid @ 2 ml/kg seed + diammonium phosphate @ 30 g/Kg seed+ micronutrient mixture @ 20 g/kg seed recorded highest germination (95.25 %), root length (5.53 cm), shoot length (5.45 cm) and seedling vigour index (4182 %).
- In IWM of chilli, weed free check recorded significantly highest yield (14.7 q/ha) which was on par with hand weeding at 20,40, and 60 DAP (13.5 q/h)
- Efficacy of different herbicides in chilli (*Capsicum annuum* L.) was tested and results revealed that pendimethalin as pre-emergence @0.75 a.i/ha + Pendimethalin as soil application at 25 & 50 DAS recorded significantly highest yields (3255 kg/ha) with highest weed control efficiency (82.79 %) and Weed Index (32.8 %)
- In INM of chilli, RDF recorded maximum yield (27.3 q/ha) followed by 75% RDF + bio fertilizers (*Azospirillum*+PSB+K solubilizing bacteria each @ 2 kg/acre) as basal application, 75% RDF + biocontrol agent *Trichoderma viride* @ 2kg/acre + mycorrhiza (VAM @ 5 kg/acre) as basal application and 75% RDF + biofertilizers (*Azosporillum* + PSB+ K solubilizing bacteria each @ 2 kg/acre) + *Trichoderma viride* @ 2 kg/acre + mycorrhiza (VAM @ 5kg/acre) as basal application.

Seed Production

Table No. 34 The following quantity of seed was supplied to the Private and Public Sectors from HRS, Lam during 2014-15

Crop	Variety	Quantity sold (Kg) up to June, 2015
Chilli	Foundation seed	
	LCA 620	656.3
	LCA-625	594.7
	LCA-334	6.0
	LCA-353	21.5
	CA960	16.5
	G4	0.6
Coriander	Sudha (FS)	50.5
	APHU Dhania-1 (FS)	32.5
	Suguna(FS)	57.5
	Swathi(FS)	0.5
	Sindhu(FS)	0.5
	Sadhana(FS)	0.5
Azowan	LS-1 (FS)	2.0

Seed production- Chilli (LCA-620)

Rouging in seed production plots

Seed extraction

Seed production plot of Coriander (Suguna - LCC-236)

TURMERIC

Horticultural Research Station, Lam, Guntur

- In turmeric, drip irrigation once in a day at 80% PE recorded maximum yield (51.1 t/ha) followed by drip irrigation once in two days at 80% PE (50.4 t/ha) which were on par with each other and significantly superior to surface irrigation at 5 cm, 0.9 IW/CPE (44.6 t/ha).
- Among the three varieties evaluated, Mydukur was found to be vigorous in growth and recorded highest fresh rhizome weight (361.6 g/plant) followed by BSR-2 (298.9 g/plant) which differed significantly from each other at harvest

Horticultural Research Station, Darsi

Testing of turmeric varieties suitable to Guntur and Prakasam District conditions

- Eleven varieties of turmeric were planted in the month of July-2014. These varieties were grouped into two groups based on the duration. Among the medium duration group, KTS-6 recorded more plant height (57.10 cm), number of Leaves (19.70), leaf length and leaf width. BSR-2 recorded high fresh rhizome yield (15.33 t/ha) followed by KTS-6.
- In long duration group, Salem recorded more plant height (62.70 cm), more number of tillers (3.86) and highest fresh rhizome yield (18.20 t/ha) followed by KTS-8 (15.33 t/ha).

GINGER

Horticultural Research Station, Chintapalli

Evaluation of herbicides for the control of weeds in ginger *(Zingiber officinalis)*

- Observations revealed that, maximum plant height recorded in T_9 i.e. oxyflurofen 23.5% E.C. @ 0.3 Kg. a.i. / ha (42.33 cm) and T_{12} (44.43 cm) i.e. weed free treatment, which were on par. T_9 and T_{12} were on par with each other in terms of number of tillers. Unweeded control plot recorded lowest plant height and number of tillers as weeds like cyprus, cynodan dominated the ginger plants.
- Maximum per plant yield (300.0 g/plant) was recorded in T_{12} & T_9 treatment, which were at par with each other T_9 i.e. Oxyflurofen 23.5 % E.C, 0.3 kg a.i/ha and T_{12} i.e weed free check plot. Maximum yield and projected yield also recorded high in T_9 (21.67 t/ha) and T_{12} (22.03 t/ha).
- Oxyflurofen was selected as best pre-emergence herbicide in this experiment compared to pendimethalin. But one has to spray the Oxyfluorfen chemical 2nd day after sowing the rhizomes and concentration should not exceed 500ml/ha, otherwise it will cause phytotoxicity to the ginger plants.
- Oxyflurofen controls all kinds of weeds up to 60 days, where as pendimethalin controls up to 25-30 days only. In excess concentration also pendimethalin has not caused any phytotoxicity to the plants.

Two post emergence weedicides used in this experiment viz., Quizalofop-ethyl and Propaquizafop to control grassy weeds at 30-50 days interval. Quizalofop-ethyl was much better than Propaquizafop towards controlling the grassy weeds. But both failed in controlling the broad leaved weeds.

GARLIC

Horticultural Research Station, Manahandi

Effect of different dates of planting on growth and yield of garlic in Kurnool district

Garlic was sown in six different dates i.e., T_1-September 1st week (05-09-2014), T_2-September 3rd week (24.09.2014), T_3-October 1st week (07-10-2014), T_4-October 3rd week (21.10.2014), T_5-November 1st week (05.11.2014) and T_6-November 3rd week (20.11.2014). Among the different dates of sowing T_3 (October 1st week sown plants) was found to be good and recorded more plant height (52.00 cm), more stem diameter (3.80 cm), more number of leaves (11.40) more diameter of bulb (9.70 cm), more fresh weight of the bulb (20.20g) more dry weight of the bulb (15.24 g) and more yield (4.90 t/ha).

MEDICINAL & AROMATIC PLANTS

AICRP on MAP & Betelvine

Horticultural Research Station, Venkataramannagudem

In *Solanum nigrum,* among different seed rates tested, 12.5 kg/ha seed rate recorded highest yield (12.94 t/ha) which was on par with 10.0 kg/ha seed rate (10.25 t/ha). Plant population was highest in case of 12.5 kg/ha seed rate (46.75 pl/m2) followed by 10 kg/ha seed rate. Fresh weight was highest in case of 30 x 30 cm spacing (110.75 g/plant) followed by 2.5 kg/ha seed rate (60.07 g/plant)

In *Solanum nigrum,* among different treatments (age of seedlings), highest herbage yield was recorded when 25 days old seedlings were transplanted (11.81 t/ha) which was on par with 15 days old seedlings (11.32 t/ha) and 20 days old seedlings (10.47 t/ha). Number of branches was more when 25 days old seedlings were transplanted (21.33) which was on par with 15 days old seedlings (19.06) and 20 days old seedlings (17.67).

PLANTATION CROPS

COCONUT

Horticultural Research Station, Ambajipeta

Development of coconut based integrated cropping system models for different agro- climatic regions

Variations in the yield of coconut and intercrops were recorded treatment wise. In coconut, nut yield of 124.8, 112.9, 110.8 and 108.9 per palm was recorded respectively in T_1, T_2, T_3 and T_4 (Table-35, 36, 37, 38, 39, 40, 41, 42 & 43). Yield of intercrops decreased with increasing organic form of fertilizer application. Soil moisture increased as depth of soil increases in all the treatments. The soil organic carbon, nitrogen, phosphorus and potassium contents increased in June 2014 compared to initial years.

Table-35: Growth parameters of coconut and component crops

Crops	T_1	T_2	T_3	T_4
Coconut				
No. of leaves on crown	33.8	32.5	32.0	31.5
Other component crops (canopy spread in cm)				
Cocoa	128.6	125.3	124.6	-
Banana	185.1	178.9	172.8	-

Table-36: Yield parameters of main & component crops

Crops	T_1	T_2	T_3	T_4
Coconut				
No. of bunches/year	13.4	12.8	11.7	11.5
No. of buttons/bunch	24.56	23.52	22.68	22.50
Nut yield/palm/year	124.8	112.9	110.8	108.9
Copra content (g)	158.6	156.4	152.8	148.6
Oil percentage(%)	69.0	68.4	68.0	68.0
Other components				
Cocoa(kg/tree)	2.5	2.45	2.3	--
Banana (kg/plant)	22.0	20.0	18.0	--
Pineapple (g/plant)	1075	1025	985	--
E.F.Yam(kg/plant)	3.0	2.75	2.40	--
Tomato (g/plant)	510	495	485	--

Table-37: Yield of coconut and intercrops/plot and per hectare in CBCS

Crops	T_1		T_2		T_3		T_4	
	Yield/ Plot	Yield/ ha	Yield/ Plot	Yield/ ha	Yield/ Plot	Yield/ ha	Yield/ Plot	Yield/ ha
Coconut (No. of nuts)	2995	18720	2710	16935	2660	16620	2614	16335
Cocoa(Kg)	90	450	88	415	82.8	384	--	--
Banana (T)	2.3	11.5	2.16	10.8	1.94	9.7	--	--
Pineapple(Kg)	516	2580	492	2460	473	2364	--	--
Tomato (Kg)	91.8	459	89.1	446	87.3	437	--	--
Elephant foot yam (kg)	540	2700	495	2475	432	2160	--	--
Heliconia (No. of cut flowers)	2700	13500	2250	11250	1800	9000	--	--

Table-38: Soil moisture Content (%)

Summer month & Depth of soil	T_1	T_2	T_3	T_4
March				
0-30 cm	15.4	15.6	15.8	14.5
30- 60 cm	19.8	20.5	21.4	16.7
60-90 cm	22.5	21.9	23.4	17.8
April				
0-30 cm	15.6	13.9	14.2	13.1
30- 60 cm	16.2	15.8	17.3	17.8
60-90 cm	18.5	17.8	19.8	18.5

Summer month & Depth of soil	T_1	T_2	T_3	T_4
May				
0-30 cm	13.5	13.9	13.8	12.8
30- 60 cm	15.8	15.6	16.1	14.6
60-90 cm	16.9	17.2	18.4	17.9
June				
0-30 cm	14.3	14.8	15.8	13.9
30- 60 cm	17.8	18.2	17.9	17.5
60-90 cm	19.8	21.5	20.5	19.8

Table-39: Economics of CBCS

Treatments	Gross returns (Rs.)	COC (Rs.)	Net returns(Rs.)
T_1	2,82,450	92,426	1,90,024
T_2	2,72,834	97,847	1,74,987
T_3	2,76,432	93,120	1,83,312
T_4	1,30,680	72,821	57,859

Table-40: Earthworm population

Depth (population in Sq.m soil)	T_1	T_2	T_3	T_4
10 cm depth	10	8	14	9
20 cm depth	11	9	16	10
30 cm depth	14	10	18	12

Table-41: Microbiological studies

Soil microbial population	T_1	T_2	T_3	T_1
Bacteria (Nutrient Agar medium) (x 10 5 cfu/g)	6.45	7.0	7.2	6.45
Trichoderma (Trichoderma specific media) (x 10 3 cfu/g)	9.35	9.25	9.35	9.15

Table-42: Biomass Production and Vermi compost Production

	T_1	T_2	T_3	T_4
Biomass (t/ha/year)	32.5	33.4	35.6	7.3
Vermicompost (t/ha/year)	17.87	16.7	19.45	3.4

Table-43: NPK, Vermicompost, bio-fertilizer for different crops

Crop	75% of Rec. NPK/plant (T1)	50% of Rec. NPK/plant (T2)	Vermi compost	Bio-fertilizer
Coconut (g/plant)	N: 375 g P: 240 g K: 900 g	N: 250 g P: 160 g K: 600 g	25kg/tree	Azospirillum:100gm/plant Phosphobacteria:100g/plant
Banana (g/plant)	N:150 g P:150 g K:300 g	N:100 g P:100 g K:200 g	8 kg/tree	Azospirillum: 50gm/plant Phosphobacteria:50g/plant
Cocoa (g/plant)	N:75 g P:30 g K:105 g	N:50g P:20 g K:70 g	3 kg/plant	Azospirillum: 50gm/plant Phosphobacteria:50g/plant
Pineapple (g/plant)	N:6 g P:3 g K:6 g	N:4 g P:2 g K:4 g	5 t/ha	Azospirillum: 2.5 kg/ha Phosphobacteria:2.5 kg/ha
Heliconia (kg/ha)	N:15 g P:15 g K:15 g	N:10 g P:10 g K:10 g	2.5 t/ha	Azospirillum: 2.5 kg/ha Phosphobacteria: 2.5kg/ha
Tomato (kg/ha)	N:36 kg/ac P:18 kg/ac K:18 kg/ac	N:24 kg/ac P:12 kg/ac K:12 kg/ac	2.5 t/ha	Azospirillum:2.5 kg/ha Phosphobacteria:2.5 kg/ha

(Vermicompost, bio-fertilizer and vermiwash will be applied twice a year)

Techniques to be adopted: Non Replicated trial

a. Treatments: Coconut + Cocoa + Banana + Pineapple +Tomato + Heliconia

Treatments:

T_1: 75 % of Recommended NPK + Organic recycling with vermicompost.

T_2: 50 % of Recommended NPK + Organic recycling with vermicompost + vermiwash application + bio-fertiliser application and in situ green manuring.

T_3: Fully organic: Organic recycling with vermicompost + vermiwash application + bio-fertiliser application and in situ green manuring & green leaf manuring (Glyricidia) + composted coir pith and mulching with coconut leaves.

T_4: Mono block of coconut

Number of replications: Non replicated

Plot size/Treatment: 1.5 acres

For each treatment the following are the component crops:

Coconut: 24 palms, Cocoa: 36 trees, Banana: 108 plants

Pineapple: 24 beds, Heliconia: 9 beds Tomato: 9 beds

Screening of cocoa clones for their performance as a mixed crop in coconut gardens.

Data on growth parameters and pod characteristics was recorded for six cocoa clones viz., VTLCC – 1, VTLCH – 1, VTLCH – 2, VTLCH – 3, VTLCH – 4, VTLC – 1 (Control). Though non significant, maximum plant height (241.09 cm) was recorded by VTLCH – 1 followed by VTLCH – 2 (220.87 cm). Highest plant girth was recorded in VTLCH -1 (25.21 cm) followed by VTLCH – 2 (23.59 cm). Observations on yield data revealed that, VTLCH-1 recorded 2.8 kg dry beans per plant and was at par with VTLCH-4(2.52 kg) and VTLCH-3 (2.00 kg dry beans) (Table-44 & 45).

Table-44: Yield attributing characteristics of cocoa clones

Treatments	Pod weight	No. Of beans per pod	Dry bean yield/ tree /year
VTLC - 1	87.00	23.29	1.55
VTLCC – 1	90.50	25.10	1.00
VTLCH – 1	154.75	25.51	1.25
VTLCH – 2	138.50	31.45	2.80
VTLCH – 3	104.50	25.62	2.00
VTLCH – 4	98.50	26.62	2.52
S Em +	5.56	1.60	0.28
CD at 5%	16.91	4.86	0.87

Table-45: Growth attributing characters and yield of cocoa clones.

Treatments	Plant height (cm)	Girth (cm)	Height at 1st branching	Canopy spread E-W	Canopy spread N-S	Pod Colour	Pod surface (smooth / rough)	Husk thickness
VTLC - 1	219.66	20.95	150.33	255.49	269.70	Dark red	Smooth	0.8
VTLCC – 1	205.38	19.84	154.59	208.08	212.00	Green	Smooth	0.65
VTLCH – 1	241.09	25.21	172.08	292.51	289.74	Green	Smooth	0.64
VTLCH – 2	219.09	23.59	151.19	278.06	264.66	Green	Smooth	0.6
VTLCH – 3	220.87	23.49	159.53	284.37	274.53	Green, Dark red	Smooth	0.64
VTLCH – 4	190.37	19.33	142.95	205.95	213.95	Dark red	Smooth	0.55
S Em +	14.85	2.30	11.01	31.18	28.18			0.12
CD at 5%	N.S	N.S	N.S	N.S	N.S			NS

Non-Plan:

Study on quality aspects of copra in coconut reasons for formation of wrinkles

Solar drying was better compared to sun drying and smoke drying (Table 46, 47, 48 and 49)

Table-46: Effect of different drying methods on quality and wrinkle (%) in ECT cultivar during Rainy season 2014

Wrinkle (%)	ECT cultivar								
	Sun drying			Solar drying			Smoke drying		
	10^{th} Month	11^{th} Month	12^{th} Month	10^{th} Month	11^{th} Month	12^{th} Month	10^{th} Month	11^{th} Month	12^{th} Month
0-5% (No wrinkle)	0	0	40	0	15	30	0	0	30
5-25% (Medium)	0	30	50	0	60	70	0	10	30
25-50% (High)	0	20	10	20	25	0	0	10	20
50-100% (Very high)	0	30	0	60	0	0	20	10	10
100% (Completely wrinkled)	100	20	0	20	0	0	80	60	10

Table-47: Effect of different drying methods on quality and wrinkle (%) in Godavari Ganga hybrid during Rainy season 2014

Wrinkle (%)	Godavari Ganga hybrid								
	Sun drying			Solar drying			Smoke drying		
	10th Month	11th Month	12th Month	10th Month	11th Month	12th Month	10th Month	11th Month	12th Month
0-5% (No wrinkle)	0	0	25	0	0	40	0	10	10
5-25% (Medium)	0	10	25	0	45	60	0	55	25
25-50% (High)	0	10	30	0	35	0	0	20	25
50-100% (Very high)	0	30	20	70	10	0	30	10	20
100% (Completely wrinkled)	100	50	0	30	10	0	70	5	20

Table-48: Effect of different drying methods on quality and wrinkle (%) in ECT cultivar during Winter season 2015

Wrinkle (%)	ECT cultivar								
	Sun drying			Solar drying			Smoke drying		
	10th Month	11th Month	12th Month	10th Month	11th Month	12th Month	10th Month	11th Month	12th Month
0-5% (No wrinkle)	0	0	30	0	20	25	0	0	15
5-25% (Medium)	0	45	55	0	55	75	0	10	30
25-50% (High)	0	25	15	15	25	0	0	20	25
50-100% (Very high)	0	10	0	35	0	0	30	20	15
100% (Completely wrinkled)	100	0	0	50	0	0	70	50	15

Table-49: Effect of different drying methods on quality and wrinkle (%) in Godavari Ganga hybrid during Winter season 2015

Wrinkle (%)	Godavari Ganga hybrid								
	Sun drying			Solar drying			Smoke drying		
	10th Month	11th Month	12th Month	10th Month	11th Month	12th Month	10th Month	11th Month	12th Month
0-5% (No wrinkle)	0	0	35	0	0	45	0	20	10
5-25% (Medium)	0	15	35	0	55	55	0	45	35
25-50% (High)	0	10	30	0	35	0	0	30	35
50-100% (Very high)	0	40	0	40	10	0	40	5	15
100% (Completely wrinkled)	100	35	0	60	0	0	60	0	10

PALMYRAH

Horticultural Research Station, Pandirimamidi

AICRP on Palms (Palmyrah)

Root studies in Palmyrah

Studies were carried out to know the root distribution in pre bearing as well as adult palmyrah palms by destructive sampling method. The data of the average root distribution in pre bearing palmyrah palms revealed that the mean number of roots produced was 182. The roots were spread to a distance of 180 cm from the bole and to a depth of 120 cm from the surface. Almost 80% of roots were confined to a distance of 30cm from the bole. Over 60 % of the root growth was found between 30-60 cm depth near the bole.

In adult palmyrah palms the mean number of roots produced was 1437. The roots have spread to a distance of 150 cm from the bole. 62.4 % of roots were observed up to 60 cm distance, 35 % roots were found between 60 to 90 cm distance and only 10 % roots have spread beyond 90 cm distance from the bole. 80% of roots were confined to a depth of 30 to 90 cm from the soil surface adjascent to the bole. 11 to 14% of roots were observed at a depth between 90 to 150 cm, most of them observed at 30 to 90 cm distance from the bole. Less than 10% of roots were found on the top 30 cm depth from the soil surface which could spread only to a distance of 30 cm.

Phyllotaxy studies in palmyrah with emphasis on sex determination of palms based on leaf whorl arrangement.

Studies on three different places indicated that the palmyrah trees with the leaf arrangement of both the clockwise and anti clockwise were bearing both male and female inflorescences and no specific role of the leaf whorl arrangement was observed in determining the sex type of palmyrah.

Further studies indicated that an adult palmyrah tree has to produce 11 leaves to complete one circle around the trunk for finding the leaf on the same vertical line on the trunk. However, the trees of less than ten years age has to produce 11 leaves to complete one circle around the trunk for finding the leaf on the same vertical line on the trunk. The studies on the angle of deflection of the palmyrah leaves is going on with the collaboration of taxonomist at Andhra University, Visakhapatnam.

Determination of the age of the palmyrah palm based on the leaf scars present on the trunk

The data collected from different age groups of trees clearly showed that there is no uniformity in number of scars on different plants which were planted on the same date in all the age groups of trees studied. A lot of variation was observed in plant height in the palmyrah plants planted on the same date and plant height was positively correlated with the leaf scars on the trunk. However no relationship was observed between leaf scars and age of the palm as the same day planted palms exhibited a wide variation in number of scars present on the trunk. Hence it can be concluded that age of the palm cannot be determined based on the number of scars present on the trunk.

Studies on use of growth inhibiting substances for induction of early flowering in palmyrah *(Borassus flabellifer* L.) through dwarfening mechanism

The trial was initiated during the month of January 2015. The existing on farm trees of four, six and eight years were selected and three chemicals *viz.,* Chlormequat chloride, Mepiquat chloride, and Triacontanol were given to the selected plants by pouring on the apical bud as well as by root feeding according to the treatmental requirements. The application of chemicals was done at three months interval. The observations on growth and yield characters will be recorded after two years from the initiation of the project i.e., from January 2017.

CASHEW

Cashew Research Station, Bapatla

Results obtained from planting densities cum fertilizer trial revealed that trees planted at closer spacing i.e. 10 m x 5 m has recorded highest yield (10.43 kg/tree) with fertilizer levels at 75:25:25: kg/ha.

In high density planting trail, 4 x 4 m spacing recorded highest growth parameters at initial years. Highest cumulative yield of 5081 kg/ha was recorded in high density (4x4 m)compared to the normal density (8x8m) plot where the yield obtained was only 1533 kg/ha.

Cluster bean, marigold, amaranthus and hibiscus (gogu) were grown as inter crops. Marigold recorded maximum yield of 6486 kg/ha with higher cost benefit ratio (1:2.09).

The organoleptic evaluation of RTS for different varieties of cashew apple showed highest scores with cashew variety BPP-8 with respect to colour, flavor, appearance, sweetness and overall acceptability.

The organoleptic evaluation of Jam for different varieties of cashew apple showed higher scores with cashew variety BPP-8 with respect to color, flavour, appearance, sweetness and overall acceptability.

OILPALM

Horticultural Research Station, Vijayarai

Inter cropping of vegetables in one year old oilpalm

Among the four vegetables grown as inter crops in one year old oilpalm, cucumber recorded an average yield of 27.35 t ha $^{-1}$ with B:C ratio of 0.81, ridge gourd recorded an average yield of 37 t ha $^{-1}$ with a B:C ratio of 3.42 and colocasia recorded an average yield of 37.6 t ha $^{-1}$ with a B:C ratio of 0.76. Sweet corn was damaged severely by monkeies at silking stage hence no yield data was recorded.

C. POST HARVEST TECHNOLOGY

Horticultural Research Station, Pandirimamidi

Shelf life studies of sap collected through CPCRI method

Inflorescence sap of male palmyrah palm collected through CPCRI method was stored under ambient, refrigerated (4^0-8^0C) and freezing (- 4^0C) conditions. The sap was filled in 200 ml. glass bottles and PET bottles stored under respective condition. The changes in p^H, TSS, total sugars, reducing sugars and sensory quality were tested during storage. It was observed that the p^H, TSS, total sugars and reducing sugars were decreased during storage. The shelf life of the sap under ambient conditions was 3 hours, under refrigerated condition it was up to 10 hours, but the shelf life could be extended beyond one week under freezing condition.

Standardization of process for inflorescence sap based products

Process development for home based crystal jaggery was attempted with inflorescence sap collected through traditional and CPCRI methods. The sap collected was concentrated to 70, 80 and 90% Brix and cooled to room temperature. The syrup can be used as sweetener and the syrup was dried at low temperature to produce jaggery in powder form/crystals. The results showed that the syrup collected through CPCRI method could only form crystals and the sap collected in traditional method could be used for syrup. Further quality studies are in progress.

Standardization of palmyrah tuber flour based food products (like Pizza, Bakery items, confectionery, health mix etc.)

Development of RTE cubes

Osmotic dehydration of palmyrah tuber pieces was carried out in sugar syrup solution having different concentrations (40, 50 and 60% w/w), tuber thickness (mm) and sample to sugar syrup solution ratio (1: 2, 1: 4 and 1: 6). It was evaluated for weight loss and solid gain of tuber pieces due to the effect of sugar syrup concentration, size of the tuber piece and sample to sugar syrup solution. Weight loss and solid gain were observed with increase in sugar syrup concentration and sample to sugar syrup solution ratio and it increased with decrease in tuber thickness. In the experiment on tuber piece osmosis, the osmotic time of 5 to 6 hours was required to attain maximum weight loss and solid gain by tuber pieces. The optimum combination of tuber pieces for weight loss (water removed) and solid gain were found to be: 60% sugar syrup solution + 4 mm tuber thickness + 1: 6 sample to sugar syrup solution ratio.

Process development for removal of bitterness in flour extracted from palmyrah tuber

Flour was extracted from palmyrah tuber and soaked in water for 4, 6, 8 and 10 hours, steamed in autoclave for 10, 20 and 30min and converted into flour by drying at low temperature for removal of bitterness. The sensory score showed that the bitterness was removed completely by soaking in water for 6 hours. Further analysis for evaluation of nutritional losses due to soaking is in progress.

Preparation of tuber flour based products and sensory evaluation

Bakery products i.e. cake, cookies and noodles were prepared by mixing tuber flour of 25, 50 and 75 per cent of raw flour with flour soaked in water and steam cooked flour. Sensory evaluation was done for the quality of the products. Flour soaked in water gave best product up 75 % and bitterness was observed in raw flour. Steam cooked flour can be used up to 25 % to avoid the bitterness.

Standardization of medium for preservation of Palmyrah tender fruit endosperm *nungu*

Tender fruit endosperm (nungu) was peeled and kept in brix of 40^o, 50^o and 60^o, kept in deep freezer, the quality of nungu treated with 50^o brix was good up to one year.

Studies on different types of packing materials used for storing tender fruit endosperm (nungu) revealed that the peeled nungu kept in brix of 40^o and 50^o and packed with polypropalyne(PP), aluminium foil and multilayer pouch were kept in deep freezer. Within 15 days all the samples in freezing condition were good and under refrigeration (4^oC) the sample packed in PP slightly changed flavor, where as nungu packed in aluminium and multilayer pouch maintained quality except sweetness. At atmospheric conditions only multilayer pouch packed nungu was good and further quality studies are in progress.

Studies in clarification of cashew apple juice

Experiments were conducted for clarification of cashew apple juice using micro filtration (0.2 micron) with hallow fiber membrane processing set up of laboratory model supplied by IIT Kharaghpur. The result showed that the astringency and sedimentation was reduced drastically and gave positive results up to 60 days of storage. It could be improved with aseptic packaging.

Survey of traditional food processing methods in agency area of East Godavari

Visited tribal villages and collected some information on traditional foods. The sulphi palm or fishtail palm(C*aryota urens,* L) is the palm which yields sap of 40-60 l. per day and the most economical palm for tribal family. The sap was collected and analyzed for proximate analysis. The sap contains pH 6.5, 12.5° Brix of TSS of the fresh pulp, 85.12% moisture content, 0.6% protein content, 1.2% ash content, 22.5% carbohydrate content, calorific value (energy) of 102.83 K.cal/100 g., 9.5 g of reducing and 13g non reducing sugars content and 12.6g. starch, 0.5 g. maltose, 16 mg ascorbic acid and 8-76 mg of calcium.

Studies on physico-chemical and sorption studies of palmyrah fruit pulp

Physicochemical properties of palmyrah fruit pulp was studied. The fruits were analysed for pH, TSS, moisture, protein, fat, ash, carbohydrate, total sugars, starch, maltose, energy value, calcium and vitamin C, using common scientific methods of food characteristics determination.

The results showed that the pH ranged between 5.5 to 6.0, TSS of the fresh pulp was 16.5°Brix, moisture content was 74-77%, protein content was 1.24 %, fat content was 0.8 %, ash content was 1.2 g, carbohydrate content was 22.5g, caloric value (energy) was 102.83 kcal/100g, reducing and non reducing sugars content was 9.5 g and 13g, starch was 12.6g, maltose was 0.5g, ascorbic acid was 16mg and calcium was 8.76 mg.

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Study on Physiological and physico-chemical changes during storage of aonla fruits

The shelf life experiment on aonla fruits was conducted with seven cultivars *viz.* ATPS-1, ATPS-2, Kanchan, Chakaiya, NA6, NA7 and NA10 to study the physiological, physico-chemical changes and microbial infection during storage of aonla fruits. Observations were recorded at every four days interval up to 16 days. Data shown in the Table-1 indicated significantly more fruit weight loss in ATPS–1 (16.83 g) followed by Kanchan (16.18 g). The fruit weight loss was minimum in ATPS-2 (10.26 %) followed by NA-10 (11.03 %). The highest per cent decay loss was recorded in NA-10 (21.20) followed by NA-6 (18.85) and least per cent decay loss was recorded in Chakaiya (8.43) (Table-2). TSS content of fruits increased during storage (Table-3) whereas, acidity content decreased (Table-4) as the storage period increased. There was slight increase in pH of fruits during storage (Table-5).

Table-1: Varietal variation in physiological loss in weight (%) of Aonla fruits during storage at room temperature

Cultivar	0 days Initial fruit weight (g)		4 days		8 days		12 days		16 days		Mean
ATPS-1	20.28	0.0	5.22	(13.19)	9.98	(18.41)	14.03	(21.99)	16.83	(24.22)	**13.27**
ATPS-2	22.40	0.0	3.47	(10.73)	6.96	(15.30)	8.84	(17.28)	10.26	(18.67)	**10.39**
Kanchan	18.70	0.0	4.43	(12.14)	8.72	(17.17)	13.68	(21.63)	16.18	(23.66)	**12.34**
Chakaiya	19.38	0.0	3.83	(11.25)	8.18	(16.58)	10.42	(18.77)	13.27	(21.32)	**11.02**
NA6	25.05	0.0	3.62	(10.96)	6.76	(15.02)	9.13	(17.52)	12.63	(20.62)	**11.44**
NA7	23.12	0.0	3.53	(10.82)	7.43	(15.81)	10.85	(19.19)	12.40	(20.57)	**11.46**

Cultivar	0 days Initial fruit weight (g)		4 days	8 days	12 days	16 days	Mean
NA10	20.86	0.0	2.60 (9.25)	6.85 (15.15)	8.11 (16.29)	11.03 (19.23)	**9.89**
Mean:	**21.40**		**3.81**	**7.84**	**10.72**	**13.23**	**11.40**
CD at P=0.05	*1.66*		*1.03*	*1.30*	*3.14*	*3.23*	
SE.m±	*0.79*		*0.49*	*0.62*	*1.50*	*1.54*	
CV (%)	*5.22*		*6.22*	*5.42*	*11.16*	*10.27*	

(Figures in parentheses indicate transformed values (ARC SIN)

Table-2: Varietal variation in % decay loss of Aonla fruits during storage at room temperature (2014)

Cultivar	0 days	4 days	8 days	12 days	16 days	Mean
ATPS-1	0.00	1.28	8.30	14.29	16.50	**8.07**
ATPS-2	0.00	0.00	8.30	17.78	18.45	**8.91**
Kanchan	0.00	0.00	2.68	6.78	10.23	**3.94**
Chakaiya	0.00	0.00	2.38	4.08	8.43	**2.98**
NA6	0.00	5.80	9.20	11.93	18.85	**9.16**
NA7	0.00	1.33	7.75	8.93	11.18	**5.84**
NA10	0.00	2.00	10.13	18.03	21.20	**10.27**
Mean:	**0.0**	**1.5**	**7.0**	**11.7**	**15.0**	**7.0**
CD at P=0.05	***0.52***	***0.81***	***1.23***	***1.31***		
SE.m±	***0.25***	***0.38***	***0.58***	***0.62***		
CV (%)	***23.54***	***7.78***	***7.06***	***5.91***		

Table-3: Varietal variation in TSS (° Brix) of Aonla fruits during storage at room temperature (2014)

Cultivar/ selection	0 days	4 days	8 days	12 days	16 days	Mean
ATPS-1	14.86	16.03	16.12	16.32	17.82	16.23
ATPS-2	16.23	16.30	17.51	15.26	15.22	16.10
Kanchan	12.98	14.59	14.74	13.78	13.08	13.83
Chakaiya	12.68	15.31	15.80	13.47	13.16	14.08
NA6	12.60	13.95	16.44	13.07	13.05	13.82
NA7	15.79	15.85	15.96	17.81	16.28	16.34
NA10	10.59	13.60	11.24	10.92	10.67	11.40
Mean:	**13.68**	**15.09**	**15.40**	**14.37**	**14.18**	**14.54**

Cultivar/ selection	0 days	4 days	8 days	12 days	16 days	Mean
CD at P=0.05	*1.54*	*0.92*	*1.27*	*0.25*	*0.76*	
SE.m±	*0.73*	*0.44*	*0.61*	*0.59*	*0.36*	
CV (%)	*7.59*	*4.09*	*5.58*	*5.84*	*3.60*	

Table-4: Varietal variation in Acidity (%) of Aonla fruits during storage at room temperature (2014)

Cultivar/ selection		0 days		4 days		8 days		12 days		16 days	Mean
ATPS-1	1.03	(5.81)	1.01	(5.75)	0.97	(5.65)	0.93	(5.53)	0.90	(5.43)	**0.97**
ATPS-2	1.07	(5.92)	1.04	(5.86)	0.93	(5.15)	0.83	(5.23)	0.79	(5.08)	**0.93**
Kanchan	1.05	(5.87)	1.02	(5.79)	0.98	(5.67)	0.92	(5.51)	0.87	(5.34)	**0.97**
Chakaiya	1.12	(6.07)	1.08	(5.95)	1.03	(5.82)	1.03	(5.81)	0.98	(5.69)	**1.05**
NA6	0.87	(5.34)	0.83	(5.23)	0.80	(5.12)	0.77	(5.03)	0.74	(4.93)	**0.80**
NA7	1.08	(5.97)	1.07	(5.92)	1.05	(5.88)	1.05	(5.87)	1.00	(5.75)	**1.05**
NA10	1.04	(5.86)	1.02	(5.80)	1.01	(5.77)	0.99	(5.72)	0.97	(5.66)	**1.01**
Mean:	**1.04**	**1.01**	**0.96**	**0.93**	**0.89**	**0.97**					
CD at P=0.05	*0.05*		*0.09*		*0.15*		*0.05*		*0.06*		
SE.m±	*0.023*		*0.041*		*0.07*		*0.022*		*0.027*		
CV (%)	*0.57*		*1.02*		*1.79*		*0.56*		*0.73*		

(Figures in parentheses indicate transformed values (ArcSin)

Table-5: Varietal variation in pH of Aonla fruits during storage at room temperature (2014)

Cultivar/selection	0 days	4 days	8 days	12 days	16 days	Mean
ATPS-1	2.61	2.71	2.68	2.68	2.65	**2.66**
ATPS-2	2.53	2.74	2.76	2.68	2.68	**2.68**
Kanchan	3.01	3.19	2.48	2.44	2.46	**2.71**
Chakaiya	2.64	2.90	2.79	2.71	2.68	**2.74**
NA6	2.88	3.13	3.01	2.94	2.90	**2.97**
NA7	2.44	2.70	2.74	2.65	2.51	**2.61**
NA10	2.67	2.85	2.90	2.77	2.73	**2.78**
Mean	**2.68**	**2.89**	**2.77**	**2.70**	**2.66**	**2.74**
CD at P=0.05	*0.25*	*0.29*	*0.17*	*0.16*	*0.24*	
SE.m±	*0.12*	*0.14*	*0.08*	*0.07*	*0.12*	
CV (%)	*6.35*	*6.87*	*4.20*	*4.04*	*6.15*	

Effect of different packaging material and storage temperature on shelf life of pomegranate arils

Effect of different packaging material and storage temperatures on shelf life of pomegranate arils was studied. 250g of pomegranate arils were packed in polythene pouches/punnets and stored at different temperatures. At every four days interval up to 12 days, observations were recorded on aril weight, TSS, acidity, pH, fungal and bacterial count and organoleptic score by drawing samples.

The results of the study revealed that the physiological loss in weight of arils was minimum (1.07 g) when arils were packed in polythene standing pouches (400 gauge) with 1% vent and stored at 0°C which was followed by pouches with 5% vent and stored at 0°C (6.08 g) and punnets with 1% vent and stored at 7-8°C (6.59 g) during 12 days of storage period (Table-6). TSS of arils decreased during storage (Table-7) whereas, pH of arils increased during storage except in treatments where arils were stored at 7-8°C (Table-8). The fungal count was more in stored arils than bacterial count. The overall acceptability of arils was recorded in treatments where arils were packed in pouches with 1% vent and stored at 7-8°C.

Table- 6: Physiological loss in weight (g) of pomegranate arils during storage

Treatments		0 days	4 days		8 days		12 days		Mean	
T_1	Pouch 1% vent at 0°C	250.00	0.17	(0.07)	0.61	(0.24)	1.07	(0.43)	0.62	(0.25)
T_2	Pouch 1% vent at 7-8°C	250.00	0.78	(0.31)	2.38	(0.95)	31.37	(12.55)	11.51	(4.60)
T_3	Pouch 1% vent at room temperature	250.00	43.22	(17.29)	76.43	(30.57)	83.72	(33.49)	67.79	(27.12)
T_4	Pouch 5% vent at 0°C	250.00	1.91	(0.76)	4.60	(1.84)	6.08	(2.43)	4.20	(1.68)
T_5	Pouch 5% vent at 7-8°C	250.00	3.02	(1.21)	8.79	(3.52)	27.32	(10.93)	13.04	(5.22)
T_6	Pouch 5% vent at room temperature	250.00	59.12	(23.65)	94.49	(37.79)	105.71	(42.28)	86.44	(34.58)
T_7	Punnet 1% vent at 0°C	250.00	7.03	(2.81)	7.80	(3.12)	8.88	(3.55)	7.90	(3.16)
T_8	Punnet 1% vent at 7-8°C	250.00	7.30	(2.92)	8.74	(3.49)	6.59	(2.64)	7.54	(3.02)
T_9	Punnet 1% vent at room temperature	250.00	9.06	(3.62)	76.64	(30.66)	53.04	(21.21)	46.25	(18.50)
T_{10}	Punnet 5% vent at 0°C	250.00	10.17	(4.07)	14.32	(5.73)	17.30	(6.92)	13.93	(5.57)
T_{11}	Punnet 5% vent at 7-8°C	250.00	9.96	(3.98)	16.23	(6.49)	28.02	(11.21)	18.07	(7.23)
T_{12}	Punnet 5% vent at room temperature	250.00	18.87	(7.55)	127.64	(51.06)	155.65	(62.26)	100.72	(40.29)
T_{13}	Control	250.00	43.02	(17.21)	80.12	(32.05)	100.15	(40.06)	74.43	(29.77)
	Mean:	**250.00**	16.43	(6.57)	39.91	(15.96)	48.07	(19.23)	34.80	(13.92)
	CD at 5%	**4.40**	**16.39**		**26.04**					
	SE.m±		**2.02**		**7.52**		**11.95**			
	CV (%)		**12.29**		**18.85**		**24.87**			

Table- 7: TSS (° Brix) of pomegranate arils during storage

	Treatments	0 days	4 days	8 days	12 days
T_1	Pouch 1% vent at 0°C	13.00	11.85	13.20	11.50
T_2	Pouch 1% vent at 7-8°C	13.00	12.65	10.55	10.35
T_3	Pouch 1% vent at room temperature	13.00	10.50	-	-
T_4	Pouch 5% vent at 0°C	13.00	11.15	12.35	12.85
T_5	Pouch 5% vent at 7-8°C	13.00	11.85	11.85	11.65
T_6	Pouch 5% vent at room temperature	13.00	10.15	-	-
T_7	Punnet 1% vent at 0°C	13.00	12.25	11.95	11.25
T_8	Punnet 1% vent at 7-8°C	13.00	12.45	12.15	12.05
T_9	Punnet 1% vent at room temperature	13.00	12.10	-	-
T_{10}	Punnet 5% vent at 0°C	13.00	12.15	12.85	12.80
T_{11}	Punnet 5% vent at 7-8°C	13.00	12.00	11.15	11.00
T_{12}	Punnet 5% vent at room temperature	13.00	10.75	-	-
T_{13}	Control	13.00	10.35	-	-
	Mean:	**13.00**	**11.55**	**7.39**	**7.19**
	CD at 5%		**0.14**	**0.12**	**0.18**
	SE.m±		**0.06**	**0.05**	**0.08**
	CV (%)		**0.55**	**0.73**	**1.17**

- Fermentation took place and hence observations were not recorded

Table- 8: pH of pomegranate arils during storage

	Treatments	0 days	4 days	8 days	12 days
T_1	Pouch 1% vent at 0°C	3.26	3.51	3.54	3.58
T_2	Pouch 1% vent at 7-8°C	3.26	3.17	2.21	3.26
T_3	Pouch 1% vent at room temperature	3.26	3.05	-	-
T_4	Pouch 5% vent at 0°C	3.26	3.44	2.50	3.59
T_5	Pouch 5% vent at 7-8°C	3.26	3.10	2.67	3.19
T_6	Pouch 5% vent at room temperature	3.26	2.74	-	-
T_7	Punnet 1% vent at 0°C	3.26	3.15	3.44	3.51
T_8	Punnet 1% vent at 7-8°C	3.26	3.15	2.12	3.25
T_9	Punnet 1% vent at room temperature	3.26	3.05	-	-
T_{10}	Punnet 5% vent at 0°C	3.26	3.25	3.61	3.48
T_{11}	Punnet 5% vent at 7-8°C	3.26	2.14	2.48	3.27
T_{12}	Punnet 5% vent at room temperature	3.26	3.07	-	-
T_{13}	Control	3.26	2.98	-	-
	Mean:	**3.26**	**3.06**	**1.73**	**2.08**
	CD at 5%		**0.017**	**0.013**	**0.011**
	SE.m±		**0.008**	**0.006**	**0.005**
	CV (%)		**0.26**	**0.35**	**0.25**

- Fermentation took place and hence observations were not recorded

Table- 9: Acidity (%) of pomegranate arils during storage

Treatments		0 days	4 days	8 days	12 days
T_1	Pouch 1% vent at 0°C	0.38	0.31	0.33	0.33
T_2	Pouch 1% vent at 7-8°C	0.38	0.37	0.41	0.56
T_3	Pouch 1% vent at room temperature	0.38	1.11	—	—
T_4	Pouch 5% vent at 0°C	0.38	0.29	0.34	0.34
T_5	Pouch 5% vent at 7-8°C	0.38	0.34	0.50	0.58
T_6	Pouch 5% vent at room temperature	0.38	1.11	—	—
T_7	Punnet 1% vent at 0°C	0.38	0.28	0.32	0.35
T_8	Punnet 1% vent at 7-8°C	0.38	0.33	0.42	0.74
T_9	Punnet 1% vent at room temperature	0.38	1.77	—	—
T_{10}	Punnet 5% vent at 0°C	0.38	0.30	0.32	0.34
T_{11}	Punnet 5% vent at 7-8°C	0.38	0.32	0.37	0.53
T_{12}	Punnet 5% vent at room temperature	0.38	1.82	—	—
T_{13}	Control	0.38	1.65	—	—
	Mean:	**0.38**	**0.77**	**0.23**	**0.29**
	CD at 5%		**0.02**	**0.015**	**0.013**
	SE.m±		**0.007**	**0.006**	**0.006**
	CV (%)		**1.02**	**2.95**	**2.01**

- Fermentation took place and hence observations were not recorded

Table- 10: Bacterial count (total viable cell count) on Nutrient Agar Medium (NAM):

Treatments		Total Colony Forming Unit($\times 10^8$ CFU/ml)		
		4 days	8 days	12 days
T_1	Pouch 1% vent at 0°C	0.00	0.06	0.38
T_2	Pouch 1% vent at 7-8°C	0.06	0.31	0.92
T_3	Pouch 1% vent at room temperature	0.26	2.49	*
T_4	Pouch 5% vent at 0°C	0.00	0.11	0.51
T_5	Pouch 5% vent at 7-8°C	0.23	0.71	1.06
T_6	Pouch 5% vent at room temperature	0.35	2.42	*
T_7	Punnet 1% vent at 0°C	0.02	0.21	0.70
T_8	Punnet 1% vent at 7-8°C	0.10	0.85	1.70
T_9	Punnet 1% vent at room temperature	1.32	2.97	*
T_{10}	Punnet 5% vent at 0°C	0.00	0.35	0.80
T_{11}	Punnet 5% vent at 7-8°C	0.21	1.09	1.91
T_{12}	Punnet 5% vent at room temperature	1.15	2.78	*
T_{13}	Control	1.45	3.23	*
	CD at P=0.05	**16.42**	**25.96**	**10.51**
	SE.m±	**7.95**	**12.58**	**5.09**
	CV (%)	**24.56**	**11.39**	**10.16**

*>300 colonies

Significant differences were observed among treatments for bacterial count during storage of pomegranate arils (Table-10). The bacterial count increased in stored arils as the period of storage increased. On 4th day, arils were almost free from bacterial contamination when packed in both pouches and punnets with 1% and 5% vent and kept at 0°C. Initial bacterial count on 4th day was maximum in T_{13} (Control) – 1.45 X 10^8 CFU/ml which was on par with T_9 (punnets with 1% vent at room temperature) – 1.32 X 10^8 CFU/ml. By 8th day, bacterial contamination was observed in all the treatments. Maximum count was recorded in T_{13} (3.23 X 10^8 CFU/ml) and T_9 (2.97 X 10^8 CFU/ml) whereas, minimum contamination was recorded in T_1 (pouches with 1% vent at 0°C) – 0.06 X 10^8 CFU/ml and T_4 (pouches with 5% vent at 0°C) – 0.11 X 10^8 CFU/ml). On final day (12 days), the arils stored in T_3 and T_6 pouches (1% and 5% vent) and punnets in T_9 and T_{12} (1% and 5% vent) and kept at room temperature were highly contaminated with bacteria besides control (T_{13}). The minimum contamination was observed in T_1 (pouch with 1% vent at 0°C) – 0.38 X 10^8 CFU/ml and T_4 (pouch with 5% vent at 0°C) – 0.51 X 10^8 CFU/ml.

Table- 11: Fungal count (total viable cell count) on Potato Dextrose Agar (PDA):

Treatments		Total Colony Forming Unit(×10^8 CFU/ml)		
		4 days	**8 days**	**12 days**
T_1	Pouch 1% vent at 0°C	0.00	0.25	0.52
T_2	Pouch 1% vent at 7-8°C	0.11	0.67	1.12
T_3	Pouch 1% vent at room temperature	0.46	2.84	*
T_4	Pouch 5% vent at 0°C	0.00	0.17	0.79
T_5	Pouch 5% vent at 7-8°C	0.18	0.79	1.14
T_6	Pouch 5% vent at room temperature	0.59	3.11	*
T_7	Punnet 1% vent at 0°C	0.01	0.27	0.77
T_8	Punnet 1% vent at 7-8°C	0.87	0.79	1.87
T_9	Punnet 1% vent at room temperature	2.28	3.00	*
T_{10}	Punnet 5% vent at 0°C	0.00	0.31	0.94
T_{11}	Punnet 5% vent at 7-8°C	0.29	1.17	2.50
T_{12}	Punnet 5% vent at room temperature	1.41	3.11	*
T_{13}	Control	1.80	3.26	*
	CD at P=0.05	**30.25**	**18.47**	**21.51**
	SE.m±	**14.66**	**8.95**	**10.42**
	CV (%)	**29.15**	**7.22**	**17.19**

*>300 colonies

Significant differences were observed among treatments for fungal count during storage of pomegranate arils (Table-11). The fungal count increased in stored arils as the period of storage increased. On 4th day, arils were almost free from fungal contamination when packed in both pouches and punnets with 1% and 5% vent and kept at 0°C. Initial fungal count on 4th day was maximum in T_{13} (Control) – 2.28 X 10^8 CFU/ml which was on par with T_9 (punnets with 1% vent at room temperature) – 1.80 X 10^8 CFU/ml. By 8th day, fungal contamination was observed in all the treatments. Maximum count was recorded in T_{13} (3.26 X 10^8 CFU/ml), T_6 and T_{12} (3.11 X 10^8) whereas, minimum contamination was recorded in T_1 (pouches with 1% vent at 0°C) – 0.17 X 10^8 CFU/ml and T_4 (pouches with 5% vent at 0°C) – 0.25 X 10^8 CFU/ml). On final day (12 days), the arils stored in T_3 and T_6 pouches (1% and 5% vent) and punnets in T_9 and T_{12} (1% and 5% vent) and kept at room temperature were highly contaminated with fungi besides control (T_{13}). The minimum contamination was observed in T_1 (pouch with 1% vent at 0°C) – 0.52 X 10^8 CFU/ml and T_4 (pouch with 5% vent at 0°C) – 0.77 X 10^8 CFU/ml.

Table- 12: Organoleptic Test ***(Amerine et al. 1965)***

Organoleptic score	Rating
9	Like extremely
8	Like very much
7	Like moderately
6	Like slightly
5	Neither like nor dislike
4	Dislike slightly
3	Dislike moderately
2	Dislike very much
1	Dislike extremely

The overall rating was obtained by averaging score of evaluation. The arils with sensory score of 5.5 and above were rated as acceptable.

Table-13: Colour and appearance of arils

	Treatments	0 days	4 days	8 days	12 days
T_1	Pouch 1% vent at 0°C	8.33	8.00	2.33	2.00
T_2	Pouch 1% vent at 7-8°C	8.33	8.00	5.00	3.00
T_3	Pouch 1% vent at room temperature	8.33	6.00	2.33	2.00
T_4	Pouch 5% vent at 0°C	8.33	6.00	3.00	2.00
T_5	Pouch 5% vent at 7-8°C	8.33	6.00	4.33	2.00
T_6	Pouch 5% vent at room temperature	8.33	6.00	2.33	2.00
T_7	Punnet 1% vent at 0°C	8.33	7.67	2.33	2.00
T_8	Punnet 1% vent at 7-8°C	8.33	8.00	5.00	3.00
T_9	Punnet 1% vent at room temperature	8.33	6.00	2.33	2.00
T_{10}	Punnet 5% vent at 0°C	8.33	6.00	3.00	2.00
T_{11}	Punnet 5% vent at 7-8°C	8.33	6.33	4.33	2.00
T_{12}	Punnet 5% vent at room temperature	8.33	6.00	2.33	2.00

	Treatments	0 days	4 days	8 days	12 days
T_{13}	Control	8.33	6.00	2.00	1.00
	Statistics				
	CD at 5%		**0.4**	**0.49**	**-**
	SE.m±		**0.19**	**0.24**	**-**
	CV (%)		**3.56**	**9.35**	**-**

The colour and appearance of arils was rated acceptable upto 4 days during storage in all the treatments and the rating was high in T_1 (pouch 1% vent at 0°C), T_2 (pouch 1% vent at 7-8°C) and T_8 (punnet 1% vent at 7-8°C). From 8th day onwards, the colour and appearance of arils was not acceptable (Table-13).

Table-14: Flavour of arils

	Treatments	0 days	4 days	8 days	12 days
T_1	Pouch 1% vent at 0°C	8.00	8.00	4.67	4.00
T_2	Pouch 1% vent at 7-8°C	8.00	7.67	4.00	3.00
T_3	Pouch 1% vent at room temperature	8.00	4.33	2.00	1.00
T_4	Pouch 5% vent at 0°C	8.00	4.33	4.33	4.00
T_5	Pouch 5% vent at 7-8°C	8.00	4.33	4.00	3.00
T_6	Pouch 5% vent at room temperature	8.00	4.00	2.00	1.00
T_7	Punnet 1% vent at 0°C	8.00	7.67	4.67	4.00
T_8	Punnet 1% vent at 7-8°C	8.00	7.33	4.00	3.00
T_9	Punnet 1% vent at room temperature	8.00	4.33	2.00	1.00
T_{10}	Punnet 5% vent at 0°C	8.00	4.33	4.33	4.00
T_{11}	Punnet 5% vent at 7-8°C	8.00	4.33	4.00	3.00
T_{12}	Punnet 5% vent at room temperature	8.00	4.67	2.00	1.00
T_{13}	Control	8.00	3.67	1.00	1.00
	CD at 5%		**0.9**	**0.49**	**0**
	SE.m±		**0.44**	**0.24**	**0**
	CV (%)		**10.08**	**8.84**	**0**

The flavour of arils during storage on 4th day was acceptable in T_1 (pouch 1% vent at 0°C), T_2 (pouch 1% vent at 7-8°C), T_7 (punnet 1% vent at 0°C) and T_8 (punnet 1% vent at 7-8°C) only (Table-14).

Table-15: Texture of arils

	Treatments	0 days	4 days	8 days	12 days
T_1	Pouch 1% vent at 0°C	8.67	7.33	1.67	1.33
T_2	Pouch 1% vent at 7-8°C	8.67	8.00	2.67	2.33
T_3	Pouch 1% vent at room temperature	8.67	5.67	2.33	2.00
T_4	Pouch 5% vent at 0°C	8.67	5.33	1.67	1.33
T_5	Pouch 5% vent at 7-8°C	8.67	6.00	2.00	1.67
T_6	Pouch 5% vent at room temperature	8.67	5.67	2.33	2.00
T_7	Punnet 1% vent at 0°C	8.67	7.00	1.67	1.33
T_8	Punnet 1% vent at room temperature	8.67	5.67	2.33	2.00
T_9	Punnet 5% vent at 0°C	8.67	5.67	1.67	1.33
T_{10}	Punnet 5% vent at 7-8°C	8.67	6.00	2.00	1.67
T_{11}	Punnet 5% vent at room temperature	8.67	5.67	2.33	2.00
T_{12}	Control	8.67	5.33	1.00	1.00
	CD at 5%		**0.62**	**0.82**	**0.73**
	SE.m±		**0.3**	**0.4**	**0.35**
	CV (%)		**5.89**	**24.04**	**25.24**

The texture of arils during storage was acceptable up to 4 days only in all the treatments except, T_4 (pouch 5% vent at 0°C) and control (Table-15). However, it was observed good in T_2 (pouch 1% vent at 7-8°C) in which the rating recorded was highest.

Table-16: Overall acceptability of arils

Treatments		0 days	4 days	8 days	12 days
T_1	Pouch 1% vent at 0°C	8.33	7.00	1.33	1.00
T_2	Pouch 1% vent at 7-8°C	8.33	8.00	1.67	1.33
T_3	Pouch 1% vent at room temperature	8.33	5.00	1.33	1.00
T_4	Pouch 5% vent at 0°C	8.33	5.00	1.00	1.00
T_5	Pouch 5% vent at 7-8°C	8.33	6.00	1.67	1.33
T_6	Pouch 5% vent at room temperature	8.33	5.33	1.33	1.00
T_7	Punnet 1% vent at 0°C	8.33	6.67	1.33	1.00
T_8	Punnet 1% vent at 7-8°C	8.33	7.00	1.67	1.33
T_9	Punnet 1% vent at room temperature	8.33	5.00	1.33	1.00
T_{10}	Punnet 5% vent at 0°C	8.33	5.00	1.00	1.00
T_{11}	Punnet 5% vent at 7-8°C	8.33	6.00	1.67	1.33
T_{12}	Punnet 5% vent at room temperature	8.33	5.00	1.33	1.00
T_{13}	Control	8.33	4.67	1.00	1.00
	CD at 5%		**0.93**	**0.79**	**0.47**
	SE.m±		**0.45**	**0.27**	**0.53**
	CV (%)		**9.5**	**34.35**	**25.16**

The overall acceptability of arils was found for arils packed in pouch with 1% vent and stored at 7-8°C (T_2) followed by pouch with 1% vent and stored at 0°C (T_1) and punnet with 1% vent and stored at 7-8°C (T_8) (Table-16).

Post Harvest Technology Research Station, Venkataramannagudem

Study on the efficiency of fruit grading equipment for mango (*Mangifera indica* L.)

The grading efficiency of machine was of 57.1% in case of variety-1 (Panchadarakalasa) and 34.40% in case of variety-2(Cherukurasam) and damage was nil due to thermocole padding in the machine. The efficiency of this machine as per design for round fruits was of 1t/hr but on observation it graded only 0.35 t/hr with an efficiency of 35% in respect of Mango. (Table-17 &18).

Table 17:Efficiency of fruit grading machine of Integrated Pack House for Mango (Variety: Panchadarakalasa)

Item	>500g		>400g		>300g		>200g		>Last grade		Total (kg)	
	No.	Weight (kg)	No.	Weight (kg)	No.	Weight (kg)	No.	Weight (kg)	No.	Weight (kg)	No.	Weight (kg)
Fruits graded properly	2	1.010	4	1.815	48	16.690	70	19.265	-	-	124	38.78
Fruits not graded properly	13	4.945	22	5.833	74	17.462	5	0.910	-	-	114	29.15
Fruits damaged	-	-	-	-	-	-	-	-	-	-	-	-
Total	**15**	**5.955**	**26**	**7.648**	**122**	**34.152**	**75**	**20.175**	**-**	**-**	**238**	**67.93**

Sl.No	Item	Weight (kg)	Percentage
	Total weight of the fruits	**67.930**	**-**
1.	Total weight of Fruits graded properly	38.780	57.10
2.	Total weight of Fruits not graded properly	29.150	42.90
3.	Total weight of Fruits damaged	-	-
4.	Total weight loss	-	-
		Number	**Percentage**
	Total number of fruits	**238**	
1.	Total Fruits graded properly	124	52.10
2.	Total Fruits not graded properly	114	47.90
3.	Total Fruits damaged	-	-

Table 18: Efficiency of fruit grading machine of Integrated Pack House for Mango (Variety : Chinnarasam)

Item	>500g		>300g		>250g		>200g		>Last grade		Total (kg)	
	No.	Weight (kg)	No.	Weight (kg)	No.	Weight (kg)	No.	Weight (kg)	No.	Weight (kg)	No.	Weight (kg)
Fruits graded properly	1	0.520	3	1.240	23	7.285	33	9.245	-	-	60	18.29
Fruits not graded properly	6	2.155	48	13.280	33	7.885	4	0.740	44	10.830	135	34.89
Fruits damaged	-	-	-	-	-	-	-	-	-	-	-	-
Total	**7**	**2.675**	**51**	**14.520**	**56**	**15.170**	**37**	**9.985**	**44**	**10.830**	**195**	**53.18**

SlNo	Item	Weight (kg)	Percentage
	Total weight of the fruits	**53.18**	**-**
1.	Total weight of Fruits graded properly	18.29	34.40
2.	Total weight of Fruits not graded properly	34.89	65.60
3.	Total weight of Fruits damaged	-	-
4.	Total weight loss	-	-
		Number	**Percentage**
	Total number of fruits	**195**	
1.	Total Fruits graded properly	60	30.80
2.	Total Fruits not graded properly	135	69.20
3.	Total Fruits damaged	-	-

Effect of post harvest treatments with plant growth regulators with different packing material on shelf life of lime (*Citrus aurantiafolia* Swingle).

The three growth regulators *viz*., GA_3 at 100,200 and 300 ppm, BA at 50,100 and 200 ppm and Cytokinin at 10,20,30 ppm concentrations were applied at full maturity stage of lime and stored in packing material *viz*., LDPE bags, Gunny bags and Poly net bags at room temperature. Among the different treatments, the acid lime treated with BA @ 200 ppm followed by 100 ppm recorded lowest physiogical loss of weight (22.44% & 23.69%), highest fruit colour score (2.45 & 2.61), highest shelf life (18.83 and 16.17 days), low spoilage percentage (27.78 and 36.11).The ascorbic acid content (25.71 mg/100 ml) and TSS (6.75º Brix) were high in limes treated with BA @ 200 ppm followed by BA @ 100ppm. Among the treatments the fruits packed in LDPE bags recorded highest shelf life of 19.85 days compared to Polynet bags (9.70 days) and PLW of 24.09% and 32.18% respectively when compared to all other treatments.

Table 19: Effect of post harvest treatments with plant growth regulators with different packing material on different physiological parameters of lime (Citrus aurantiafolia Swingle).

Growth regulators/ Packing material	Physiological loss of weight (%)				Shelf life (Days)				Juice content (%)			
	LDPE Bags	Gunny Bags	Polynet Bags	Mean	LDPE Bags	Gunny Bags	Polynet Bags	Mean	LDPE Bags	Gunny Bags	Polynet Bags	Mean
T_1:GA_3 100 ppm	28.60	33.28	35.78	32.55	16.00	11.00	7.50	11.50	51.60	38.67	38.11	42.79
T_2: GA_3 200 ppm	27.58	31.72	34.18	31.16	16.50	11.00	8.50	12.00	53.86	39.66	38.94	44.15
T_3 :GA_3 300 ppm	26.73	31.08	33.54	30.45	18.50	11.50	9.50	13.17	54.91	41.16	40.06	45.37
T_4: BA 50 ppm	19.55	25.20	29.03	24.59	22.50	13.00	11.00	15.50	58.70	48.20	45.71	50.87
T_5:BA 100 ppm	18.58	24.40	28.09	23.69	23.50	13.50	11.50	16.17	59.13	49.31	47.79	52.08
T_6:BA200 ppm	16.94	23.48	26.92	22.44	25.50	15.50	12.50	17.83	60.47	50.67	48.39	53.17
T_7:Cytokinin 10 ppm	25.33	29.96	32.69	29.32	20.00	12.00	9.50	13.83	55.78	42.83	41.32	46.64
T_8:Cytokinin20 ppm	24.35	29.37	31.55	28.42	21.00	12.50	10.00	14.50	58.02	45.48	43.64	49.04
T_9:Cytokinin 30 ppm	21.93	27.78	30.51	26.74	21.50	13.50	10.50	15.17	56.87	44.35	43.04	48.08
T_{10}: Control	31.36	34.74	39.57	35.22	13.50	8.50	6.50	9.50	43.10	38.53	33.04	38.22
MEAN	24.09	29.10	32.18		19.85	12.20	9.70		55.24	43.88	42.00	
	C.D	SE (d)	SE (m)		C.D	SE (d)	SE (m)		C.D	SE (d)	SE (m)	
Factor (A)	2.88	1.41	1.00		0.70	0.34	0.24		N.S.	4.65	3.29	
Factor (B)	1.58	0.77	0.55		0.38	0.19	0.13		5.20	2.55	1.80	
Factor (AXB)	N.S.	2.44	1.73		1.21	0.59	0.42		N.S.	8.06	5.70	

Among the different treatments, the lowest physiological loss of weight of 22.44 % was recorded in the limes treated with BA @ 200 ppm followed by BA @ 100 ppm (23.69%) where as the maximum shelf life of fruits, 17.83 days and juice content of 53.17% was recorded in limes treated with BA @ 200 ppm. However, the LDPE bags showed less PLW, highest juice content and long shelf life of fruits when compared to other methods of packing.

Fruits treated with growth regulators and stored in LDPE bags

Fruits treated with growth regulators and stored in gunny cloth bags

Fruits treated with BA 200 ppm stored in LDPE bags

Fruits treated with BA 100 ppm stored in LDPE bags

Table 20: Results of growth regulators & packing meterial in shelf life of citurus avrauta folia

Growth regulators/ Packing material	Acidity (%)				Fruit Colour (Score)				Total Soluble Solids (^{0} Brix)			
	LDPE Bags	Gunny Bags	Polynet Bags	Mean	LDPE Bags	Gunny Bags	Polynet Bags	Mean	LDPE Bags	Gunny Bags	Polynet Bags	Mean
T_1:GA_3 100 ppm	6.92	6.05	5.88	6.28	3.40	3.78	4.25	3.81	6.85	7.80	8.00	7.55
T_2: GA_3 200 ppm	7.13	6.29	6.12	6.51	3.20	3.59	4.03	3.61	6.65	7.70	7.85	7.40
T_3 :GA_3 300 ppm	7.32	6.42	6.35	6.69	3.10	3.47	3.94	3.50	6.55	7.55	7.65	7.25
T_4: BA 50 ppm	7.49	6.73	6.57	6.93	2.38	2.83	3.20	2.80	6.35	7.35	7.50	7.07
T_5:BA 100 ppm	7.63	6.87	6.63	7.04	2.18	2.64	3.02	2.61	6.20	7.25	7.30	6.92
T_6:BA200 ppm	7.84	7.13	6.83	7.27	2.01	2.52	2.81	2.45	6.05	7.05	7.15	6.75
T_7:Cytokinin 10 ppm	7.27	6.58	6.31	6.72	2.92	3.34	3.76	3.34	7.15	8.20	8.20	7.85
T_8:Cytokinin20 ppm	7.42	6.72	6.47	6.87	2.84	3.18	3.54	3.18	7.00	8.05	8.35	7.80
T_9:Cytokinin 30 ppm	7.58	6.81	6.62	7.00	2.68	3.02	3.36	3.02	6.80	7.95	8.55	7.77
T_{10}: Control	6.65	5.63	4.96	5.74	3.61	4.35	4.63	4.20	7.40	7.95	8.85	8.07
MEAN	7.32	6.52	6.27		2.83	3.27	3.65		6.70	7.69	7.94	
	C.D	SE (d)	SE (m)		C.D	SE (d)	SE (m)		C.D	SE (d)	SE (m)	
Factor (A)	N.S.	0.45	0.32		0.65	0.32	0.22		0.41	0.20	0.14	
Factor (B)	0.50	0.25	0.17		0.35	0.17	0.12		0.22	0.11	0.08	
Factor (AXB)	N.S.	0.78	0.55		N.S.	0.55	0.39		N.S.	0.35	0.25	

The maximum acidity of 7.27% and fruit colour score of 2.45 was recorded in limes treated with BA @ 200 ppm followed by BA @ 100 ppm (7.04%) and (3.02) respectively where as the minimum 6.75º Brix of Total Soluble Solids was recorded. Among the different packing materials the LDPE bags showed better when compared to other methods of packing.

Table 21: Effect of various growth regulators on storage life of acid line

Growth regulators	Spoilage (%)				Ascorbic acid content (mg/100 ml.)				Disease Occurence (%)			
	LDPE Bags	Gunny Bags	Polynet Bags	Mean	LDPE Bags	Gunny Bags	Polynet Bags	Mean	LDPE Bags	Gunny Bags	Polynet Bags	Mean
T_1:GA_3 100 ppm	33.34	58.33	66.67	52.78	31.46	20.49	17.14	23.03	33.34	-	-	
T_2: GA_3 200ppm	33.33	41.67	66.66	47.22	32.17	22.58	18.48	24.41	33.33	-	-	
T_3 :GA_3 300 pm	25.00	50.00	58.33	44.44	32.51	23.16	19.73	25.13	25.00	-	-	
T_4: BA 50 ppm	25.00	41.67	58.33	41.67	34.46	26.87	22.86	28.06	25.00	-	-	
T_5:BA 100 ppm	25.00	33.33	50.00	36.11	34.68	27.62	24.50	28.93	16.67	-	-	
T_6:BA200 ppm	16.67	25.00	41.67	27.78	35.13	28.87	25.71	29.90	16.67	-	-	
T_7:Cytokinin 10 ppm	41.67	58.33	83.33	61.11	32.13	24.09	20.60	25.60	33.33	-	-	
T_8:Cytokinin20 ppm	33.34	50.00	75.00	52.78	32.72	25.45	21.64	26.60	25.00	-	-	
T_9:Cytokinin 30 ppm	33.33	50.00	75.00	52.78	33.36	26.14	23.31	27.60	25.00	-	-	
T_{10}: Control	41.67	66.67	91.67	66.67	26.04	16.42	15.13	19.19	41.67	-	-	
MEAN	30.83	47.50	66.66		32.46	24.17	20.91		-	-	-	

Growth regulators	Spoilage (%)				Ascorbic acid content (mg/100 ml.)				Disease Occurence (%)			
	LDPE Bags	Gunny Bags	Polynet Bags	Mean	LDPE Bags	Gunny Bags	Polynet Bags	Mean	LDPE Bags	Gunny Bags	Polynet Bags	Mean
	C.D	SE (d)	SE (m)		C.D	SE (d)	SE (m)		-	-	-	
Factor (A)	14.35	7.03	4.97		3.32	1.62	1.15		-	-	-	
Factor (B)	7.86	3.85	2.72		1.82	0.89	0.63		-	-	-	
Factor (AXB)	N.S.	12.17	8.61		N.S.	2.81	1.99		-	-	-	

The percentage of spoilage was less in limes treated with BA @ 200 ppm (27.78%) followed by BA @ 100 ppm treatment where as the disease occurrence was more in limes packed in LDPE bags. But in other packings the fruits mutilated and dried and turn to brown very early after treatment in storage.

Study on the preparation of value added products from the seed of Jack Fruit (*Artocarpus integrefolia L.)*:

An observational study was conducted in preparation of chips with mixed flour of jack seed and moong dal flour with different ratios. The 50:50 ratio of both the flours was found good for quality chips with colour and recovery of chips. But bitterness was observed on frying the chips in all the combinations except sole moong dal flour.

D. ENTOMOLOGY

FRUITS

JACK FRUIT

Horticultural Research Station, Kovvur

Fruit borer was found as the major pest of Jack fruit, observed in all the surveyed areas and infestation ranged from 0-28 per cent. Severe infestation of mealy bug on fruit was observed at V.R.Gudem. Leaf webber and fruit fly infestation was observed in traces.

Table-1: Incidence of different pests on Jackfruit

District/ Mandal	Month	Pest infestation (%)			
		Fruit borer	Mealy bug	Leaf webber	Fruit fly
Visakhapatnam					
Chintapalli/ Gondipakalu	July, 2014	1-8	-	Traces	-
Chinnabarada	July, 2014	0-9	-	-	-
Peddabarada	July, 2014	4-11	-	-	-
Labbangi	July, 2014	5-10	-	-	-
Asharada	July, 2014	6-13	-	-	-
Payakaraopeta/Srirampuram	July, 2014	3-9	-	-	-
Rajagopalapuram	July, 2014	6-11	-	-	-
G K Veedhi/ K. Kotasingi	September, 2014	-	-		-
G. Madugula/Madhuramamidi	September, 2014	-	-		-
East Godavari					
Tuni	July, 2014	8-28			-
Vizianagaram					
Cheepurapalli/ Cheepurapalli	October, 2014	-	-		-
West Godavari					
T P gudem/V. R. gudem	December,2014	-	8-19		-
	March, 2014	2-5	27-65		-

CITRUS

Citrus Research Station, Tirupati

Population dynamics of major insect pests and their natural enemies in citrus:

A periodical survey for major pests on sweet orange and acid lime was conducted at fortnightly intervals in a fixed plot at the farm and the results revealed that the incidence of citrus leaf miner was moderate to high from September to January, low during June - July and February – March. During the months of May and June no damage

was recorded. citrus butterfly damage started from June 2nd fort night onwards. Moderate infestation was recorded during July-October; incidence was noticed during entire summer (March-May). High to severe infestation of green and rust mite was recorded from March to August while mite damage was low in October, January and February months.

Among the other pests, thrips infestation was found to be high on both leaves (40-50%) and fruits (30-40%) during November-January months and moderate in July and August months. Psyllid infestation was very low (0-5 nymphs/5cm twigs) in July and August months. Ash weevil damage was recorded from June onwards with peak incidence in September, October and November (30-40%) months. Snow scales infestation on tree trunks was found high (25-30%) in December and January months especially on acid lime.

Occurrence of natural enemies: Predatory mite, (*Cheletogenes* sp) population was found high (8-10 mites/fruit) in July and August months on rust mite infested fruits. During the month of December braconid larval parasite, (*Distatryx papilionis*) parasitisation was noticed on lemon butterfly larvae. Other natural enemies like different species of spiders (>5/plant), coccinellids (5-8 adults/twig), chrysopids (1-2 egg masses/plant) and mantids (4-5/plant) were noticed in December, January and February.

Evaluation of different spray schedules against leaf miner in citrus (nursery/young orchards)

Least incidence of citrus leaf miner was recorded (8.43 per cent) in the treatment, neem formulation of 10000 ppm @ 5ml/l followed by thiamethoxam (0.025%)and was found significantly superior to control up to 14 days in reducing the leaf miner incidence. After 14 days other treatments proved effective were neem formulation of 10000 ppm @ 5ml/l followed by thiodicarb (0.075%) and spinosad (0.002%).

Table-2: Evaluation of different spray schedules against citrus leaf miner

S. No.	Treatments	Pre count	Mean per cent incidence of leaf miner (Post count)		
			3 DAS	7 DAS	14 DAS
1	Neem formulation 10000 ppm @ 5ml/l followed by Acephate (0.1125%)	31.87	13.93(21.91)	28.80(32.46)	35.97(36.85)
2	Neem formulation 10000 ppm @ 5ml/l followed by Thiamethoxam(0.025%)	42.80	7.63(16.03)	2.57(9.22)	8.43(16.88)
3	Neem formulation 10000 ppm @ 5ml/l followed by Profenophos(0.1%)	33.27	3.93(11.43)	6.83(15.15)	25.40(30.26)
4	Neem formulation 10000 ppm @ 5ml/l followed by Thiodicarb (0.075%)	46.23	10.50(18.90)	6.43(14.69)	11.93(20.21)
5	Neem formulation 10000 ppm @ 5ml/l followed by Spinosad (0.002%)	40.73	8.03(16.46)	4.20(11.83)	12.10(20.36)
6	Neem formulation 10000 ppm @ 5ml/l followed by Diafenthiuron (0.05%)	28.83	7.03(15.37)	10.70(19.09)	15.60(23.26)
7	Neem formulation 10000 ppm @ 5ml/l followed by Neem formulation 10000ppm	42.73	8.57(17.02)	4.27(11.92)	17.37(24.63)
8	Water spray	36.97	33.60(35.43)	26.50(30.98)	40.57(39.56)
	CD @ 5%	—	4.472	5.868	8.807
	CV (%)	—	21.790	29.685	24.040

DAS: Days after spray

Figures in parentheses are arc sin percentage transformed values

Management of citrus thrips, aphids and black fly/whitefly in citrus.

Thrips:-

Leaves: The treatments neem formulation 10000 ppm @ 5ml/l followed by thiamethoxam (0.025%) or fiopronil (0.01%) or dimethoate (0.06%) were found significantly superior over control and at par with each other in controlling thrips on leaves upto 14 DAS.

Fruits: Thrips damage on fruits was noticed at lower level in the treatments; neem formulation of 10000 ppm @ 5ml/l followed by fiopronil (0.01%), dimethoate (0.06%), and thiamethoxam (0.025%) which were at par with each other and significantly superior to control in controlling the thrips damage on fruits in sweet orange.

Table-3: Evaluation of different synthetic chemicals against citrus thrips (leaf infestation)

S. No.	Treatments	Pre count	Mean per cent incidence of leaf miner (Post count)		
			3 DAS	7 DAS	14 DAS
1	Neem formulation 10000 ppm @ 5ml/l followed by Spinosad (0.002%)	37.8	05.53(13.60)	12.50(20.70)	15.20(22.95)
2	Neem formulation 10000 ppm @ 5ml/l followed by Quinalphos (0.05%)	34.8	18.57(25.53)	23.90(29.27)	23.83(29.22)
3	Neem formulation 10000 ppm @ 5ml/l followed by Fipronil (0.01%)	44.3	08.10(16.54)	11.73(20.03)	10.03(18.46)
4	Neem formulation 10000 ppm @ 5ml/l followed by Profenophos (0.1%)	40.1	16.17(23.71)	15.93(23.53)	18.73 (25.64)
5	Neem formulation 10000 ppm @ 5ml/l followed by Thiamethoxam (0.025%)	42.4	10.67(19.07)	08.40(16.85)	8.83(17.29)
6	Neem formulation 10000 ppm @ 5ml/l followed by Dimethoate (0.06%)	41.6	10.30(18.72)	14.63(22.49)	11.87(20.15)
7	Water spray	42.3	34.43(35.93)	53.37(46.93)	41.63(40.18)
	CD @ 5%	NS	8.285	4.657	6.94
	CV (%)	—	31.4	13.00	20.98

DAS: Days after spray

Figures in parentheses are arc sin percentage transformed values

Table–4: Evaluation of synthetic chemicals and natural products against citrus thrips on fruits

S. No	Treatments	Mean per cent thrips infested fruits		Cost benefit ratio
		2 Months after spray	3 Months after spray	
1	Neem formulation 10000 ppm @ 5ml/l followed by Spinosad (0.002%)	15.80^{a}(23.41)	25.37^{abc}(30.13)	1.41
2	Neem formulation 10000 ppm @ 5ml/l followed by Quinalphos (0.05%)	23.00^{a}(28.62)	27.60^{a}(31.64)	1.55
3	Neem formulation 10000 ppm @ 5ml/l followed by Fipronil (0.01%)	10.07^{c}(18.33)	12.88^{cd}(20.76)	1.73

4	Neem formulation 10000 ppm @ 5ml/l followed by Profenophos (0.1%)	18.47^{ab}(24.68)	20.51^{ab}(26.75)	1.2
5	Neem formulation 10000 ppm @ 5ml/l followed by Thiamethoxam (0.025%)	8.67^{bc}(17.65)	14.55^{d}(21.90)	2.5
6	Neem formulation 10000 ppm @ 5ml/l followed by Dimethoate (0.06%)	11.48^{bc}(19.75)	14.20^{bcd}(22.09)	3.1
7	Water spray	20.30^{a}(26.63)	25.07^{a}(30.03)	—
	CD @ 5%	5.757	11.123	
	CV(%)	14.24	5.187	

Figures in parentheses are arc sin percentage transformed values

Table–5: Evaluation of synthetic chemicals and natural products against citrus thrips on fruits

S. No	Treatments	Mean per cent thrips infested fruits		Cost benefit ratio
		2 Months after spray	3 Months after spray	
1	Neem formulation 10000 ppm @ 5ml/l followed by Spinosad (0.002%)	8.25 (16.69)	15.42 (23.12)	3.4
2	Neem formulation 10000 ppm @ 5ml/l followed by Quinalphos (0.05%)	13.46(21.52)	23.4 (28.93)	1.8
3	Neem formulation 10000 ppm @ 5ml/l followed by Fipronil (0.01%)	12.45 (20.67)	17.52 (24.74)	4.5
4	Neem formulation 10000 ppm @ 5ml/l followed by Profenophos (0.1%)	16.85 (24.23)	22.5 (28.31)	2.2
5	Neem formulation 10000 ppm @ 5ml/l followed by Thiamethoxam (0.025%)	10.54 (18.94)	16.75 (24.15)	4.2
6	Neem formulation 10000 ppm @ 5ml/l followed by Dimethoate (0.06%)	8.58(17.03)	18.25(25.29)	3.5
7	Water spray	26.75(31.14)	38.75 (38.5)	
	CD @ 5%	5.589	7.411	

Table–6: Evaluation of synthetic chemicals and natural products against citrus aphids

S. No.	Treatments	Pre count No. of aphids/5 cm.twig	Mean per cent incidence of leaf miner (Post count)		
			3 DAS	7 DAS	14 DAS
1	Neem formulation 10000 ppm @ 5ml/l followed by Spinosad (0.002%)	66.7	88.03(69.76)	100(90.00)	100(90.00)
2	Neem formulation 10000 ppm @ 5ml/l followed by Quinalphos (0.05%)	72.8	87.16(69.00)	95.30(77.48)	79.60(63.15)
3	Neem formulation 10000 ppm @ 5ml/l followed by Fipronil (0.01%)	26.4	97.20(80.37)	97.60(81.09)	93.93(75.74)
4	Neem formulation 10000 ppm @ 5ml/l followed by Profenophos (0.1%)	49.2	71.73(57.88)	95.96(78.40)	93.13(74.80)
5	Neem formulation 1000250 ppm @ 5ml/l followed by. Thiamethoxam (0.025%)	40.8	100(90.00)	100(90.00)	100(90.00)
6	Neem formulation 10000 ppm @ 5ml/l followed by Dimethoate (0.06%)	45.4	100(90.00)	100(90.00)	100(90.00)
7	Water spray	36.6	07.30(15.68)	07.56(15.96)	11.16(19.52)
	CD @ 5%	—	11.924	5.582	5.063

Figures in parentheses are arc sin percentage transformed values

Evaluation of bio-rational insecticides against citrus psylla

Foliar spray with novaluron10EC (0.005%) or abamectin 1.9EC (0.0007%) or azadirachtin (1%) (0.04%) or *Verticillium lecanii* $2x10^8$ cfu (4g/l) twice at 15 days interval starting from pest initiation effectively checks the psyllids infestation on sweet orange, providing nearly 70% pest control till 14 days after spraying.

Table-7: Evaluation of bio-rational insecticides against citrus psylla (*Diaphorina citri*) during 2011-13(Pooled data)

Treatments	Per cent reduction of the pest over control											
	3 DAS				DAS				14 DAS			
	2011	2012	2013	Pooled mean	2011	2012	2013	Pooled mean	2011	2012	2013	Pooled mean
T_1- Abamectin 1.9EC (0.0007%)	81.67 (64.65)	80.7 (63.93)	66.1 (54.3)	60.99 (51.34)	94.57 (76.52)	93.2 (74.88)	90.5 (72.0)	74.49 (59.66)	42.27 (40.55)	55.8 (48.33)	84.0 (66.4)	51.76 (46.01)
T_2-Novaluron10EC (0.005%)	86 (68.02)	80.1 (63.50)	84.5 (66.8)	66.11 (54.40)	82.70 (65.42)	93.1 (74.77)	93.4 (75.1)	71.76 (57.90)	80.67 (63.92)	83.6 (66.11)	90.9 (72.4)	67.49 (55.23)
T_3-Petroleum spray oil (5.9ml/l)	57.50 (49.31)	51.2 (45.68)	63.0 (52.5)	49.18 (44.52)	78.50 (62.38)	57.6 (49.37)	76.2 (60.8)	57.51 (49.32)	52 (46.15)	64.3 (53.30)	75.6 (60.4)	53.28 (46.88)

In sweet orange, for effective control of citrus green mites, two sprays of ethion 50 EC (0.05%) or propargite 57 EC @ 0.057 % or spiromesifen 240 SC @ 1 ml/l and fenazaquin @ 2 ml/l, first at initiation of the pest infestation while the second spray at 15 days thereafter are recommended.

T_4-Neem oil (3%)	75.33 (60.22)	80.4 (63.72)	76.0 (60.6)	61.53 (51.66)	54.47 (47.56)	88.9 (70.53)	84.8 (67.0)	61.71 (51.77)	40.17 (39.33)	75.8 (60.53)	74.1 (59.4)	53.09 (46.77)
T_5-Azadirachtin1% (0.04%)	94.33 (76.22)	95.2 (77.34)	83.6 (66.1)	73.22 (58.84)	97.93 (81.73)	95.8 (78.17)	87.9 (69.6)	76.51 (61.01)	62.67 (52.33)	76.1 (60.73)	80.9 (64.1)	61.83 (51.84)
T_6-*Verticillium lecanii* $2x10^8$ cfu (4g/l)	62.33 (52.14)	83.10 (65.72)	71.9 (57.9)	58.61 (49.96)	94.03 (75.86)	90.1 (71.66)	75.3 (60.2)	69.23 (56.31)	70.53 (57.12)	81.2 (64.30)	62.5 (52.2)	55.10 (47.92)
T_7-Dimethoate 30EC (as standard) (0.06%)	98.33 (82.58)	97 (80.02)	89.7 (71.2)	77.96 (62.0)	96.77 (79.64)	93.7 (75.46)	95.7 (78.0)	77.71 (61.83)	75.17 (60.11)	80.3 (63.65)	89.5 (71.1)	64.95 (53.7)
T_8-Control (water spray)	0	2.3 (6.93)	5.6 (13.68)	7.48 (15.87)	4.21 (11.84)	0	1.8 (7.7)	3.10 (10.14)	0	4.5 (12.24)	2.3 (8.7)	4.52 (12.25)
CV	5.00%	2.7%	5.4	9.334	4.31%	4.3%	9.1%	12.06%	3.68%	5.1%	9.1%	10.33%
CD@ 5%	10.526	3.438	6.285	9.301	9.803	5.753	11.977	13.13	6.868	5.694	11.201	9.393

DAS: Days after spray Figures in parentheses are arc sin percentage transformed values

Bio-rational management of Lemon Butterfly in young orchards Results:

Technology developed:

Foliar spray with *Bacillus thuringiensis* (0.1%) or NSKE (5%) at pest appearance effectively checks the larval population providing 85-90% larval control till 14 days after spraying in sweet orange.

Table-8: Effect of different bio-pesticides against Lemon Butterfly in young orchards (pooled data of 2011-13)

Treatments	No. of larvae / 15 cm twig											
	3 DAS				DAS				14 DAS			
	2011	2012	2013	Pooled mean	2011	2012	2013	Pooled mean	2011	2012	2013	Pooled mean
NSKE (5%)	2.03	4.33	2.00	2.00	1.58	2.20	1.00	1.43	1.58	1.83	0.50	1.28
Neem soap (10 g/l)	2.18	5.23	2.50	2.50	2.06	4.27	2.00	1.78	1.71	3.83	1.50	2.34
Karanj oil (1%)	2.38	5.90	1.00	1.00	1.71	3.83	1.00	1.59	1.88	3.83	1.00	2.23
Neem oil (1%)	2.00	3.97	1.50	1.50	1.77	3.17	1.00	1.54	2.02	2.47	1.00	1.83
Pongamia soap (10 g/l)	2.20	4.57	3.00	3.00	2.00	4.07	1.50	1.71	1.73	3.67	1.00	2.13
Bt (0.1% =1 g/l)	1.80	3.08	0.00	0.00	1.25	1.50	0.00	1.14	1.25	0.00	0.00	0.42
Carbaryl (0.1%) Control	1.36	1.97	0.00	0.00	1.32	0.50	0.00	1.01	1.22	0.00	0.00	0.41
(Water spray)	3.13	9.33	8.00	8.00	3.17	8.33	6.00	2.47	3.32	8.33	8.00	6.55
CV	6.80	17.6	21..4	17.08	8.9	16.6	26.6	15.6	7.10	21.9	27.8	22.9
CD@ 5%	0.255	1.510	0.521	0.438	0.287	1.058	0.589	0.435	0.226	1.204	0.562	0.610

Table-9: Evaluation of Synthetic chemicals and Natural products against citrus Green mites (*Scizotetranychus hindustanicus*) (pooled results of 2011-13)

Treatments	No. of mites/cm² of leaf											
	3 DAS				DAS				14 DAS			
	2011	2012	2013	Pooled mean	2011	2012	2013	Pooled mean	2011	2012	2013	Pooled mean
Neem oil (5%)	0.9 (1.18)	1.2 (1.30)	1.20 (1.33)	1.1 (1.26)	0.90 (1.18)	1.5 (1.45)	2.03 (1.67)	1.48 (1.39)	1.04 (1.22)	1.8 (1.52)	0.83 (1.15)	1.21 (1.26)
Petroleum spray oil (1%)	0.81 (1.14)	2.2 (1.64)	1.03 (1.24)	1.34 (1.34)	0.28 (0.87)	2.1 (1.61)	3.00 (1.87)	1.79 (1.45)	1.08 (1.23)	2.4 (1.70)	1.23 (1.32)	1.47 (1.39)
Petroleum spray oil (2%)	0.6 (1.04)	3.3 (1.95)	2.70 (1.79)	2.2 (1.59)	0.24 (0.85)	2.4 (1.70)	3.50 (2.00)	2.05 (1.52)	0.8 (1.14)	2.9 (1.84)	1.93 (1.56)	1.71 (1.46)
Ethion 50 EC (0.05%)	0.29 (0.86)	0.2 (0.83)	0.6 (0.81)	0.4 (0.92)	0 (0.7)	0.3 (0.89)	0.16 (0.81)	0.15 (0.80)	0 (0.7)	0.5 (1.0)	0.67 (1.08)	0.32 (0.89)
Abamectin 1.9 EC (0.0007%)	0.02 (0.72)	0.3 (0.89)	0.16 (0.81)	0.76 (0.81)	0.17 (0.8)	0.3 (0.89)	0.36 (0.93)	0.28 (0.88)	0.83 (1.15)	0.4 (0.95)	1.03 (1.24)	0.42 (0.94)
Buprofezin 25 SC (0.125%)	0.57 (1.03)	0.4 (0.95)	0.30 (0.89)	0.42 (0.96)	1.08 (1.25)	1.4 (1.38)	0.93 (1.20)	1.14 (1.27)	0.82 (1.14)	1.8 (1.51)	0.76 (1.12)	0.99 (1.21)
Triazophos 40 EC (0.06%)	0 (0.7)	0.29 (0.89)	0.20 (0.84)	0.13 (0.79)	0.23 (0.85)	1.4 (1.38)	0.43 (0.96)	1.14 (1.27)	0.92 (1.19)	0.8 (1.14)	0.30 (0.89)	0.67 (1.07)
Propargite 57 EC (0.057%)	0.28 (0.87)	0.3 (0.89)	0.20 (0.84)	0.26 (0.87)	0.1 (0.76)	0.4 (0.94)	0.26 (0.87)	0.25 (0.86)	0 (0.7)	0.5 (1.0)	0.16 (0.81)	0.22 (0.84)
Dicofol 20 EC (Std) (0.04%)	0 (0.7)	0.63 (1.06)	0.23 (0.85)	1.62 (1.26)	0 (0.7)	0.9 (1.18)	0.86 (1.17)	0.59 (1.02)	0 (0.7)	1.0 (1.22)	0 (0.70)	0.33 (0.88)
Spiromesifen 240 SC @1ml/l	0.1 (0.77)	0 (0.7)	0.23 (0.85)	0.14 (1.01)	0.16 (0.80)	0 (0.7)	0.20 (0.84)	0.12 (0.78)	0 (0.7)	0.2 (0.83)	0.15 (0.81)	0.12 (0.78)
Fenazaquin @ 2ml/ l	0 (0.7)	0 (0.7)	0.20 (0.84)	0.07 (0.75)	0 (0.7)	0.1 (0.77)	0.20 (0.84)	0.1 (0.77)	0 (0.7)	0.3 (0.89)	0.26 (0.87)	0.19 (0.82)
Control(water spray)	1.65 (1.44)	4.63 (2.26)	4.60 (2.26)	2.92 (1.82)	2.13 (1.59)	3.8 (2.07)	3.70 (2.05)	3.08 (1.88)	1.6 (1.31)	3.6 (2.02)	4.20 (2.17)	3.1 (1.87)
CD@ 5%	0.2628	0.4825	0.410	0.57	0.4622	0.6481	0.652	17.90	0.4953	0.3825	0.379	0.302

Figures in parentheses are sine percentage of transformed values

The pooled analysis results indicated that all the tested acaricides are superior to control in the management of green mites on leaves. However the pesticides, ethion 50 EC (0.05%), abamectin 1.9 EC (0.0007%), propargite 57 EC (0.057%), spiromesifen 240 SC and fenazaquin are the effective chemicals with lowest pest infestation till 14 DAS against green mites in sweet orange.

Table- 10: Evaluation of Synthetic chemicals and Natural products against citrus rust mites on fruits (pooled results of 2011-13)

Treatments	3MAS (% infested fruits)				5 MAS(% infested fruits)			
	2011	2012	2013	Pooled mean	2011	2012	2013	Pooled mean
Neem oil (5%)	2.43 (8.91)	2.10 (8.33)	8.63 (17.08)	4.38 (12.11)	3.63 (10.94)	5.31 (13.32)	13.06 (21.19)	7.33 (15.6)
Petroleum spray oil (1%)	2.33 (8.72)	1.00 (5.73)	5.23 (13.22)	2.85 (9.81)	4.23 (11.83)	3.96 (11.43)	3.63 (10.98)	3.94 (11.39)
Petroleum spray oil (2%)	2.76 (9.63)	1.60 (7.26)	5.23 (13.22)	3.19 (10.31)	4.32 (11.97)	6.50 (14.77)	11.13 (19.49)	7.31 (15.6)
Ethion 50 EC (0.05%)	1.49 (7.04)	2.06 (8.25)	1.93 (7.99)	1.82 (7.71)	2.12 (8.33)	3.20 (10.23)	7.23 (15.60)	4.18 (11.83)
Abamectin 1.9 EC (0.0007%)	2.33 (8.72)	3.50 (10.78)	3.33 (10.52)	3.05 (9.98)	3.42 (10.65)	4.83 (12.69)	7.16 (15.52)	5.13 (13.05)
Buprofezin 25 SC (0.125%)	4.1 (11.68)	2.50 (9.09)	7.80 (16.22)	4.80 (12.66)	5.85 (13.94)	4.76 (12.60)	18.13 (25.20)	9.58 (18.05)
Triazophos 40 EC (0.06%)	0.81 (5.16)	2.26 (8.64)	3.16 (10.25)	2.07 (8.33)	4.63 (12.39)	3.80 (11.24)	7.80 (16.22)	5.41 (13.44)
Propargite 57 EC (0.057%)	2.01 (8.13)	1.26 (6.44)	7.20 (15.56)	3.49 (10.78)	2.65 (9.28)	2.50 (9.09)	6.83 (15.15)	3.99 (11.54)
Dicofol 20 EC (Standard) (0.04%)	1.02 (5.74)	1.83 (7.77)	7.00 (15.34)	3.28 (10.47)	2.47 (9.10)	2.95 (9.88)	4.96 (12.87)	3.46 (10.78)
Spiromesifen 240 SC @1ml/l	1.68 (7.49)	1.56 (7.17)	0 (0.00)	1.08 (6.02)	3.2 (10.31)	2.58 (9.24)	1.43 (6.87)	2.40 (8.91)
Fenazaquin @ 2ml/ l	1.75 (7.71)	1.75 (7.60)	1.20 (6.29)	1.56 (7.27)	3.65 (10.94)	3.45 (10.70)	3.70 (11.09)	3.60 (10.94)
Control(water spray)	12.70 (12.54)	12.06 (20.32)	10.30 (18.72)	11.68 (20.00)	22.87 (28.59)	23.20 (28.76)	14.26 (22.19)	0.11 (26.64)
CD@ 5%	6.560	4.806	3.230	3.01	6.3771	4.602	4.570	5.33

Estimated BC Ratio from 2011-13

Treatments	2011	2012	2013	Mean
Neem oil (5%)	3.54	4.4	3.2	3.7
Petroleum spray oil (1%)	0.74	2.0	3.5	2.1
Petroleum spray oil (2%)	0.78	1.8	3.2	1.9
Ethion 50 EC (0.05%)	9.5	9.5	7.5	8.8
Abamectin 1.9 EC (0.0007%)	0.9	3.6	5.6	3.3
Buprofezin 25 SC (0.125%)	2.16	4.4	4.4	3.6
Triazophos 40 EC (0.06%)	2.94	5.5	5.9	4.7

Propargite 57 EC (0.057%)	7.7	8.8	7.8	8.1
Dicofol 20 EC (Standard) (0.04%)	7.2	8.7	7.9	7.9
Spiromesifen 240 SC @1ml/lt	3.71	6.1	5.9	5.2
Fenazaquin @ 2ml/ lt	3.42	6.6	6.6	5.5
Control(water spray)	0	0	0	0

The analysis of results indicated that all the treatments were superior to control in reducing the pest infestation on fruits. Spiromesifen 240 SC @1ml/l and fenazaquin @ 2ml/l though significantly superior to control the cost of the chemical is high. However among the different treatments, ethion 50EC (0.05%) and propargite 57 EC (0.057%) are the best ones with lowest pest infestation which were on par with standard check dicofol 20 EC (0.04). Among the botanicals neem oil (5%) was effective in mite (green & rust mites) management.

Technology Developed

In sweet orange, for effective control of citrus green mites, two sprays of ethion 50 EC (0.05%) or propargite 57EC @ 0.057% or spiromesifen 240 SC @1ml/l and fenazaquin @ 2ml/l, first at initiation of the pest infestation while second spray 15 days thereafter, are recommended. Similarly for managing the rust mites in sweet orange two sprays with the above chemicals at marble stage and 20 days after first spray are recommended.

Bio-rational Management of Scales in Citrus (Sweet orange/ Acid lime)

The results revealed that the treatments; acetamiprid (0.005%) and *Verticillium leccanii* ($1x10^8$ spores/1g) were found significantly superior to control.

Table-11: Evaluation of bio-rational insecticides against citrus snow scales (*Unaspis citri*) during 2014

Treatments		Pre-count (No. of scales/ $2cm^2$ bark)	Percent reduction over control		
			3DAS*	7 DAS	14 DAS
T_1	Buprofezin 25SC(0.025%) -1g/L	36.77	48.43^{bcd}(44.10)	45.36^{cd}(42.34)	60.46^{ab}(51.04)
T_2	Acetamiprid20SP (0.005%)	24.00	71.00^{a}(57.42)	72.26^{a}(58.22)	71.10^{a}(57.48)
T_3	Imidacloprid 200SL (0.005%)	25.57	54.40^{bc}(47.52)	44.96^{cd}(42.11)	36.96^{de}(37.44)
T_4	Azadirachtin (1%) (0.04%)	18.00	55.66^{b}(48.25)	65.86^{ab}(54.25)	48.80^{bcd}(44.31)
T_5	Pongamia oil (1%)	29.23	39.13^{de}(38.72)	34.76^{de}(36.13)	29.23^{e}(32.73)
T_6	Petroleum spray oil (1%)	27.70	50.63^{bcd}(45.36)	51.83^{c}(46.05)	56.03^{abc}(48.46)
T_7	*Verticillium leccanii* ($1x10^8$ spores / 1g)	37.90	46.63^{bcd}(43.07)	57.43^{bc}(49.27)	71.23^{a}(57.56)
T_8	Chlorpyriphos (0.05%)	33.53	42.23^{cd}(40.53)	55.10^{bcde}(47.93)	43.43^{bcde}(41.22)
T_9	Malathion (0.1%)	29.37	42.86^{bcd}(40.89)	52.70^{bc}(46.55)	42.16^{cde}(40.49)
T_{10}	Water spray (Control)	32.93	28.70^{e}(32.39)	26.13^{e}(30.74)	37.00^{de}(37.46)
	CV (%)	7.7	10.00	10.79	13.05
	CD@ 5%	0.721	7.522	8.402	10.03

DAS: Days after spray

Figures in parenthee are arc sin percentage transformed values

Cost Effectiveness of different insecticides against thrips in sweet orange

Among differnt combinations of insectides tested against thrips damage in sweet orange, the treatment with neem formulation 10,000 ppm @ 5 ml/1 followed by dimethoate (0.06%) showed higher CB raio (Table-12).

Table-12 Cost benefit ratio of different insecticides tested against thrips in sweet orange

Treatments	Pesticide cost Rs/Kg	Total cost of pl. Protection/ Treatment Rs	Yield Kg/Tr.	Net gain over control Kg/Tr.	Reali zation over control Rs/Tr.	CB ratio
Neem formulation 10000 ppm @ 5ml/l followed by Spinosad (0.002%)	1080/ 75ml	167.9	34.2	11.9	238	1.41
Neem formulation 10000 ppm @ 5ml/l followed by Quinalphos (0.05%)	425	94.2	29.3	7.0	140	1.55
Neem formulation 10000 ppm @ 5ml/l followed by Fipronil (0.01%)	1015	112.0	32.0	9.7	194	1.73
Neem formulation 10000 ppm @ 5ml/l followed by Profenophos (0.1%)	500	96.5	28.0	5.7	114	1.20
Neem formulation 10000 ppm @ 5ml/l followed by Thiamethoxam (0.025%)	1680	106.7	34.3	12.0	240	2.50
Neem formulation 10000 ppm @ 5ml/l followed by Dimethoate (0.06%)	450	93.2	36.7	14.4	288	3.10
Water spray	—		22.3	—	—	—

Market price of the fruits – Rs. 20/Kg Cost of Neem formulation 10000 ppm –Rs. 1100/l.
Labour charges @ 200/day

MANGO

Mango Research Station, Nuzvid

Survey was conducted in mango orchards in various mandals of Krishna district for the incidence of different pests. Severe incidence of hoppers and thrips was observed throughout the flowering and fruit development stages. Mango fruit borer incidence was recorded at low to medium level apart from flower feeding caterpillars causing damage to inflorescence.

Horticultural College & Research Institute, Anantharajupeta

Studies on the management of leaf hoppers in mango with certain newer insecticides

Among the new insecticides studied, thiamethoxam 25WG @ 0.005 per cent was found effective against mango leaf hopper i.e per cent reduction of mango leaf hoppers was 84.39 per cent.

GUAVA

Horticultural College & Research Institute, Anantharajupeta

Screening of certain guava varieties against spiraling white fly (*Aleurodicus disperses*) and its management with certain newer insecticides

Among the new insecticides, diafenthiuron 50 wp @ 0.07 per cent was found to be effective against spiraling white fly i.e percent reduction of white fly population was 74.90 per cent.

SPICES

CHILLI

Horticultural Research Station, Lam, Guntur

Screening of chilli germplasm/Cultivars for resistance to thrips, mites, blossom midge and Pod borers

Forty Eight entries were screened against thrips, blossom midge, and pod borer incidence. Thrips mean population ranged from 2.2 to 10.3 per three leaves, pod borer ranged from 0.0 to 5.25 per cent and blossom midge incidence ranged from 0.0 to 16.67 per cent. During the season very low incidence of thrips and pod borer was recorded including the check.

Population dynamics of chilli pest complex in relation to abiotic and biotic factors

The incidence of thrips, whitefly, blossom midge and pod borers was recorded on standard week basis and correlation and regression analysis was done and the results are given below.

a) Thrips *(Scirtothrips dorsalis):*

The correlation between thrips and weather parameters was studied and the studies revealed that there was significant positive correlation with maximum and minimum temperature and significant negative correlation with evening relative humidity. R^2 value was equal to 0.822 which implies that weather parameters contributed 82.2percent in thrips incidence.

b) Whitefly (*Bemisia tabaci*):

The correlation between whitefly population and weather parameters was studied and the studies revealed that there was significant positive correlation with maximum and minimum temperature and significant negative correlation with evening relative humidity. R^2 value was equal to 0.845 which means that weather parameters contributed significantly to an extent of 84.5 per cent in the variation of whitefly population.

c) Blossom midge (*Ashondylia capsici)*:

The correlation between blossom midge and weather parameters was studied and found that there was no significant correlation with any one of the weather parameters. R^2 was equal to 0.263 indicating that weather parameters contributed to an extent of 26.3 per cent in the development of blossom midge

d) Pod borers *(Spodoptera litura)*:

The correlation studies between pod borer incidence and weather parameters revealed that there was no significant correlation of pest incidence with any one of the weather parameters. R^2 value was equal to 0.286 which implies that weather parameters contributed only 28.6 per cent in *Spodoptera litura* incidence.

Evaluation of certain insecticides against chilli pest complex

Thirteen insecticides were evaluated against chilli pest complex and results revealed that spinosad @ 0.25ml/l and diafenthiuron @ 1.5g/l were found significantly superior to other treatments in controlling thrips. Significantly lowest blossom midge incidence was recorded in treatments, triazophos @ 2.0ml/l followed by rynaxypyr. With regard to yield, spinosad @ 0,25ml/l and diafenthiuron @ 1.5g/l were found significantly superior than other treatments.

Integrated pest management on chillies

In IPM plot, 2394 kg/ha yield was recorded whereas 2745 kg/ha was recorded in non IPM plot. The pest population in both the plots was recorded. The pests *viz*. thrips, whiteflies, pod borers and blossom midge were low in non IPM than that of IPM plots.

Studies on compatibility of certain new insecticides and fungicides used in chilli.

a) Physical Compatibility:

Seven insecticides *viz*., (spinosad, diafenthiuron, spiromesifen, flubendiamide, acetamiprid, emamectin benzoate) and two fungicides (azoxystrobin and difenoconazole) were tested for physical compatibility and found that all are physically compatible without forming any precipitation, curding, heating and bubbling. But the colour of the solution was varied with the insecticide.

b) Chemical compatibility:

Two fungicides were compatible with all six insecticides tested without any blasting or foaming.

c) Phytotoxicity:

There was no phytotoxic effect on any part of the plant from 1 to 14 days after spraying of above insecticides and fungicides solution on the crop.

d) Bio efficacy studies:

Bio-efficacy studies revealed that, insecticides which were effective against thrips were effective in combination also. In case of fruit rot, efficacy of azoxystrobin was reduced when combined with diafenthiuron, spiromesifen and acetamiprid. A synergistic effect was found between difenoconazole and spinosad, difenoconazole and flubendiamide and decreased the fruit rot incidence.

MEDICINAL & AROMATIC PLANTS

Horticultural Research Station, Venkataramannagudem

Five lepidopteron insect on kasturi benda and dulagondi were reported. Two coleopteran defoliators; hadda beetle (*Henosepilachna vigintiopunctata*), ash weevil (*Mylloceros sp*) were recorded in aswagandha and dulagondi respectively. Similarly twelve sucking insects *viz*., mites, thrips and aphids on kamanchi; whitefly on dulagondi; red cotton bug, seed bug, leaf hopper and aphids on kasturi benda; green bugs and cow bugs on aswagandha were found. No insect damage was observed in tulasi and vasa crops.

Incidence of two defoliators on bavanchalu was recorded from seedling stage to seed harvesting stage, with peak incidence of 14.7 no. /plant during 45th standard week (November 2nd week). White fly incidence was initiated in August and prevailed up to December in dulagondi with peak incidence of 9.6 no./plant during 45th standard week where as ash weevil damage was highest in 48th standard week and leafhopper incidence was maximum in 38th standard week (September 3rd week).

In kasturi benda, at vegetative stage aphids, leaf hopper and leaf webber were recorded from September onwards and continued up to December. Maximum incidence of shoot damage was noticed in December third week (51st SW) where as highest number of damaged pods per plant was recorded in February (6th sw). During pod development stage, maximum number of red cotton bugs and seed bugs were recorded in 4th standard week and 6th standard week respectively.

Seed yield loss of 24.83 per cent was recorded due to sucking insects and shoot and fruit borer in kamanchi and 12 per cent loss in herbage yield due to red spider mite was recorded in unprotected plots when compared to neem oil (@ 3ml/l) treated plots of kamanchi.

Spider population was dominant compared to coccinellids and parasitoids in all medicinal crops. *Pediobius foveolatus* as parasitoid on grubs of hadda beetle was found to be negligible during this year. *Brachymeria* species was reported as pupal parasitoid on leaf webber of kasturi benda crop. Coccinellid predator, *chilonemes sexmaculatus* was found feeding on nymphs and adults of aphid on kamanchi during March, 2015.

Among all the chemicals tested against red spider mite in kamanchi, two sprays of propargite 57 EC @ 2ml/l followed by wettable sulphur @ 4gm/l were found effective in reducing the mite incidence.

Pests of Medicinal crops

Kasturi benda
Oxycarenus hyalipennis

Kasturi benda
Earias vittella

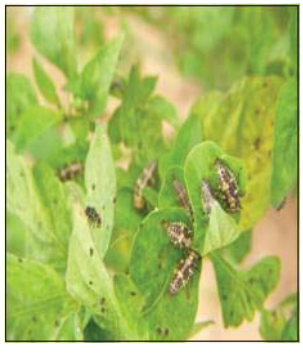
Dulagondi
Mylloceros sps

Kamanchi
Aphis gossypii

Natural enemies against insect species

Spider against fruit borer on kasturi benda

Spider against leaf folder on bavanchalu



Grubs of Coccinellidae beetle feeding on aphids on kamanchi

Brachymeria sp against *Helcystogramma* sp on kasturi benda

PLANTATION CROPS

COCONUT

Horticultural Research Station, Ambajipeta

Survey and monitoring of pest problems in coconut (eriophyid mite, rhinoceros beetle, red palm weevil, black headed caterpillar and other pests).

a) Roving survey:

Roving survey was carried out in East Godavari and West Godavari districts. Rhinoceros beetle, black headed caterpillar and eriophyid mite were the major pests infesting coconut in this region. The incidence of Rhinoceros beetle was around 10 per cent in the surveyed districts and the leaf damage by the beetle was 10.27, 10.43 and spindle damage was 5.93, 6.40 per cent respectively in these two districts. No incidence of red palm weevil was observed in the surveyed areas. The infestation of black headed caterpillar was observed in Dosakayapalli village of East Godavari district up to 48.82 per cent and in West Godavari up to 68.18 per cent. The infestation of eriophyid mite was recorded in all the plantations in the surveyed districts and was in the range of 67.34 to 78.82 per cent. Intensity of mite was mild to moderate in all the districts surveyed (Table-13).

Table-13: Mean Incidence of major coconut pests in important districts of Andhra Pradesh (Roving survey)

District	Black headed caterpillar Mean incidence (%)	Rhinoceros beetle *			Red palm weevil Mean incidence (%)	Eriophyid mite Mean incidence (%) & intensity
		Incidence (%)	Intensity (%)			
			Leaf damage	Spindle damage		
E.Godavari	48.82 ± 2.55	10.27 ±1.77	8.99±1.21	5.93±0.62	Nil	78.82±3.26
W. Godavari	68.18 ± 3.81	10.43 ± 0.87	10.89±0.87	6.40±1.03	Nil	67.34 ± 2.79

*Values represent Mean ± Standard error

b) Fixed plot survey

Fixed plot survey was under taken in Palivela village in Kothapeta mandal and Korlapativaripalem in Ambajipeta mandal of East Godavari district. Low intensity of leaf damage by rhinoceros beetle was noticed in both the gardens and it ranged from 7.27 to 8.83 per cent at Korlapativaripalem and 8.42 to 15.75 per cent at Palivela Village. No spindle damage was observed in the fixed plot gardens. The incidence of rhinoceros beetle was found to be low and was ranged between 15 to 30 per cent at Palivela village and 10 to 20 per cent at Korlapativaripalem. Hundred per cent incidence of eriophyid mite was observed; however mild to moderate scale of mite intensity up to September 2014 and severe scale in January 2015 was noticed in both the villages. No incidence of red palm weevil and coconut black headed caterpillar was observed in fixed plot survey gardens (Table-14).

Table-14: Extent of infestation by different pests in fixed plot surveys in Andhra Pradesh

Month	Black Headed Caterpillar	Red Palm Weevil Incidence (%)	Rhinoceros beetle Incidence (%) Leaf damage)		Eriophyid mite Incidence (%) (%) and intensity	
June'14	No incidence was observed at the two fixed plot survey villages		**Korlapati-vari palem**	**Palivela**	**Korlapati-vari palem**	**Palivela**
			8.53 ± 1.29*	8.88 ± 0.99	100%(1.17) Mild	100%(2.0) Moderate
Sep'14			7.27 ± 1.29	8.42 ± 1.08	100% (1.91) Moderate	100%(1.45) Moderate
Dec'14			8.82 ± 1.24	14.02 ± 1.16	100% (2.25) High	100%(2.17) High
Mar'15			8.83± 0.97	15.75± 1.95	100% (1.84) Moderate	100%(2.19) High

*Values represent Mean ± Standard error

Management of eriophyid mite in coconut gardens

The trial was conducted in farmer's field in Korlapativaripalem village of East Godavari district. The pre treatment observation revealed that the eriophyid mite infestation was 48.42, 48.45 and 73.3 per cent respectively

in various treatments. After four months, the mite infestation increased in all the treatments *i.e.,* from 48.42 per cent to 62.29 per cent in treatment T_1 from 48.45 per cent to 62.81 per cent in treatment T_2 and in control from 73.3 to 78.40 per cent. After eight and twelve months a similar increase in per cent mite infested nuts was recorded in all the treatments from 48.42 per cent to 97.02 per cent in treatment T_1, from 48.45 per cent to 97.74 per cent, in treatment T_2 and in control from 73.3 per cent to 98.87 per cent. Regarding eriophyid mite intensity, the initial MDGI was ranged from 0.60 to 1.53 with scale being mild to moderate. After four, eight and twelve months interval, the grade index in treated and control plots also gradually increased (Table -15).

Table-15: Per cent nut damage and mean damage grade index due to eriophyid mite infestation in experimental plots in East Godavari district

	Pre treatment (March 14)		1st Quarter (May 14)		2nd Quarter After 4 months (September 14)		3rd QuarterAfter 4 months (March15)	
	% infestation of mite	Mean damage grade index	% infestation of mite	Mean damage grade index	% infestation of mite	Mean damage grade index	% infestation of mite	Mean damage grade index
T_1	48.42 (44.08)*	0.60 (1.02)**	62.29 (56.29)	1.02 (1.41)	65.82 (54.64)	1.11 (1.45)	97.02 (84.27)	1.15 (1.46)
T_2	48.45 (44.10)	0.75 (1.08)	62.81 (56.37)	1.12 (1.45)	66.32 (56.09)	1.35 (1.46)	97.74 (86.87)	1.13 (1.46)
T_3 : Control	73.3 (61.31)	1.53 (1.17)	78.40 (62.35)	1.13 (1.46)	75.68 (61.65)	1.65 (1.62)	98.87 (86.13)	1.70 (1.64)
SEM	2.39		5.82	0.41	2.45	0.02	1.69	0.03
CD (5%)	6.93	N.S.	NS	NS	NS	0.05	NS	NS

T_1 : IPM garden (With Root feeding) T_2 : IPM garden (Without Root feeding)

Figures in parentheses are arc sin transformed values

****Figures in parentheses are square root transformed values***

Studies on field efficacy of commercially available pheromones against coconut pests *viz.*, rhinoceros beetle and red palm weevil

The studies carried out with only rhinolure and RPW lures were discontinued as per XXIII annual group meeting recommendations. Studies conducted with NPM CPCRI lure and PCI lure arranged in two different gardens. It was found that highest number of beetles were trapped in CPCRI lure i.e. 87 beetles/4 traps with an average of 1.81 beetles/trap/month and in PCI lure, 77 beetles /4 traps with an average of 1.60 beetles/trap/month during the experimental period. No catches were recorded in control trap (Table-16).

Table-16: Comparative efficacy of different lures against rhinoceros beetle (2014-15)

Sr. No	Month	Total no. of beetles trapped in 4 traps								
		T1 – NPM CPCRI lure			T2 – PCI lure			T3 – Blank trap		
		M	F	T	M	F	T	M	F	T
1.	April 2014 to March 2015	30	57	**87**	32	45	**77**	0	0	**0**
	Mean + SE	**7.25 + 1.76**			**6.42 + 1.41**					

Multi-location field evaluation of talc formulation of *Hirsutella thompsonii* (CPCRI isolate) against coconut eriophyid mite at AICRP palm centres

The experiment was initiated in the month of February 2012 with four treatments with 20 palms in each treatment (total 80 palms for the experiment).

T_1: Spraying talc formulation of *H.thompsonii* @ 20g/palm–3 sprays during October/ November, January/ February and April/May

T_2: Spraying *H.thompsonii* @ 20g/palm during October/November and January/February, followed by Botanical formulation (2% Neem oil – garlic – soap emulsion) during April/May.

T_3: Spraying Palm oil – sulphur emulsion –3 sprays/year during October/November, January/February and April/May.

T_4: Control.

The mite pre treatment population which ranged from 0.70 to 1.37/1mm^2 in February 2014 increased in all the treatments by February 2015 except in control and also an increase in predator population was observed in November 2014 and February 2015 sample nuts compared to February 2013 month's sample nuts. The lowest mite population of 0.13 and 1.22/1mm^2 was continuously recorded in treatment T_1: Spraying talc formulation of *H.thompsonii* @ 20g/palm during the entire observational period.

Table-17: Grade index of harvested nuts and mite intensity from February 2014 to February 2015

Treatment No.	Pre treatment harvested nuts scaleFebruary, 2014	Grade index for sprayed and mite intensity		
		November, 2013 - September, 2014	February, 2014 - November, 2014	May, 2014 – February, 2015
T_1	1.67(1.63)* (moderate)	1.16(1.46) (moderate)	1.0(1.41) (Mild)	1.36 (1.53)(moderate)
T_2	1.85(1.67) (moderate)	0.88(1.36) (Mild)	1.07 (1.43)(moderate)	1.89(1.70)(moderate)
T_3	1.03(1.39)(moderate)	1.15(1.46)(moderate)	1.20(1.48)(moderate)	2.60(1.89)(High)
T_4	2.0(1.69)(moderate)	1.44(1.56)(moderate)	1.04(1.43)(moderate)	2.48(1.85)(moderate)
S.E.	**0.09**	**0.05**	**0.04**	**0.07**
C.D.	**N.S.**	**NS**	**NS**	**0.22**

*Fig. in parentheses are square root transformed values

Table-18: Average pop. of mite/1 mm^2 predator pop./nut and percentage of intensity

Tr. No.	Pre treatment (February, 2014)			Post treatment (November, 2014)			Post treatment (February, 2015)		
	Avg. pop.%			Avg. pop.		%	Avg. pop.		%
	mite / 1mm^2	predator /nut	intensity	mite / 1mm^2	predator/ nut	intensity	mite / 1mm^2	predator/ nut	intensity
T_1	0.70 (1.08)*	1.00 (1.15)*	66.22 (55.00)**	0.13 (1.06)	5.0 (0.241)	67.71 (56.22)	1.22 (1.48)	12.5 (3.49)	74.28 (63.10)
T_2	0.66 (1.04)	4.00 (2.00)	62.89 (52.89)	0.21 (1.10)	3.0 (1.96)	76.51 (62.97)	2.85 (1.95)	10.80 (3.35)	84.86 (73.51)

T_3	0.43 (0.95)	1.80 (1.44)	53.96 (47.37)	0.56 (1.24)	2.0 (1.68)	76.08 (63.65)	3.65 (2.09)	3.2 (1.95)	66.62 (60.71)
T_4	1.37 (1.34)	5.70 (2.20)	66.75 (55.62)	0.53 (1.23)	2.0 (1.66)	80.28 (66.04)	3.92 (2.18)	1.9 (1.68)	8.05 (76.040)
S.E.	**0.07**	**0.26**	**2.54**	**0.03**	**0.13**	**2.65**	**0.13**	**0.28**	**7.16**
C.D.	**0.20**	**0.76**	**N.S.**	**0.09**	**0.38**	**NS**	**0.37**	**0.80**	**NS**

*Fig. in parentheses are square root transformed values

** Fig. in parentheses are arc sine transformed values

Evaluation of insecticides against the red palm weevil, *Rhynchophorus ferrugineus*

The experiment was initiated in the month of December 2014 in red palm weevil affected coconut garden at Yarramsettivaripalem village of P.Gannavaram mandal of East Godavari district with five treatments with one palm in each treatment .The experimental garden was of one acre (80 palms) with East Coast Tall (ECT) variety aged between 10-15 years. In the experimental garden, red palm weevil pre infestation was 6.25 percentage *i.e.*, 5 palms out of 80 palms. Each treatment was imposed in one palm each. After three months fresh infestation was noticed only in imidacloprid and chlorantraniliprole treatment imposed palms and the treatments were reimposed on the affected palms in these two treatments.

Non Plan:

Mass multiplication and supply of parasitoids of *Opisina arenosella*

The infestation of coconut black headed caterpillar was recorded in the following villages in the districts of Andhra Pradesh *viz.,*

District	Village
East Godavari	Dwarapudi, Matlapaem, Dosakayalapalli
West Godavari	Poduru, Palakollu, Kavitim, Nidadavolu
Srikakulam	Saradhapuram

And about 2, 53,300 parasitoids of coconut black headed caterpillar were supplied to the farmers.

Studies on field evaluations of new systemic insecticides against coconut pests through root feeding.

Among various pesticides tested against black headed caterpillar (*O.arenosella*) by root feeding method, absorption by coconut palm was observed only in monocrotophos (36% SC) followed by emamectin benzoate (1% EC), imidacloprid (17.8 SL) and azadirachtin 10000 ppm.

Sl. No.	Name of pesticide	Pesticide + Water (ml)	Absorption [Days]	Observation period	% mortality
1	Monocrotophos (36%SC)	15 + 15	3	48 hours	100
2	Emamectin Benzoate (1%EC)	5 + 45	5	48 hours	90
3	Imidacloprid (17.8 SL)	10 + 40	4	48 hours	80
4	Azadirachtin 10000 ppm	15 + 15	3	48 – 72 hrs	60
5	Control (water)	**30**	**2**	_	0

COCOA

Horticultural Research Station, Amabajipeta

Studies on the seasonal incidence and management of cocoa pests

The cocoa pest succession and intensity was studied at HRS, Ambajipeta. The brown leaf chaffer beetle, *(Adoretus versutus)* and black leaf chaffer beetle, *(Apogonia blanchardi)* were observed from June –September (high) especially on young plants. The bagworm, *(Pteroma plagiophelps)* was noticed all round the year (low).Tussock moth caterpillars and hairy caterpillars, semi-loopers were prevalent between December–April (low). Incidence of bark eating caterpillar in cocoa was noticed all round the year. Incidence of mealy bug in isolated pockets was observed. Incidence of tent caterpillar was observed in the month of January 2015.

CASHEW

Cashew Research Station, Bapatla

Evaluation of insecticides for the control of foliage and floral pests of Cashew

Among the insecticides evaluated as post extraction prophylaxis, chlorpyriphos 0.2% offered protection to the tune of 91.66% trees without re-infestation or persistent attack followed by monocrotophos 0.2% with 75% trees without re-infestation or persistent attack.

Influence of biotic and abiotic factors on the incidence of pest complex of cashew

The data indicated that minimum temperature and rain fall independently exerted significantly negative influence on the pest incidence, which indicates that one degree increase in the minimum temperature was expected to bring down leaf miner incidence by 3.02 percent. Similarly 1 mm increase in rainfall would reduce the population by 0.33 percent. Data revealed that no variable seem to independently exert significant influence.

All five independent variables have accounted for 60.88% of total variation in percent shoot damage by shoot tip caterpillar (R^2=0.6088). Rain fall was expected to bring down percent shoot damage by 0.13 times when all other variables tested were at their mean level (Ceteris paribus -holding other things constant). With regard to apple and nut borer, all five independent variables have accounted for 30.46% of total variation in percent nut damage by apple and nut borer (R^2=0.3046).

Screening of germplasm to identify resistant types against major pests of Cashew

Among the 40 germplasm accessions screened to identify the tolerant lines against the pests of cashew, without spraying any chemicals, T.No.129 recorded the zero incidence. The accession ABT-3 has recorded the highest incidence of leaf miner (16.14%) and T.No.6/14 has recorded the lowest incidence (1.17%). The accession T.No.30/1 has recorded the highest incidence of shoot tip caterpillar (14.10%) and T.No.2/5 recorded the lowest incidence (1.21%). The accession, BLA.39/4 has recorded highest incidence of apple and nut borer (17.54%) and T.No.275 has recorded zero incidence.

Evaluation of the performance of the cashew varieties released from different centers.

T.No.6/14 has recorded the lowest incidence of leaf miner (1.17%) followed by accession ABT-3 (16.14%). The accession, BLA.39/4 has recorded highest incidence of apple and nut borer (17.54%) and T.No.275 has recorded zero incidences.

E. PLANT PATHOLOGY

FRUITS

BANANA

Horticultural Research Station, Kovvur

Survey of fungal, bacterial and viral diseases of banana

Banana sigatoka disease was prevalent with highest incidence of 47% in roving survey during 2014-15. Banana bract mosaic was identified as major viral disease with highest incidence on cv. Sugandham (27%), while banana streak virus was more evident during winter especially in tissue culture plants with 10% mortality. The only bacterial disease *i.e.*, rhizome rot incidence ranged from 0-16% on cvs. Grand Naine and Tella Chekkarakeli. Resistant cv. K.C. Keli was found to be affected by fusarial wilt in nematode infested soil at shooting.

Integrated management of fusarium wilt disease

Integrated management practices *i.e.*, selection of disease free suckers, application of neem cake or vermicompost 250g/plant in combination with 0.2% carbendazim (0.2%) for dipping of suckers and soil drenching or soil application of *Trichoderma viride or Pseudomonas fluorescens* @ 50 g/p were not effective in reducing fusarial wilt disease. No significant difference was observed in disease severity percentage treatments imposed at 3 MAP.

Management of Sigatoka or prevalent leaf spot disease with oil based formulations

Among the treatments, propiconazole 1ml/l spraying with propiconazole 0.5ml/l + petroleum based mineral oil 10ml/l, difenconazole 1 ml/l and difenconazole 1 ml/l (0.1%) + petroleum based mineral oil 10ml/l were equally effective in management of sigatoka leaf spot disease (Table-01).

Table 1: Management of Sigatoka or prevalent leaf spot disease with oil based formulations

Treatment	Mean PDI	Mean YLS	Bunch weight (Kg)	B C ratio
T_1: Untreated check	23.25(28.82)	9.06	13.25	2.126
T_2: Petroleum based mineral oil (1%)	20.89(27.18)	9.36	13.33	1.998
T_3: Propiconazole 1 ml/l (0.1%)	7.60(15.90)	11.74	17.42	2.639
T_4: Difenconazole 1 ml/l (0.1%)	7.21(15.48)	11.96	17.83	2.604
T_5: Carbendazim 12% + Mancozeb 63%	13.84(21.76)	10.21	15.75	2.294
T_6: T_2+Propiconazole 0.5 ml/l (0.05%)	7.24(15.49)	10.51	17.17	2.541
T_7: T_2+Carbendizem (0.05%)	10.38(18.68)	10.78	14.42	2.144
T_8: T_2+Difenconazole 1 ml/l (0.1)	7.26(15.54)	11.65	17.58	2.556
SE(m)	0.901	0.34	0.437	
CD	2.759	1.03	1.338	

Diagnosis of banana viruses in germplasm and planting material used in experiments

Integrated management of rhizome rot disease of banana

Among 107 banana accessions, 47 with BBrMV and 59 plants with BSV/CMV in one field while in other 28 plants were infected with BBrMV only.

Table-2: Effect of different treatments on rhizome rot incidence (observational trial)

Treatments	Incidence (%)							Bunch wt. (Kg)
	2 MAP	3 MAP	4 MAP	5 MAP	7 MAP	9 MAP	11 MAP	
T_1: Healthy Tissue Culture Plants	0.00	25.00	25.00	31.25	31.25	31.25	31.25	20.30
T_2: T_1 + Dipping in Streptocylin for 30 min @ 500 ppm	6.25	18.75	18.75	18.75	18.75	18.75	18.75	20.00
T_3: T_1 + Dipping in PFfor 30 min@ 50g/lt of water	0.00	12.50	12.50	18.75	18.75	18.75	18.75	20.25
T_4: T_1+ Dipping in TVfor 30 min@ 50g/lt of water	0.00	0.00	6.25	31.25	31.25	31.25	31.25	20.25
T_5: T_1+ drenching with Streptocyclin 1-2 l/plant @ 500 ppm (15 days, 2nd& 4th MAP) +Growing Cowpea/ Sunhemp in the interspaces till 6 MAP	0.00	12.50	18.75	31.25	31.25	31.25	31.25	18.50
T_6: T_1+ drenching with PF1-2 liters /plant @50gm per liter of water 5 times at monthly interval +Growing Cowpea/ Sunhemp in the interspaces till 6 MAP	0.00	6.25	6.25	6.25	6.25	6.25	6.25	18.00
T_7: T_1+ drenching with TV@1-2 liters /plant @50gm per liter of water 5 times at monthly intervals +Growing Cowpea/ Sunhemp in the interspaces till 6 MAP	0.00	6.25	6.25	6.25	6.25	6.25	6.25	19.00
T_8: T_1+ drenching with PF+ TV@1-2 liters /plant @50g /liter of water 5 times at monthly +Growing Cowpea/ Sunhemp in the interspaces till 6 MAP	0.00	0.00	0.00	0.00	0.00	6.25	6.25	19.00
T_9: T_1+ Soil Appln with 6g bleaching powder 5times at monthly intervals up to 4 MAP + drenching with Streptocyclin 1-2 litres / plant (500 ppm) at 1st MAP+ TV(50g / plant at 2nd& 4th MAP) + Growing Cowpea/ Sunhemp in the interspaces till 6 MAP	0.00	0.00	0.00	6.25	6.25	6.25	6.25	21.75
T_{10}: T_1+ Appln of bleaching powder 25g/pit two times at 30th day and 45th day after planting followed by application of PF@ 50g/plant at 2nd& 4th MAP + Neem cake application	0.00	0.00	0.00	6.25	6.25	6.25	6.25	19.25

Up to fifth month after planting there was no mortality whereas incidence was gradually increased in all treatments at five months after planting T_1, T_4 and T_5 have recorded highest incidence of 31.25 per cent followed by T_2 and T_3 which were recorded as 18.75 per cent. However T_6 to T_{10} recorded least incidence (6.25%). Among the treatments bunch weight of 18 to 20 kg was recorded.

Screening banana genotypes for *Fusarium* wilt disease

Among 107 collections of banana for Fusarial wilt incidence screened, 54 collections showed resistance, remaining collections showed varying degree of susceptibility upto 6 months after planting in wilt sick plot.

Studies on Post harvest diseases of banana

Botryodiplodia theorobromae, *Fusarium semitectum*, *Colletolrichum gloeosporioides*, *Aspergillus flavus*, *Aspergillus niger* and *Aspergillus terreus* were found to be associated with crown rot of banana.

Horticultural Research Station, Mahanandi

Management of Sigatoka leaf spot disease of Banana *Mycosphaerilla musicola*

Mineral oil 1% + tebuconazole 50% + trifloxystrobin 25% WG @ 0.5 g/l was found superior in controlling the Sigatoka leaf spot in banana (14.28%) with more yield (59.46 t/ha) and BC Ratio (1.84) during this year.

Finally, it was concluded that, after onset of disease, two sprays at 30 days interval in the month of November and December with mineral oil 1% + tebuconazole 50% + trifloxystrobin 25% WG @ 0.5 g/l was found superior in controlling the sigatoka leaf spot in banana (16.12) with more yield (53.30 t/ha) and BC Ratio (1.62)

SAPOTA

Horticultural Research Station, Kovvur

Survey and incidence of diseases in sapota

Phaeophleospora (10.17%) and *Pestalotiopsis* leaf spots (1-16%) were the major diseases while less incidence of red rust and flat limb were recorded on sapota during the survey.

JACK

Horticultural Research Station, Kovvur

Survey and incidence of diseases in Jack fruit

Survey conducted on jack during 2014-15 revealed that fruit rot (0-32%) and leaf spot disease (1-16%) were the most prevalent diseases recorded in all the locations surveyed. Fruit rot was the major disease of Jackfruit with highest of 32 per cent incidence in Chinthapalli, Visakhapatnam district. Leaf spot was the common disease of jackfruit and incidence ranged between 3-16 %.

PAPAYA

Horticultural Research Station, Kovvur

Survey on fungal and viral diseases of papaya

Papaya ring spot disease was the most prevalent disease recorded in all locations surveyed and disease incidence ranged between 30-100 per cent. Severe incidence (40-60 %) of collar rot disease was recorded in Vizianagaram district especially during October 2014 due to incessant rains. Fruit rot incidence ranged between 0-8 per cent.

CITRUS

Citrus Research Station, Tirupati

Studies on greening disease: survey, isolation and characterization of citrus greening bacterial isolates

Ten field resistant citrus species consisting of 441 plants belonging to ten different citrus species were challenge inoculated with HLB infected buds using patch grafting method under controlled condition. Greening symptoms were

In sweet orange, highest per cent (81.25%) recovery of dry root rot infected plants was recorded by soil drenching with Mancozeb (0.2%) followed by application of Trichoderma reesei (100 g/tree)+ Pseudomonas fluorescens (100 g/tree) + 2 Kg neem cake + FYM 25 Kg after 15 days of drenching.

observed after eleven months of inoculation. DNA was isolated from all the inoculated plants and PCR was carried out using new set of CGB specific primers to confirm the HGB infection.

Identification and molecular characterization of CTV isolates.

The following oligo nucleotide primers were synthesized for differentiation of mild and severe strains of CTV isolates (PCR product of coat protein) and are being used.

CTV Severe strains	HCP1 :	**ATG GAC GAC GAA ACA AAG AA**
	HCP2 :	**TCA ACG TGT GTT GAA TTT CC**
CTV Mild strains	CP3 :	**TTT GGA CTG ACG TCG TGT T**
	CP4 :	**TTA CCA ATA CCC TTA GAA TTA T**

Production and distribution of virus free planting material

A total of 0.92 lakh virus free Sathgudi budlings budded on Rangpur lime and 0.309 lakh Balaji acidlime seedlings were supplied to the orchardists of Andhra Pradesh, Tamil Nadu, Karnataka and Maharashtra states.

Management of scab in sweet orange

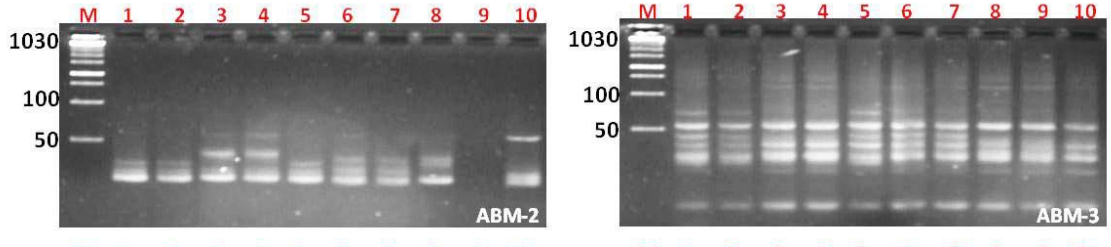
The results revealed that T_8 (Hexaconazole (0.2%) found significantly superior over all other treatments with 5.80% incidence followed by T_3 (Hexaconazole (0.2%) + Streptocycline (100ppm)) with 8.08% incidence. Other treatments T_1 (Calixin (0.1%) + Streptocycline (100ppm)), T_2 (Carbendazim (0.1%) + Streptocycline (100ppm)) T_6 (Calixin (0.1%)) and T_7 (Carbendazim (0.1%)) were on par with each other followed by T9 (Mancozeb (0.3%)). In T_{11} (control) disease incidence was as high as 28.72%.

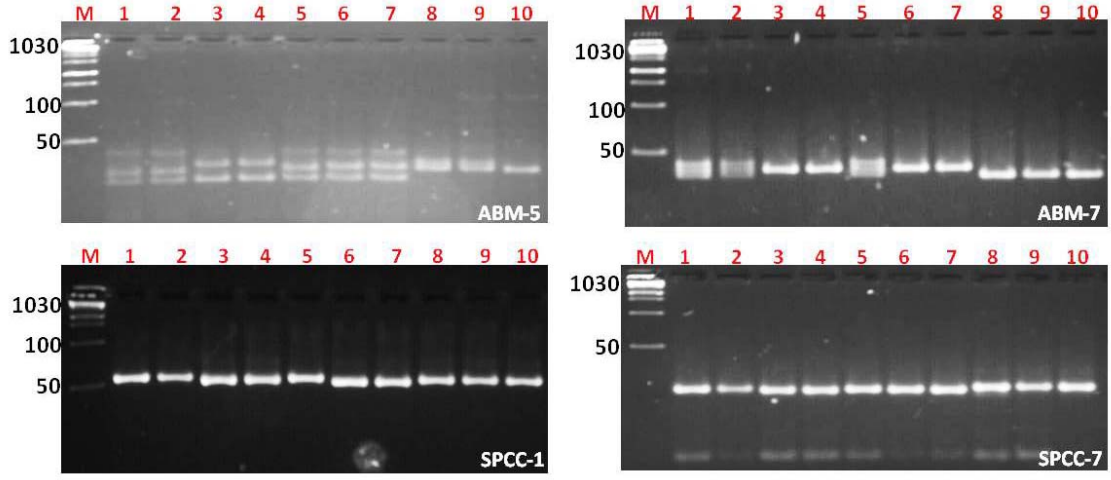
Etiology and management of bark and wood splitting disease in acid lime

- The causal organism was isolated and identified as *Botryodiplodia theobromae* (IARI, Acc.No.6004.05). The pathogenicity tests were carried out by artificial inoculation (bark cut and root inoculation methods) on stem and root, which expressed symptoms of bark split after 15 months of inoculation.
- The treatments were imposed and initial and final length of bark split was recorded. Percent spread over control was calculated. Results revealed that, T_2 (Hexaconazole 1 ml/l) was significantly superior by restricting the percent spread to 68.9 followed by T_1 (Carbendazim (1g/l)) 54.28%. T_3 (Difenoconazole (1ml/l) 41.06%, T_4 (Tridemorph (1ml/l) 40.91% and T_6 (Thiophanate methyl (1ml/l)) 46.31% were on par with each other.

DNA finger printing of Sathgudi sweet orange and Rangpur lime

Primer survey was carried out by using 14 SSR primers (Table 3) and none of them showed any specific bands for Sathgudi sweet orange, Kodur Sathgudi, Rangpur lime, Texas Rangpurlime, Australian sour orange, Jambheri (Assam), Rough lemon 8779, Balaji acidlime, and TAL-94/13.





Horticultural Research Station, Ananthapuramu

Citrus Research Station, Petlur

Survey and monitoring of important diseases of acid lime in Nellore District

Greasy spot was observed in all the gardens surveyed and it was low when compared to last year and highest PDI of 45.8% recorded at gardens of Gudur mandal, where as the severity of bacterial canker was low in P.S-1 and Balaji varieties (up to 10 to 15%) and moderate to severe in local variety (up to 40%). Pink disease was noticed in few locations. Among post harvest diseases, sour rot was the major disease and recorded up to 30-40% loss. Root rots were major problem in acid lime and 20 to 25% of the plants were affected mainly with pathogen *Fusarium solani*. *Diplodia* gummosis also severely appeared during the months of February and March, 2015.

Epidemiology and control of greasy spot of acid lime

The disease first appeared during July 1st Fort Night (3.59%) and it reached 38.51% by the 1st Fort Night of October. Maximum temperature and minimum temperature had positive correlation where as RH and rainfall had negative correlation with disease incidence. Among different fungicides, pyraclostrobin (0.1%) proved to be the best followed by tebuconazole (0.1%) as against 40.60% disease incidence in control.

Post harvest losses in acid lime and its management

The post harvest losses were major with 33.5% loss during January and February, also the extent of loss was more at retail level (21.0% to 33.5%). Among several diseases, sour rot was the major disease. Among the chemicals evaluated, boric acid (1%) and sodium salicylate (1%) were found effective against sour rot and black mold rot pathogens.

Effect of different antibiotics on canker disease of acidlime

Two antibiotics (Bactrinol and Bacteriomycin) were tested at two concentrations 250 and 500 ppm alone and in combination with COC and compared with common practice of Streptomycin Sulphate (500 ppm) + COC (3000 ppm).The canker severity was low in bacteriomycin (500 ppm) in combination with COC (3000 ppm) followed by Streptomycin Sulphate (500 ppm) + COC (3000 ppm).

Studies on sour rot disease in acid lime

Fourteen clones were screened against sour rot and recorded percent sour rot incidence. Among different fungicides evaluated, benomyl (0.1%) found effective followed by Mancozeb+carbendazim (0.2%), when applied twice at monthly intervals before harvest.

Validation of IDM technology for management of dry root rot in acid lime

Five villages representing five mandals were selected and in each village 15 dry root rot affected plants were selected and adoped IDM package two times i.e., one time at pre monsoon season and another at post monsoon season and recorded the percentage recovery from dry root rot symptoms and compared with the farmers practice (15 plants). In

Venkatagiri mandal 10 plants were recovered out of 15 plants in IDM package adopted plots, where as only 3 plants were recovered in farmers practice. In all the mandals the per cent recovery was high where ever the IDM practice was adopted for dry root rot over the farmer practice.

Horticultural Research Station, Darsi

Survey and surveillance of sweet orange diseases in Prakasam District

Survey was conducted in 10 mandals. Among the biotic diseases observed, dry root rot incidence was more (13.18%) followed by fruit drop (13.05%) and in abiotic diseases, Zn deficiency was high. Out of 10 mandals surveyed dry root rot was more in CS Puram (21.48%) followed by Yerragondapalem (16.85 %).

WATERMELON

Horticultural Research Station, Darsi

Effect of staggered sowing on the incidence of diseases in watermelon

During the year, thrips infestation and watermelon bud necrosis virus were observed in watermelon irrespective of the sowing time. Thrips population decreased from 15th October to 15th December and the population increased from 1st January to 15th February. Similarly, disease severity was significantly less (31.66%) in the crop sown on 15th December than in the crop sown on 1st December (39.99 %), 1st January (53.88%) and 15th January (51.70%).

POMEGRANATE

Horticultural Research Station, Anantapuramu

Survey and surveillance of diseases of Pomegranate

- Survey of pomegranate orchards revealed that the bacterial blight caused by *Xanthomonas auxonopodis Pv. punicae* was the major endemic disease followed by fungal fruit spots and wilt.
- The bacterial blight was prevalent in 59 per cent of orchards surveyed with disease severity ranging between 4.4 to 30.8 per cent (Table-4).

Tabel-4: Status of Pomegranate diseases in Andhra Pradesh

S. No.	District	Number covered			Bacterial Blight		Fungal leaf and fruit spot	Wilt
		Mandal	Villages	Orchards	Prevalence (%)	Mean Severity on a tree (%)	Prevalence (%)	Prevalence (%)
1.	Ananthapuramu	13	24	37	59	19.1	62	11
2.	Kadapa	1	2	2	NIL	-	-	-

Management of bacterial fruit spot in pomegranate

In all the treatments the data on disease incidence and per cent severity on leaf, stem and fruit of each tree along with yield data revealed that management schedule effectively reduced the disease incidence and severity of bacterial blight compared to farmer's practice (Table-5)

Table-5: Influence of spray schedule on the incidence of bacterial blight in pomegranate during 2014

Particulars	Incidence			Severity			Severity on (%) each tree	Yield (tons/ha)
	Leaf	Stem	Fruit	Leaf	Stem	Fruit		
Treatment	16.40	18.80	15.67	7.20	6.40	5.67	5.97	15.5
Farmer's practice	64.00	65.60	66.00	15.60	17.20	14.67	15.27	9.6

BER

Horticultural Research Station, Ananthapuramu

Epidemiology of powdery mildew of ber

- Studies on epidemiology of powdery mildew of ber were carried out to know the favorable climatic conditions for the development of disease. During 2014, powdery mildew of ber did not appear. This may be due to delayed onset of monsoon, prolonged dry spells and prevalence of high temperatures and low rainfall.
- Pooled data showed that the disease initiation took place during 35th or 36th standard meteorological week and intensity increased as the season advanced. Correlation studies revealed that, Per cent Disease Index (PDI) has significant and negative correlation with maximum and minimum temperatures and positive correlation with relative humidity and sunshine hours. The incremental increase in powdery mildew incidence showed linear pattern from September to December in every year with its peak in the month of October (Table-6).

For disease initiation:

The climatic conditions were

- Temperature (minimum) < 23.7 °C
- Morning Relative Humidity: >75.5
- Sunshine hours: >6.06

Table-6: Epidemiological studies on powdery mildew of ber, cv. gola (14 years pooled)*

S.No	Standard Week no.	PDI (Percent) Disease Index)	Increase in disease (PDI)	Weather data (Average during standard week)					
				Temperature		Relative Humidity			
				Maximum	Minimum	Morning	Evening	Rainfall	Sunshine hours/day
1.	35	1.30	---	32.91	23.60	76.19	44.54	25.03	5.57
2.	36	9.18	7.88	32.52	23.38	77.60	47.23	39.53	6.91
3.	37	24.00	14.81	32.68	23.40	76.53	44.20	22.29	5.99
4.	38	32.00	8.01	32.64	23.17	77.30	45.25	24.16	6.01
5.	39	44.51	12.51	32.99	22.88	77.61	44.03	22.13	8.60
6.	40	53.99	9.48	32.82	22.88	77.72	43.55	19.55	7.89
7.	41	60.13	6.14	32.84	22.65	78.79	42.52	22.41	6.74
8.	42	51.36	-8.77	32.72	23.30	79.17	42.11	15.65	6.59
9.	43	53.79	2.43	31.50	21.62	82.74	47.87	16.01	5.39
10.	44	56.09	2.30	30.72	20.88	84.57	48.87	11.34	7.87

S.No	Standard Week no.	PDI (Percent) Disease Index)	Increase in disease (PDI)	Weather data (Average during standard week)					
				Temperature		Relative Humidity			
				Maximum	Minimum	Morning	Evening	Rainfall	Sunshine hours/day
11.	45	56.85	0.76	31.22	19.98	83.51	44.40	9.52	6.89
12.	46	55.82	-1.03	31.26	18.77	84.82	40.62	4.89	7.62
13.	47	59.69	3.86	30.65	19.11	85.19	44.41	5.38	7.28
14.	48	53.30	-6.39	30.62	18.79	86.77	44.03	4.02	6.65
15.	49	51.17	-2.13	29.53	17.66	87.57	42.40	1.47	7.59

*- **During 2003 powdery mildew did not appear.**

Table-7: Correlation coefficient of PDI (Percent Disease Index) with weather parameters from (14 Years pooled)#

S.No.	Weather Parameters	Percent Disease Index (PDI)
1.	Maximum Temperature	**-0.48**
2.	Minimum Temperature	**-0.58***
3.	Morning Relative Humidity (RH1)	**+0.63***
4.	Evening Relative Humidity (RH2)	**-0.24**
5.	Rainfall	**-0.71*****
6.	Sunshine hours	**+0.44**
***significant at 5%, ***significant at 0.5%**		

 # - During 2003 powdery mildew did not appear.

Multiple Regression equation:

Y = -1541.1 + 24.2 (Tmin) + 11.8 (RH1) – 0.8 (RF) + 18.3 (SSH)

R^2 = 73%

Y = -1708.5 + 24.2 (Tmin) + 13.6 (RH1) +19.7 (SSH)

R^2 = 70%

Screening of germplasm of arid fruits for resistance to diseases

Screening of pomegranate varieties to fungal and bacterial spots indicated that Jalore seed less was highly susceptible while other var. Ganesh, Mridula, Rub-2 and Bhagwa were susceptible.

Bio-control of ber powdery mildew

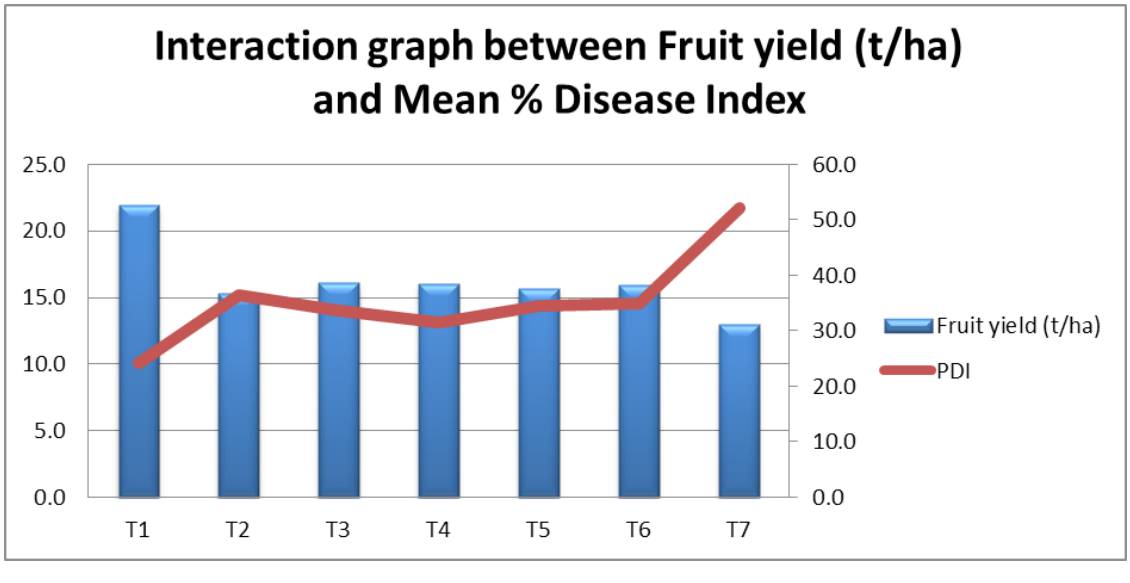
- During 2014, powdery mildew of ber did not appear, this may be due to delayed onset of monsoon, prolonged dry spells and prevalence of high temperature and low rainfall. Hence, the treatments were not imposed. Based on the seven years data the experiment was concluded.
- Field experiment was conducted for seven years from 2007 to 2013, for evaluating bio-agents *viz.*, *Pseudomonas fluorescens* and *Trichoderma* sp. alone and in combination with fungicide Dinocap (Karathane) against ber powdery

mildew on Cv Gola. The experiment was laid in Randomized Block Design (RBD) with three replications and seven treatments and unsprayed check was maintained as a control. *Pseudomonas* sp. and *Trichoderma* sp. were mass multiplied on nutrient broth and potato dextrose broth respectively. The concentration of 1% of bio-agents was prepared by dissolving the broth culture in water @ 10 ml/l. The treatments were imposed just after the appearance of the disease through foliar spray. The second and third sprays were given at an interval of 20 days. Observations on disease intensity were recorded after 20 days of each spray on 0-5 foliar disease rating scale and percent disease index was calculated. Pooled analysis was carried out and cost : benefit ratio was worked out.

Table-8: Effect of bio-agents and fungicide on ber powdery mildew during 2007 to 2013 (7 years pooled)

Treatment		Mean percent disease index		Per cent disease control over check	Fruit yield (t/ha)	Cost: Benefit Ratio
T_1:	0.1% Karathane alone	24.2	(29.5)*	53.6	21.9	1:2.41
T_2:	0.05% Karathane alone	36.5	(37.1)	29.9	15.3	1:0.92
T_3:	1% *P. fluorescens* (CIAH 196) + 0.05% Karathane	33.7	(35.5)	35.3	16.1	1:0.73
T_4:	1% *P. fluorescens* (CIAH NR) + 0.05% Karathane	31.6	(34.2)	39.3	16.0	1:0.71
T_5:	1% *Trichoderma* (CIAH 240) + 0.05% Karathane	34.5	(35.9)	33.8	15.7	1:0.77
T_6:	1% *Trichoderma* (CIAH NR) + 0.05% Karathane	34.9	(36.2)	33.0	15.9	1:0.83
T_7:	Unsprayed check	52.1	(46.2)	—	13.0	—
	SE.m+	2.53		1.84		
	CD at 5%	5.13		3.74		

*Figures in the parentheses indicates the transformed values



Results

Pooled data analysis (2007-13) indicated that, all the treatemnts differed significantly with control in reducing the disease incidence, however the lowest per cent disease index of 24.2 with highest per cent disease control 53.6 and fruit yield of 22 t/ha was recorded in the treatment with Karathane which differed significantly with other treatments. The combination of bio-agent and Karathane was significantly effective in reducing the incidence of per cent disase index and fruit yield. However, lowest per cent disease index of 31.6 was recorded with 1% *P. florescense* (CIAH NR) + 0.05% Karathane followed by 1% *P. florescense* (CIAH 196) + 0.05% Karathane.

Conclusion & Recommendation

The existing recommendation of fungicide i.e Karathane @ 0.1% still found to be effective against ber powdery milew, than the bioagents viz., *P. florescence and Trichoderma viride* which were ineffective.

VEGETABLES

VEGETABLES

Horticultural Research Station, Lam, Guntur

Survey and Surveillance of diseases in important vegetable crops in the farmers field at periodical intervals

In chillies, 5.5-18.0% of damping off, 11.4 -23.4% of choanephora blight, 5.4-15.1% of wilt, 10-12% of cucumber mosaic virus, 8.7-28.9% of leaf curl virus(Gemini virus), 6.4-10.8% of powdery mildew, 6.5-8.8%of fruit rot and 4.5-5.6% of cercospora leaf spot were recorded during 2014-15. In ridge gourd 4.5-6.0% of Mosaic and 5.4-12.4% of downy mildew were recorded. In brinjal 16.5-17.2% of bacterial fruit rot, 15.5-21.0% bacterial wilt were recorded. In tomato 6.9 – 14.4% of early blight and 6.4-30.2% of leaf curl virus were recorded. In bitter gourd yellow mosaic (25.4-28.9%), in snake gourd bacterial fruit rot (21.4-32.1%) were recorded. In beans, 4.5-20.3% of yellow mosaic, 5.2-15.3% of anthracnose and 7.6 -8.9% wilt were recorded. In bhendi, 4.4 – 15.5% of YVMV was recorded.

Epidemiology of most important diseases of commercially important vegetable crops of the locality

- Regression equation developed for the chilli leaf curl revealed that disease incidence has positive correlation with maximum temperature, relative humidity (FN), rainfall and whitefly population and negative correlation with minimum temperature, relative humidity (AN). Further the coefficient of multiple determination R^2 value was 0.735 and significant which implies that 73.5% of variation in the development of chilli leaf curl virus was explained by the five independent variables and whitefly population.
- Similarly for tomato leaf curl virus, the independent variables, maximum temperature, minimum temperature, relative humidity (FN), rainfall and whitefly population has positive correlation with disease incidence except relative humidity (AN). The coefficient of multiple determination R^2 value was 0.777and significant, which implies that 77.7% of variation in the development of chilli leaf curl virus was explained by the five independent variables and whitefly population.

OKRA

Horticultural Research Station, Lam, Guntur

Okra Yellow Vein Mosaic Virus (YVMV) resistant trial (IET, AVT-II)

- The experiment was conducted to screen the okra hybrids for YVMV disease during summer season with 11 hybrids in Initial Evaluation Trial and 6 hybrids in Advanced Varietal Trial-II against 4 susceptible checks.
- In IET, among the entries tested, no YVMV disease symptoms were recorded in 2014/OKYVRES-3, 2014/ OKYVRES-5, 2014/OKYVRES-10 and 2014/OKYVRES-11. While the yield of 89.22 qha^{-1}, 86.07 qha^{-1}, 109.49 qha^{-1} and 130.80 qha^{-1} respectively was recorded.
- In AVT-II, among the entries tested, only on 4 varieties *viz*, 2012/ OKYVRES-1, 2012/ OKYVRES-2 YVMV disease incidence was not there and recorded a fruit yield of 86.39 qha^{-1} and 103.94 qha^{-1} respectively.

Horticultural Research Station, Mahanandi

Highest yellow vein mosaic virus disease incidence (55.0) was recorded in 3rd week of October 2014. The disease incidence has negative correlation with maximum and minimum temperatures and positive correlation with relative humidity and rain fall.

Survey and surveillance of disease in major horticultural crops existing in Rayalaseema zone

Roving survey was conducted in vegetable and fruit crop growing areas in Kurnool, Anantapur and Prakasam districts of Andhra Pradesh. In Kurnool district more per cent disease index (PDI) of purple leaf blotch was observed in Kharif (36.5) than in Rabi (30.5) on onion. In tomato, early blight (21.5%) and bud necrosis virus (12.5 %) were recorded. In Chilli wilt (6.0%) and viral disease (15.0%) were observed. The powdery mildew disease incidence in Chilli (16.0%), Capsicum (15.0%) and Cluster bean (16.0%) was recorded. In turmeric, leaf spot (22.5%) and rhizome rot (14.5%) were the major diseases recorded.

TOMATO

Horticultural Research Station, Mahanandi

- Highest leaf curl (12.55%) and bud necrosis (11.58%) disease incidence was recorded at 2nd week of November 2014. The disease incidence has negative correlation with maximum and minimum temperature and positive correlation with relative humidity.
- Early blight disease was recorded from August 1st week to 2nd week of November. The results indicated that the disease incidence has significantly negative correlation with maximum temperature (-0.2416), minimum temperature (-0.4296) and rain fall (-0.0065) and had positive correlation with morning relative humidity (0.0018), evening relative humidity (0.2079). The coefficient of multiple determination was 0.6305, which implies that 63.05% variation in development of early blight incidence was explained by weather parameters.

Conclusion

Prediction equations developed based on pooled data (2011-12, 2012-13 and 2013-14) for turmeric leaf blotch, purple blotch of onion and tomato early blight were under validation during 2014-15. Validation was done with current year data on disease incidence (2014) and corresponding weather parameters. Validation was done for testing the goodness of fit using 2014-15 data. The prediction equations of the three pathosystems were very effective in predicting the disease incidence one week ahead of disease development.

CHILLIES

Horticultural Research Station, Mahanandi

- Highest leaf spot incidence (19.0) was recorded in 4th week of October, 2014. The disease incidence has negative correlation with maximum and minimum temperature and had positive correlation with evening relative humidity and rain fall.
- Highest virus complex incidence (7.24%) was recorded at 2nd week of November 2014. The disease incidence has negative correlation with maximum, minimum temperature and rain fall and positive correlation with relative humidity.

ONION

Horticultural Research Station, Mahanandi

Purple leaf blotch disease was recorded from August 1st week to 2nd week of November, 2014. The results indicated that the disease incidence has significant negative correlation with maximum temperature (-0.2145), minimum temperature (-0.4629), morning relative humidity (-0.0467), rain fall (0.0644) and had positive correlation with evening relative humidity (0.1853). The coefficient of multiple determination (R^2 value) was 0.6095, which implies that 60.95% variation in development of purple leaf blotch disease incidence was explained by weather parameters.

Tebuconozole 50% + trifloxystrobin 25% WG @ 0.5 g/l was found to be superior in controlling the purple leaf blotch in onion with low disease incidence (19.36 %) and higher yield (21.72 t/ha.).

Screening of onion varieties against fungal diseases

Among the 15 onion varieties, more purple leaf blotch disease incidence (40.50%) was recorded in Bellary Red, whip smut (24.50%) and basal rot (35.66%) diseases were recorded on cv. Bhima shubra.

Management of Alternaria leaf blotch *(Alternaria porri)* on onion *(Allium cepa)*:

Tebuconazole 50% + trifloxystrobin 25% WG was found to be superior in controlling the purple leaf blotch in onion (17.37) with more yield (20.36 t/ha) and B:C Ratio 1.56).

FLOWERS

CROSSANDRA

Horticultural Research Station, Anantapuramu

Integrated management of collar rot in Crossandra

During 2014, lowest wilt incidence (47.73 per cent) was recorded in treatment with integration of *Trichoderma viride* and drenching + spraying with carbendazim @ 1 g/l which differed significantly from other treatments followed by the treatments, drenching + spraying with carbendazim @ 1 g/l (53.41 per cent) and application of *Trichodema viride* through FYM + neem cake (225 kg FYM + 25 kg Neem cake + 2.5 kg Trichoderma per hectare) (56.44 per cent) which were on par with each other and differed significantly with other treatments.

Table-8: Effect of different treatments on incidence of collar rot/wilt of crossandra during 2014

S. No.	Treatments	Mean Percent wilt
T_1	Application of *Trichoderma viride* through FYM + neem cake	
	(225kg FYM + 25 kg Neem cake + 2.5 kg *Trichoderma*/ha)	56.44 (48.70)*
T_2	Drenching + spraying with Tebuconazole @ 2 ml/ltr	79.17 (63.03)
T_3	Drenching + spraying with carbendazim @ 1 g/l	53.41 (46.97)
T_4	Spraying with Copper Oxychloride @ 3 g + Streptocycline @ 0.01 g/L	60.98 (51.40)
T_5	$T_1 + T_2$	76.52 (61.08)
T_6	$T_1 + T_3$	47.73 (43.69)
T_7	Spraying with Bacterimycin @ 0.1%	66.29 (54.58)
T_8	Application of Carbofuran granules @ 25kg /hectare	70.83 (57.32)
T_9	Drenching + spraying with Aliette @ 1g/l	83.71 (66.33)
T_{10}	Control	85.98 (68.06)
	SE.m+	**1.82**
	CD at 5%	**5.41**
	C V %	**5.61**

* Figures in the parentheses indicate the transformed values

SPICES

CHILLIES

Horticultural Research Station, Lam, Guntur

Nursery disease management using bio agents and new fungicides in chillies, tomato and brinjal

Seed treatment @4g/kg seed, soil application @ 10g/sqm and soil drenching @ 5% of *Trichoderma viride*-2 (IIVR) and *Pseudomonas fluorescence* were at par with each other and significantly superior with highest germination percentage and lowest damping off incidence in chilli, tomato and brinjal.

Disease reaction of chilli germplasm against different diseases

Out of 51 chilli entries screened against fruit rot (*Colletotrichum capsici*) and chilli leaf curl virus, only 2 entries has shown resistance (<5%), 20 entries were moderately resistant and 29 entries were susceptible to fruit rot as against 27.5% incidence in susceptible check. For chilli leaf curl virus, 2 entries were found susceptible and 49 entries were highly susceptible.

Integrated management of vector borne viruses in chilli

The experiment was conducted with an objective of controlling the vector borne viruses in chilli by adopting integrated management practices. After transplanting the seedlings in main field the treatments were imposed as per the schedule. Sprayings started after the establishment of seedlings and continued at weekly interval. The results revealed that up to five sprayings the crop was healthy and the pest load was below Economic Threshold Level (ETL). After seventh spray (during last week of December), heavy incidence of thrips (>25per leaf) was recorded except in the treatment sprayed with Cyzpyr @ 1.8 ml/l and heavy incidence of mite was also recorded (>25per leaf) in all the treatments. Chilli leaf curl incidence transmitted by whitefly was recorded and all the treatments were significantly superior over control. There was severe incidence of thrips and mites resulting in failure of the crop.

Horticultural Research Station, Darsi

Fungicidal management of powdery mildew in chilli

Among eleven fungicides evaluated, triademifon (29.72 %) and myclobutanil (29.77 %), reduced the disease severity of chilli powdery mildew effectively after 3rd spraying and increased the yield.

BLACK PEPPER

Horticultural Research Station, Chintapalli

Effectiveness of new molecules of fungi toxicants against Phytophthora foot rot of Black Pepper in Existing Plantation (PEP/CP/5.4)

New molecules ie., Fenamidone (10%) + Mancozeb (50%) and Copper Hydroxide were tested for their efficacy against foot rot of black pepper caused by *Phytophthora capsici*. Spraying and drenching with 0.1 % of Fenamidone (10%) + Mancozeb (50%) alone and spraying and drenching with 0.1% of Fenamidone (10%) + Mancozeb (50%) coupled with soil application of *Trichoderma harzianum* (MTCC 5179) @ 50 g/vine with 1.0 kg neem cake recorded lesser incidence of leaf yellowing, defoliation and vine mortality.

Table No.9: Effectiveness of new molecules of fungi toxicants against *Phytophthora* foot rot of Black Pepper in Existing Plantation:

	Treatments	Yellowing (%)	Defoliation (%)	Death of Vines (%)	Yield / Vine (Kg)
T_1	Spraying and drenching with 0.1 % Fenamidone (10 %) + Mancozeb (50 %) (Sectin)	15.20	20.32	12.11	1.5
T_2	Spraying and drenching with 0.1 % Fenamidon (10 %)+ Mancozeb (50 %) (Sectin) + Soil application of *T.harzianum* (MTCC-5179) 50 g/vine with 1 kg neem cake	11.50	13.98	8.50	3.02
T_3	Spraying and drenching with 0.2 % kocide + after 10 days soil application of *T. harzianum* (MTCC 5179) 50g/vine with 1 kg neem cake.	17.30	16.45	13.21	2.35

	Treatments	Yellowing (%)	Defoliation (%)	Death of Vines (%)	Yield / Vine (Kg)
T_4	Potassium phosphonate (0.3%) + *Trichoderma harzianum* (MTCC-5179)	13.24	16.04	12.04	2.82
T_5	Control	26.78	32.25	24.58	1.05
	SEM ±	1.31	2.00	1.15	1.01
	CV %	14.02	16.35	17.78	13.07
	CD (P=0.05)	2.04	4.01	3.81	0.66

Foliar Symptoms of Phytophthora Foot Rot in Black Pepper

TURMERIC

Horticultural Research Station, Mahanandi

Turmeric leaf spot disease incidence was recorded from August 1st week to November 2nd week. Correlation of disease with weather parameters indicated that the disease incidence has significant negative correlation with maximum temperature (-0.3020), minimum temperature (-0.5512) and had positive correlation with morning relative humidity (0.0120), evening relative humidity (0.2435) and rain fall (0.0076).

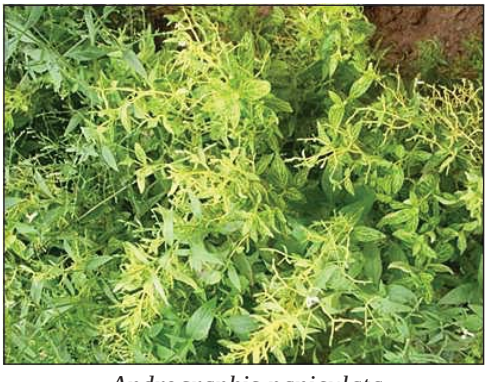
MEDICINAL & AROMATIC PLANTS

Horticultural Research Station, Venkataramannagudem

- Yellow mosaic virus on *Andrographis paniculata* with 89.30% incidence and mosaic on *Ocimum basillicum*, little leaf like symptoms on *O. gratissimum* (25%) and rosette symptoms on *Sauropus androgynus* (100%) were first in their occurrence during 2014-15 in monitoring plots. Similarly sclerotial root rot on *Psoralea corylifolia* with 73.91% incidence, stem lesions on *Plumbago zeylanica* (<1%) were also recorded for the first time.
- Time of onset of YMV disease on *Macuna pruriens* varied with the time of sowing. There was delay in the disease on set in later sown crop by 33-40 days especially in early maturing varieties *viz.*, Selection -8 and Arka Aswini.

- In betelvine, Phytophthora foot rot disease incidence reduced significantly, while the leaf spot disease incidence was not reduced and leaf yield was not increased significantly with the IDM technology over the farmers practice in demonstration plots conducted in farmers' fields.
- In *Acorus calamus* germplasm, Helminthosporium leaf spot incidence was highest (27.69 %) in Rahuri accession and lowest in Araku accession, while the incidence in other accessions ranged from 7.19 to 21.24 %. The leaf spot incidence was highest in APAc-5 (10.71 %) which differed significantly with the rest of the accessions in Multi Location Trial.
- Isabgol downy mildew disease incidence was reduced by 42.22 % with 50 % increase in yield (12.66 q/ha) over the control (6.33 q/ha) with chlorothalonil in combination with two sprays of potassium dihydrogen phosphate. However the disease incidence was on par and less in treatments receiving three sprays than two sprays. The results of the first year indicated that the treatments, two sprays with potassium dihydrogen phosphate and one fungicide spray significantly reduced the disease with significant increase in yield.

Diseases of Medicinal crops



Andrographis paniculata
Yellow mosaic disease

Ocimum basillicum
mosaic disease

Psoralea corylifolia
Sclerotial root rot

Acorus calamus
Helminthosporium leaf spot

PLANTATION CROPS

COCONUT

Horticultural Research Station, Ambajipeta

Survey and surveillance of coconut diseases

- The mean percent incidence of basal stem rot, stem bleeding and bud rot diseases were 7.81, 1.77 and 0.81 respectively in roving survey conducted during 2014-15.
- Last year during july, coconut fields of Tuni village of Tuni mandal of East Godavari District, Srirampuram, Kumarapuram, Rajavaram villages of Payakarao pet mandal and Rajagopalapuram village in Kotauratla mandal

Bio control based integrated disease management package i.e application of 50 g of Trichoderma viride + 5 kg neem cake/tree, removing and destroying dead trees and basin irrigation showed significant reduction of both vertical and horizontal spread of basal stem rot disease in coconut under field conditions.

of Visakhapatnam district exhibited symptoms similar to leaf rot disease. Diseased palms displayed the symptoms of yellowing or browning, wilting followed by drooping of the lower and in some cases middle leaves along with fruit bunches. The diseased leaves on palm or diseased palms in the field were not continuous and dispersed. Leaf bases showed the symptom of browning and rotting and there by drooping of the leaves. The gardens were 25 to 30 years old, 20 km away from sea coast, having sandy soils intercropped with cocoa and banana. The fields were managed during summer. Up to june first week the temperature in the area was around 40-43^{o}C and previous 15 days continuous rainfall with high humidity and temperatures around 29^{o}C prevailed in the surveyed villages. Isolated pathogen was identified as *Exserohilum sp.*, based on spore characteristics.

- Fixed plot survey conducted at P.Gannavaram, East Godavari District during 2014, where per cent incidence of basal stem rot was 16 % in August 2014 and increased to 20 % by end of December 2014. Per cent incidence of stem bleeding varied between 2.28-2.82 % while bud rot disease incidence was very low (1.63 %).

Basal stem rot disease

Etiology and epidemiology of basal stem rot disease of coconut

Molecular characterization and conservation of *Ganoderma spp.*

Based on the isozyme analysis, pathogenic virulence studies and RAPD PCR analysis, the *Ganoderma* isolates from all the three states were grouped as more virulent, moderate virulent and less virulent. Isolates of Karnataka state were found more virulent. Five out of six Arsikere (Gl2, Gl3, Gl4, Gl6, A2) isolates showed more virulence nature and one isolate (Gl5) showed moderate virulence in the pathogenic virulence studies conducted with Bengal gram as indicator plant. Isolates from Andhra Pradesh belonged to all the three categories such as more virulent (7 out of 18 isolates), moderately virulent (3 out of 18 isolates) and less virulent (8 out of 18 isolates). Six out of eight Ganoderma isolates from Tamil Nadu showed less virulence nature. The other two isolates PVI-2 and CRS-5 showed more virulent nature. The type cultures, DMR-44, DMR-45 and DMR-86 from Directorate of Mushroom Research, Solan, Himachal Pradesh, showed more virulent nature with pathogenic studies on Bengal gram plants.

Epidemiology and disease forecasting

Impact of other palms and intercrops in coconut on occurrence and spread of disease

In sole coconut plot, the basal stem rot PDI was 16% in April 2014 and was increased to 20% by March 2015. Mean vertical spread in sole coconut crop was recorded as 121.0cm in April 2014 and as 112.25cm in March 2015 where as in mixed crop of coconut and banana, 26% was recorded during June 2014 and increased to 30% by 2015. Mean vertical spread in coconut + banana plot was recorded as 90.46 cm in June 2014 and as 77.46cm in March 2015.

Early detection of basal stem rot disease in coconut

Polyclonal antibodies were raised in New Zealand White Rabbits against *Ganoderma lucidum*. Pure cultures of *Ganoderma lucidum* was used to develop polyclonal antibodies. The developed antibodies were tested with the pure cultures as antigen in glass capillary tube assay, slide agglutination test and by indirect ELISA. Positive reaction of developed antiserum of *G. lucidum* with their respective antigens was observed in glass capillary tube assay and slide agglutination tests by the formation of precipitations. The antiserum was then used to detect its sensitivity against the pathogens in indirect ELISA method.

Indirect form of ELISA (I-ELISA): *Ganoderma lucidum*:

- The developed polyclonal antisera diluted in carbonate buffer (pH 9.6) were first added to the ELISA plate. Then test samples at various concentrations of 10^{-1}, 10^{-2}, 10^{-3}, 10^{-4}, 2 X 10^{-4} were added to the same plate. After two hours of incubation, secondary antiserum conjugate (anti rabbit IgG ALP conjugate) at the concentration of 1:10,000 was added to the plate. Then the substrate was added and absorbance's were recorded with ELISA reader at 405 nm. The Indirect form of ELISA was found to be sensitive in detecting the *Ganoderma* isolates.
- As per the recommendations of the 23rd annual group meeting, cross reactivity test was carried out with two other pathogens, *Thielaviopsis paradoxa* and *Penicillium sp.* using the antibodies developed for *Ganoderma lucidum*. The same protocol that is used for antigen preparation with respect to *Ganoderma* isolates was used using the mycelia mat

of *Thielaviopsis paradoxa* and *Penicillium sp.* Results revealed the cross reaction of polyclonal antibodies developed for *Ganoderma lucidum* with *Penicillium* species and *Thielaviopsis paradoxa*.

PCR and Specific primers

Ganoderma specific primers Gan 1 and Gan 2 were used for specific amplification of 167bp product with all the available *Ganoderma* isolates. PCR reaction conditions were as follows: An initial denaturation cycle was carried out at 95°C for 10 min. It was followed by the three step cycle of denaturation temperature at 94°C for 1min, annealing temperature at 52°C for 45sec and renaturation temperature at 72°C for 1 min. This three step was repeated for 48 number of cycles and the final extension was carried out at 72°C for 10 min. After amplification, the pcr mix was loaded in the 1.0 % agarose gel and observed under UV transilluminator. Most of the *Ganoderma* isolates showed amplification at the expected size of 167 bp. Further studies are in progress.

DNA finger printing of coconut varities specific to Andhra Pradesh

Fifteen coconut specific SSR primers are being used for RAPD analysis. All the primers detected amplification in the coconut varieties Gangabondam, Pillalakodi, East Coast Tall and Jonnalaraasi. The number of scorable bands produced by the primers ranged from two to 7. 100% polymorphism was observed in all primers. Studies are in progress with the other varieties such as COD, Laccadive Ordinary, Phillippines Ordinary, Godavari Ganga for developing the dendrogram and relationship among them.

COCOA

Horticultural Research Station, Ambajipeta

Survey and surveillance of diseases of cocoa and their management

Surveys conducted during the year indicated that pod rots, stem canker and leaf spots were the major diseases on cocoa. Among the pod rots, rots caused by *Phytophthora palmivora* and *Botryodiplodia sp* were observed. In addition to the *Phytophthora* pod rot, minor incidence of pod rot caused by *Botryodiplodia sp* was observed during last year from January 2014 under dry conditions.

Management of *Phytophthora* pod rot and stem canker in cocoa

Bio control agents, *Trichoderma viride* (50g) along with neem cake (2kg.) *T. Virens (cake), Pseudomonas fluorescens* (50g) along with neem cake (2kg) and chemical fungicide, copper oxy chloride (3g/lit) were tested for their efficacy against stem canker disease of cocoa under field conditons. All the treatment except control recorded reduction in disease severity after six mnths of treatment application. Among the treatment, drenching of copper oxy chloride (3g/lit) was found effective followed by basal application of *Trichoderma viride* (50g) and neem cake (2kg). Disease severity of 14.1com was reduced to 5.8cm incopper oxy chloride (3g/lit) application and disease sseverity of 13.0com was reduced to 8.4cm in *Trichoderma viride* (50g) and neem cake (2kg) application.

Table-9: Management of stem canker disease of cocoa

S. No	Treatment	Mean disease spread in cm				
		June, 2014	August, 2014	October, 2014	December, 2014	February, 2015
T_1	*Trichoderma virens* cake application	15.0	15.0	16.2	15.2	12.1
T_2	*Trichoderma viride* and neem cake	13.0	13.0	13.2	11.0	8.4
T_3	Copper oxychloride (3g/lit)	14.1	14.1	14.1	10.1	5.8
T_4	*Pseudomonas fluorescens* and neem cake	14.4	14.4	14.4	14.0	9.8
T_5	Control	10.4	10.4	12.5	14.5	12.8

F. SOIL SCIENCE, AGRONOMY

Citrus Research Station, Petlur

- In acid lime organic farming experiment, plant height in T_6 Vermicompost (On N equivalent basis of RDF) + *Trichoderma viride*(1kg in 100kg FYM/vermicompost) + Azadirachtin (1 % (10000ppm) at 5 ml/l as spray) was maximum (142.50cm) and maximum canopy volume (122.92 m^3) in T_7 which include T_6+ *Pseudomonas fluorescence.*
- In acid lime organic farming experiment, plant height in treatment T_4– ZnSo4 foliar application + Fe incubated 2 days in FYM (Slurry) + Mg So4 foliar application recorded the maximum height 2.37 m, canopy volume 4.66m^3.
- Acid lime Mulching experimen in treatment T_2 (100 microns transparent polythene) recorded the maximum plant height (2.28 m) and stem girth (5.8 cm) where has canopy volume was maximum in T_4 – coconut leaves (4cm thickness) 4.66 m^3.
- The maximum plant height of 2.65m was recorded in T_6- (RDF +Fe+Zn+Mg @0.2%) and the canopy volume of 5.47m^3 and stem girth of 20.34cm was recorded maximum in T_1(RDF + without removing calcareous layer).
- Soil and water samples were collected from the mandals of Dakkili, Venkatagiri, Sydapuram, Rapur and Balayapalli for physico-chemical and nutrient analysis.
  - Visual nutrient deficiency symptoms in the surveyed acid lime orchards of the mandals of Dakkili, Venkatagiri , Sydapuram, Rapur and Balayapalli indicated mainly Fe and Zn deficiency.
  - Few orchards were poorly maintained, these orchards were displaying multi-nutrient deficiencies, such as N, Mg, Fe, Zn, Mn and B.
  - Some orchards in Balayapalli, Rapur and Venkatagiri mandals are declining due to presence of calcareous layer in sub-surface, these orchards showing N, P, Fe and Zn deficiencies.
  - Water analysis data revealed that the irrigation water used were moderately saline to saline and the electrical conductivity (E.C.) ranged from 0.89 – 2.31 dSm^{-1}.

V. EXTENSION

Five exhibitions were organized at Kamavarapukota (16.07.2014), Gannavaram (21.10.2014), Doddipatla (01.11.2014), KVK, Undi (17.11.2014 and Kaikaram (12.12.2014).

To disseminate the fitting technologies in various horticultural crops the scientists working in various research stations, Krishi Vigyan kendras, colleges and polytechnics have palyed a key role by way of conducting on farm trials, frontline demonstrations, trainings, field days, diagnostic surveys, method demonstrations, exposure visits, exhibitions etc. Apart from the regular extension services provided to the farmers the participation in different programmes organized by the state government departments and government of Andhra Pradesh was also note worthy and few important events participated by the university scientists in various places are as follows:

Dr.BM.C. Reddy, Vice-Chancellor, along with the university officers and scientists have participated in farmers –scientists interaction meeting organized in Rythu Sadassu at Kamavarapukota on 16.07.2014. Sri, N. Chandra Babu Naidu garu, Hon'ble Chief Minister of Andhra Pradesh along with the public representatives of the district visited the exhibition of improved technologies of horticultural crops displayed by the university and insisted upon the need for focusing on enhancing the productivity of major hortiocultural crops grown in the district.

Dr. B.M.C. Reddy, Vice-Chancellor visiting the exhibition

HUDHUD

Scientists of the university working in various research stations, colleges and Krishi Vigyan kendras were deputed immediately after hitting of HUDHUD cyclone in Visakshapatnam, Vizianagaram and Srikakulam districts on 12.12.2014. The team was led by the Vice-chancellor and the Director of Research. After review of the damage occurred to horticultural crops *viz.,* coconut, cashew, banana, betelvine, vegetables etc., fixed schedules were prepared and executed to conduct awareness campaigns and demonstrations on amelioration measures to the affected fields. A Special NSS camp was also arranged by the students of HC&RI, Venkataramannagudem to restore and rejuvenate the trees and bushes that were up rooted in VUDA park in Visakhapatnam city. Sri. N. Chandra Babu Naidu garu, Hon'ble Chief Minster of A.P addressed the students along with Sri Ayyanna Patrudu, Panchayat Raj Minister, and appreciated the efforts made by the students. Sri. P. Pulla Rao, Agricultural Minister, government of A.P visited P.K Palavalasa Village of Cheepurupalli mandal to see the demonstrations conducted for rejuvenation of afftected coconut trees. Sri Ganta Srinivas Rao, HRD Minister interacted with the students and thanked them for the services rendered. About 1789 coconut palms were treated with crown cleaning and COC drenching to save the palms . Vice-Chancellor along with the Director of Research reviewed the recovery operations from time to time and provided guidance to the students and scientists.

Damages Caused by Hudhud Cyclone in various Horticultural Crops

Fallen coconut palms

Crown damage in coconut

Damage in cashew orchards

Lodged banana crop

Scientist of the university working in various research stations, colleges and Krishi Vigyan Kendras were deputed immediately after hitting of HUDHUD cyclone in Visakhapatnam, Vizianagaram and Srikakulam districts of Andhra Pradesh and suggested amelioration measures.

Crown cleaning in Coconut

Drenching coconut crown with COC

Hon'ble Chief Minster of A.P addressing the students along with Sri Ayyanna Patrudu, Panchayat Raj Minister, District Collector and Dr.B.M.C.Reddy,VC, Dr.YSRHU

Sri. P. Pulla Rao garu, Agricultural Minister visit to affected fields in P.K Palavalasa (V) Chepurupalli (M)

Sri. N. Chandra Babu Naidu garu, Hon' Chief Minister interacting with farmers in Dibbalapalem (V), Bhogapuram (M)

Students removing and loading the broken branches and stems at VUDA park

A Special NSS camp was organised by the College of Horticulture, Venkataramannagudem to restore and rejuvenate the trees and bushes that were affected due to HUDHUD cyclone in Visakhapatnam

Sri Ganta Srinivas Rao, HRD Minister thanking the students for the services rendered

Earthing up of partially lodged palms in Ravada (V), Bhogapuram (M)

Dr.J.Dilip Babu, Director of Research, Dr.YSRHU along with the team of scientists from HRS, Nuzuvid, Vijayarai and KVK, Venkataramannagudem have participated in Rythusadassu and arranged the exhibition stall during the occasion of launching of Rythu Sadhikaratha Trust at College of Veterinary Science, Gannavaram on 21.10.2014.

Hon'ble Chief Minister, Agriculture Minister and other dignitaries visiting the exhibition

Scientists of HRS, Venkataramannagudem, Ambajipeta, Kovvur, and KVK have organized an exhibition on the occasion of Hon'ble CM's visit to Polam Pilustondi programme at Doddipatla village, Yalamanchili Mandal, W.G.Dist., on 01-11-2014.

Exhibition organized at Doddipatla village during the inauguration of Polam pilustondi programme by Hon'ble Chief Minister, A.P.

A Farmer-Scientists interaction meeting and exhibition of technologies that are economically viable in agricutlrue and horticulture fields were organized by the scientists of HRS, VR Gudem, Kovvur, Ambajipeta and KVK, Venkataramannagudem during the visit made by the Central Minister of Commerce, Smt. Nirmala Sitaraman garu on 17-11-2014 at KVK, Undi.


Exhibition visited by Smt. Nirmala Sitaraman garu, Central Minister of Commerce and Sri. M. Venkateswar Rao, M.P., Eluru

Dr.M.M.Naidu Sr. Scientist (Hort.), HRS, Kovvur, Dr. E. Karuna Sree and Dr. A. Srinivas, Programme Coordinators of KVKs have participated in the Rythu Sadassu and arranged an exhibition on 12.12.2014 at Kaikaram village. Sri. N. Chandra Babu Naidu garu, Chief Minister inaugurated the exhibition and visited the stall.


Hon'ble Chief Minister and ministers of Govt. of A.P visited the exhibition arranged by DR YSRHU during Rythu Sadassu at Kaikaram village, West Godavari

A. On Farm Testings (OFTs) & Front Line Demonustraction (FLDs)

Thirty Eight technologies were assessed/demonstrated by the KVKs to test the performance of selected improved technologies in Agriculture, Horticulture, Fisheries, Animal Husbandry and Home Science in order to find their suitability to the micro climatic conditions of the respective districts.

A total of thirty eight technologies were assessed/demonstrated by Krishi Vigyan Kendras of Venkataramannagudem and Pandirimamidi to test the performance of selected improved technologies in agriculture, horticulture, fisheries, animal husbandry and home science in order to find their suitability to the climatic conditions in the respective district. The details are as given below:

Krishi Vigyan Kendra, Venkataramannagudem

Crop/Enterprise	Title of OFT/FLD if any	Technology demonstrated	Extension activities
Okra	Assessment of yield improvement in Okra through nutrient management.	T_1: Recommended dose of NPK @ 180:75:75 kg/ha at weekly interval with 10% of dose at 10 days stage and 70% dose at 10 to 40th day	Field day and method demonstrations

Crop/Enterprise	Title of OFT/FLD if any	Technology demonstrated	Extension activities
		of crop and 20% of the dose at 41 to 90th day. FYM @ 15t/ha. at last ploughing and foliar spray of 10 grams urea and 5g micro nutrient mixture at flowering stage and fruiting stage. T_2: Non application of organic manures, less usage of straight fertilisers and using complex fertilisers (28.28.0 UAP)	
Paddy	Weed management in direct sown paddy	T_1: Hand weeding 3 times (manually) T_2: Ethoxy Sulfuron 15 % WDG + Bis Pyribac Sodium 10 % ECT$_3$: Pyrizosulfuron Ethyl 10% WP + 2,4 D, Salt 80 % WP	Field day and method demonstrations
Maize	Soil test based fertilizer management in *rabi* maize	T_1 : 212:60:45 NPK kg /ac farmer practice T_2 : Recommended NPK fertilisers(100 : 32 : 32 kg/ac) T_3 : STBFR equation based	Field day, method demonstrations
Maize	Management of Zinc deficiency in *rabi* maize	INM components	Field day, diagnostic visits, field visits and method demonstrations
Acid lime	Micro nutrient management in acidlime	INM Components	Method demonstrations
Paddy	Introduction of high yielding paddy variety, MTU-1075	ICM	Field day, diagnostic visits, field visits and method demonstrations
Blackgram	Introduction of YVMV resistant blackgram variety, LBG-752	INM	Field visits
Greengram	Introduction of YVMV resistant greengram variety, LGG-460	ICM	Field visits
Groundnut	Introduction of bold seeded high yielding groundnut var.Kadiri-8	ICM	Field visits

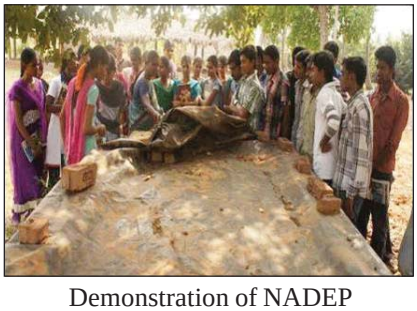
Crop/Enterprise	Title of OFT/FLD if any	Technology demonstrated	Extension activities
Sesamum	Demonstration of gingelly variety YLM-66	ICM	Field visits
Oil palm	Control of boran and magnesium deficiency in oil palm	INM	Method demonstrations, field visits
Dolichos bean	Varietal evaluation of dolichos bean	T_1: RND-1 T_2:Pusa Early Prolific	Method demonstrations, field visits
Banana	Varietal evaluation of banana variety, FHIA-3	T_1: FHIA-3 T_2: Kovvuru Bontha	Method demonstrations, field visits
Marigold	Introduction of marigold variety, Pusa Naringa Gainda	Varietal evaluation	Method demonstrations, field visits
Chrysanthemum	Introduction of chrysanthemum, PAU-B-107	Varietal evaluation	Method demonstrations, field visits
Turmeric	Introduction of turmeric variety, JTS-6	Varietal evaluation	Method demonstrations, field visits
Fodder	Assessment of Phule Jayawant, a multicut perennial fodder variety	T_1: Phule Jayawant T_2 :CO-4	Field visits
Backyard Poultry birds	Assessment of Srinidhi poultry birds in rural backyards Vs. Vanaraja	T_1: Srinidhi Poultry Birds T_2 : Vanaraja Poultry Birds	Field visits Backyard Poultry birds
Backyard Poultry birds	Use of azolla as poultry feed in backyards for yield improvement	T_1: Vanaraja birds feeding 100g fresh azolla per bird + 50 g. grains + natural feeding/ day T_2: Vanaraja birds feeding with 50g grains + natural feeding/day	Field visits
Murrel culture	Introduction of Murrel seed along with IMC in small culture tanks	T_1: Introduction of IMC fish culture + Murrel fish T_2: IMC fish	Field visits
Terrace kitchen garden	Cultivation of vegetables in container in semi urban areas	Cultivation of tomato, brinjal, okra, guar, leafy vegetables and cucurbits in containers	Field visits, training programmes
Mushrooms	Milky mushroom production in rural areas	Introduction of milky mushroom cultivation	Field visits, training programmes

Application of
boron in cucurbits

Vaccination to
Vanaraja poultry birds

PRA exercise at
Nachugunta village

Murrel culture in small tanks



Demonstration of NADEP
Composting

Turmeric var-JTS-6 in
Chodavaram Village

Mari gold var- pusa basanthi
demonstration

Field visit to chilli crop in
Gavaravaram vilalge

Demonstration of processing of
cashew apple

Krishi Vigyan Kendra, Pandirimamidi

Crop/Enterprise	Title of OFT/FLD if any	Technology demonstrated	Extension activities
Turmeric	Introduction of new high yielding turmeric cultivar Salem	T_1 : Turmeric cultivar, Salem with RDF T_2: Duggirala Red	Demonstration, field visits and training
Tapioca	Assessment of high yielding improved tapioca variety, Srivijaya	T_1: Tapioca variety Srivijaya with RDF T_2: Local variety	Field visits and trainings
Banana	Introduction of tissue culture banana variety, Grand Naine	T_1: Banana variety Grand Naine with RDF T_2: Local variety	Trainings

Crop/Enterprise	Title of OFT/FLD if any	Technology demonstrated	Extension activities
Sweet orange	Improvement of yield and fruit quality in sweet orange	T_1: Application of IIHR special (Citrus special) @ 75g/15 l of water on new flush and at peanut size. T_2: No micro nutrient sprayings	Demonstrations and trainings
Sweet corn	Demonstration of sweet corn variety –Madhuri in agency area	T_1:Sweet Corn variety – Madhuri with RDF T_2: Commercial maize	Trainings
Tomato	Demonstration on drought resistant tomato variety – Arka Meghali	T_1:Drought resistant tamato variety – Arka Meghali T_2: No Crop in *rabi*	Demonstrations and trainings
Blackgram	Demonstration on blackgram new variety, PU-31	T_1: Introducing YMV resistant variety Pu-31 seed treatment with Imidacloprid @ 5g/kg. need based sprayings with acetamiprid @ 1 g/l at 30DAS followed by spraying with chlorpyriphos @ 2.5 ml/l at 45 DAS followed by acephate @ 1.5 g/l at 60DAS stage. T_2:Farmers practice	Demonstrations, field days and trainings
Brinjal	Integrated pest & disease management in brinjal	T_1: IPDM T_2: Farmer practice	Demonstrations and trainings
Paddy	Demonstration on paddy new variety, MTU -1075	T_1: 3G Granules application in nursery @ 160 g/cent, 4G application of granules in main field @ 8kg/acre at 20 DAP Application of ace-phate spray @ 1.5 g/l at 50 DAP d) Cartap hydrochloride 50% SP spray @ 2g/l at 80 DAP T_2: Farmers practice	Trainings
Ragi	Demonstration of white seeded ragi variety, VRW-936	T_1: Ragi seed (VRW-936) T_2: No crop	Trainings

Crop/Enterprise	Title of OFT/FLD if any	Technology demonstrated	Extension activities
Gingelly	Demonstration of high yielding gingelly variety, YLM-66	T_1:YLM-66 (Sarada), need based sprayings. T_2: No practice	Trainings
Sorghum	Demonstration of sorghum variety, CSV-15 under TSP-2014 sponsored by Directorate of Sorghum Research, Hyderabad	T_1: Sorghum – CSV 15 with RDF. T_2: Local variety	Field visits and trainings
Cotton	Demonstration on IPM technologies in cotton.	T_1: IPM practices T_2: Farmer practices	Demonstrations and trainings
Fish	Composite fish culture	T_1: Cattla, Rohu, CC fish fingerlings T_2: Farmers Practice	
Fodder	Fodder production	Co-4	Demonstrations
Feed	Introduction of azolla cultivation	*Azolla pinnata*	Demonstrations

Follow up visit to Turmeric fields in D.V.Kota Village by KVK Scientists and ATMA Officials

Distribution of tapioca planting material

Followup visit to T.C.Banana fields in Pedduru and Bhimavaram villages

Spraying of micro nutrient mixture, IIHR Special at Boduluru Village

Followup visit to sweet corn field

Nursery bed preparation and management at Pamugandi and D.N.Palem villages

Harvesting of tomato variety, Arka Meghali

Blackgram field observation

Installation of pheramone traps in brinjal

Harvesting of brinjal in on farm trial

Ninety three field diagnostic visits were conducted by the scientists in different horticultural crops and need based recommendations for the identified problems were given.

Follow up visits in paddy at Rajampalem village

Field Day on Gingelly, variety - YLM-66

Gingelly variety,
YLM-66 at harvesting stage at Devaram Village

Followup visit to ragi field in D.N.Palem
Village in Harvesting stage

Input distribution by P.O.,
ITDA & Officers on 05.07.2014

Installation of yellow sticky traps in
IPM field, Lothupalem


Composite fish culture-Catla, Rohu and common carp

A. DIAGNOSTIC VISITS

Krishi Vigyan Kendra, Venkataramannagudem

- On 19.04.2014, Dr.E.Karunasree, Programme Co-ordinator visited terrace kitchen garden maintained at Tanuku and discussed about seasonal calendar for kitchen garden in containers with ADA, Tanuku on 19th April, 2014.
- Dr.E.Karunasree, Programme Co-ordinator and Kum S.Vishala, RA (Hort.) conducted demonstration on installation of pheramone traps in brinjal field for the control of fruit borer and yellow sticky traps for white fly in Telikicharla and Chodavaram villages on 6th May, 2014.
- On 17.05.2014, Dr.E.Karunasree, Programme Co-ordinator and Kum S.Vishala, RA (Hort.) conducted method demonstration on spraying of boran in cucurbits for yield improvement in Ramannagudem village.
- Sri Ch.Kiran Kumar, SMS (SS & AC) and Kum S.Vishala, RA (Hort.) conducted field diagnostic visit in Oil Palm at Telikicharla village and suggested soil sample collection and analysis on 28th May, 2014.
- Dr.E.Karunasree, Programme Co-ordinator and Kum.S.Vishala, RA (Hort.), conducted field diagnostic visit in Oil Palm at Chodavaram village and suggested inter crops in two year old orchards on 17th June, 2014.
- Kum.S.Vishala, RA (Hort.) visited OFT and FLD fields at Telikicherla and Chodavaram villages on 3rd July, 2014 and adviced JTS-6, turmeric variety along with seed treatment and planting method.
- Sri Ch.Kiran Kumar, SMS (SS&AC), Kum.M.Neela Rani, RA (Ento.) and Kum.V.Hemalatha, RA (Extn.), conducted field diagnostic visit in bhendi at Chodavaram village and identified jassids damage and suggested control measures along with fertilizer management.
- Dr.E. Karunasree, Programme Co-ordinator conducted field visit at Telikicharla village along with FET team, NAARM, Hyderabad on 19.08.2014.
- Sri Ch. Kiran Kumar, SMS (SS & AC), conducted field diagnostic visit in OFT Bhendi fields at Gollapadu village on 22.08.2014 and suggested fertilizer use efficiency measures to beneficiary farmers.
- KVK technical team conducted field diagnostic visit in Paddy fields at Chodavaram village on 22.08.2014 along with FET Team, NAARM, Hyderabad and explained the management practices in *kharif* paddy var. MTU-1075 to ARS trainees.
- Kum.S.Santha Kumari, RA (Vety. Science), visited Vanaraja chicks at Chodavaram village on 09.09.2014 and obtained data on FC Ratio.

- Kum.M.Neela Rani, RA (Ento.) and Kum.V.Hema Latha, RA (Extn.), conducted diagnostic visit in brinajal crop at Chodavaram village on 09.09.2014 and identified fruit and shoot borer problem in brinjal and suggested management practices.
- Kum.S.Vishala, RA (Hort.) and Kum.V.Hema Latha, RA (Extn.), conducted field diagnostic visit on 11.09.2014 in Citrus at Telikicharla village and identified micro nutrient deficiency symptoms and suggested of foliar spray of micro nutrient mixture @ 5g/l of water.
- Sri.Ch.Kiran Kumar, SMS (SS&AC) and Kum.V.Hemalatha, RA (Extn.), conducted field diagnostic visit in 12.09.2014 in bhendi at Chodavaram village and identified boron deficiency (curling of fruits and leaves) and suggested spraying of borax @ 5mg./l. of water.
- Sri.Ch.Kiran Kumar, SMS (SS&AC), conducted OFT field diagnostic visit in bhendi fields at Telikicharla village on 05.11.2014 and observed the jassid infestation and recommended flonicamid (Ulala) @ 75g/acre.
- Kum. M.Neela Rani, RA (Ento.) and Kum.S.Vishala, RA (Hort.), conducted OFT field diagnostic visit in marigold (Var. Pusa Basanthi) fields at Chodavaram village on 05.11.2014 and observed leaf eating caterpillar (*Spodoptera* and *Helicoverpa*) and recommended Novaluron + Indoxacarb @ 350 ml/acre.
- Sri.Ch.Kiran Kumar, SMS (SS&AC) and Kum.M.Neela Rani, RA (Ento.), conducted OFT field diagnostic visit in blackgram field at Chodavaram Village on 05.11.2014 and observed leaf spot in blackgram and recommended carbendazim @ 150 -200 gm/acre.
- Dr.E.Karunasree, Programme Co-ordinator and Kum.M.Neela Rani, RA (Ento.), conducted OFT field diagnostic visit in marigold raised with mulching at M.Nagulapalli village on 07.11.2014 and observed thrips damage and suggested to spray fipronil @ 2 to 2.5ml/lit.
- Sri.Ch.Kiran Kumar, SMS (SS&AC), conducted field diagnostic visit in bhendi field at Nachukunta village on 10.11.2014 and observed boron deficiency and advised to spray borax @ 2g /l of water.
- Sri.Ch.Kiran Kumar, SMS (SS&AC), conducted OFT field visit in paddy field (MTU-1075) at Nachukunta village on 10.11.2014 and observed non lodging of paddy variety.
- Dr.E.Karunasree, Programme Co-ordinator and Kum.M.Neela Rani, RA (Ento.), conducted field visit in vegetable crops at Khandavalli village on 12.11.2014.
- Dr.B.M.C.Reddy, Hon'ble Vice-Chancellor, Dr.YSRHU and Dr. E.Karunasree, Programme Co-ordinator, visited Guava plantation at Kadiyadda village and assessed the performance of three different types of closer spacing in guava plantations i.e 6'X4', 6'X6' and 7.5'X6.
- Dr.Sujatha, Associate Dean, HC & RI, Venkataramannagudem along with KVK, scientific staff conducted field diagnostic visit in mango at Telikicharla village on 02.01.2015.

Diagnostic visits by the scientists of KVK, Venkataramannagudem

Terrace Kitchen gardening at Vil: Tanuku

Use of pheromone traps against brinjal fruit and shoot borer

FFS in oilpalm nutrient management

Brinjal field visit at Chodavaram

FET Scientists visit to Paddy var-MTU-1075 field

Micro nutrient management in acid lime

Visit to mango orchard affected by thrips

Field visit to guava orchard var- Thaiwan by Dr. B.M.C. Reddy, Vice-Chancellor

Krishi Vigyan Kendra, Pandirimamidi

- On 01.04.2014, Sri.V.GovardhanRao, SMS (Pl.Path.) visited the Cashew plantations in Goragommi village of Gangavaram mandal and demonstrated the sprayings to control Tea mosquito bug and inflorescence blight.
- On 21.04.2014, Sri.V.GovardhanRao, SMS (Pl.Path.) and Sri. B.BhaskarRao, SMS (Hort.) visited brinjal field in Rajampalem village of Gangavaram mandal and observed fruit and shoot borer infestation and suggested removal and distruction of infested parts followed by spraying of profenophos @ 1ml/l.

Diagnostic visit to brinjal field in Rajampalem village of Gangavaram mandal

Horticultural Research Station, Kovvur

- Dr.B.V.K.Bhagavan, Principal Scientist (Hort.) visited farmer's fields and markets at Nuzvid and Vijayawada and collected data on post harvest losses of mango under AICRP on fruits from 10.6.2014 to 11.6.2014.
- Dr.B.V.K.Bhagavan, Principal Scientist (Hort.) & Head visited cyclone affected areas in Visakhapatnam, Vizianagaram and Srikakulam districts from 16.10.2014 to 28.10.2014 for estimation of damages and suggested the revival measures.
- Dr.M.M.Naidu, Senior Scientist (Hort.), visited Visakhapatnam district from 13.10.2014 to 18.10.2014 and from 24.10.2014 to 29.10.2014 to survey the cyclone affected areas and suggested the revival measures.
- Smt.K.Mamatha, Scientist (Hort.) visited Visakhapatnam district and suggested the revival measures to hudhud cyclone effected horticultural crops from 19.11.2014 to 22.11.2014.
- Dr.T.Rajasekharam, Scientist (Pl.Path.) visited Vizianagaram district from 19.10.2014 to 22.10.2014 and from 29.10.2014 to 31.10.2014 to survey the cyclone affected areas and suggested the revival measures.
- Dr.B.V.K.Bhagavan, Principal Scientist (Hort.) visited banana farmer's fields of Eleswaram village and recommended different agro techniques for higher yields in banana on 09.02.2015.
- Dr.B.V.K.Bhagavan, Principal Scientist (Hort.) visited Aswaraopeta and Mondivarru villages for inspection of banana plantation under TSP programme and tribal farmers were advised on banana cultivation on 11.02.2015.

Horticultural Research Station, Venkataramannagudem

- P.Rama Devi, Scientist (Pl.Path.) and P. Sunitha, Scientist (Ento.) visited papaya garden at Telikicharla on 15-11-2014 and suggested measures for virus management.
- P.Rama Devi, Scientist (Pl.Path.) visited betelvine gardens in Mulukuduru, Guntur district on 03-02-2015.
- P. Rama Devi, Scientist (Pl.Path.) and P. Sunitha, Scientist (Ento.) visited bitter guard and coccinia gardens in Khandavalli of Peravali mandal and Kakula Illandalaparru, Iragavaram mandal, W.G.Dist on 10.03.2015.

Horticultural Research Station, Ambajipeta

- Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.) and Sri.K.Ravindra Kumar, Scientist (Horticulture) conducted diagnostic survey of coconut gardens at Moinabad, Ranga Reddy district, Andhra Pradesh from 15.04.2014 to 17.04.2014

- Forty farmers from Srikakulam district along with scientists of KVK and DAATTC visited Horticultural Research Station, Ambajipeta and were briefed about the ongoing research activities by the scientists of HRS on 24.04.2014.
- Sri.K.Ravindra Kumar, Scientist (Hort.) visited coconut gardens of Rambhadrapuram and Saluru mandals of Vizianagaram district for field diagnostic survey on 30.4.2014.
- Dr.G.Ramanandam, Principal Scientist (Hort.) & Head and Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.) visited Yelisettivari palem of Kothapeta mandal and Undrajavaram and Chivatam villages of Tanuku mandal for survey of coconut and cocoa on 01.05.2014.
- Dr.G.Ramanandam, Principal Scientist (Hort.) & Head visited Mylannagudem village of Jangareddy gudem mandal for survey of coconut, oil palm and banana gardens damaged due to heavy gales on 10.05.2014.
- Dr.N.B.V. Chalapathi Rao, Senior Scientist (Ento.) inspected nurseries of East Godavari district from 20.05.2014 to 22.05.2014.
- Dr.N.B.V. Chalapathi Rao, Senior Scientist (Ento.) and Dr. A. Snehalatha Rani, Scientist (Pl. Path.) visited Horticultural Research Station, Pandirimamidi for survey on pests and diseases in Palmyrah on 04.07.2014.
- Dr.A.Snehalatha Rani, Scientist (Pl.Path.) conducted diagnostic survey in Srirampuram, S.Narsapuram, Rajagopalapuram, Kumarapuram, Rajavaram villages of Visakhapatnam district on 29.07.2014.
- Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.) proceeded to Nidadavole, Samanasagudem and Kalavalapalli villages of West Godavari district for carrying out roving survey of coconut gardens on 19.09.2014.
- Dr.G.Ramanandam, Principal Scientist (Hort.) & Head and Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.) accompanied Hon'ble Agril.Minister, Govt.of A.P. Sri P.Pulla Rao, Hon'ble Vice-Chancellor, Dr.YSRHU, Director of Research, Assistant Director of Horticulture, Rajahmundry and Kakinada to the cyclone affected horticultural crops *viz*., coconut, oil palm, cashew, banana etc., and interacted with farmers on 13.10.2014 at Rajahmundry, Tuni, Srungavarapukota villages of E.G.Dist.,
- Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.) visited Jonnada for slug infested coconut gardens and diagnostic survey of cocoa on 22.10.2014.
- Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.) & Dr.A.Snehalatha Rani Scientist (Pl. Path.) conducted diagnostic survey of coconut gardens in Komaragiripatnam village of East Godavari District on 11.11.2014.
- Dr.G.Ramanandam, Principal Scientist (Hort.) & Head and Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.) conducted diagnostic survey of coconut gardens in Undrajavaram village of West Godavari Dist on 14.11.2014.
- Dr.G.Ramanandam, Principal Scientist (Hort.) & Head and Dr. N.B.V. Chalapathi Rao, Senior Scientist (Ento.) conducted diagnostic visit to Savaram village of West Godavari District on 28.11.2014.

Horticultural Research Station, Pandirimamidi

- Dr. G.Narasimha Murthy, Scientist (Hort.) observed the stem and root borer damage in cashew gardens and suggested corrective measures at Bhimavaram and Nimmalapalem on 16.07.2014.
- Dr.K.Rajendra Prasad, Scientist (Hort.) observed thrips and mites damage and recommended chemical sprays in polyhouse capsicum cultivation at Peddapuram on 20.09.2014

- Dr. G.Narasimha Murthy, Scientist (Hort.) visited brinjal fields and observed shoot and fruit borer damage and suggested control measures at Ramannapalem and Folkspeta on 09.10.2014.
- Dr. G.Narasimha Murthy, Scientist (Hort.) visited ginger and pineapple fields and interacted with farmers on production technology of ginger and pineapple at Gurtedu on 12.11.2014.
- Dr.K.Rajendra Prasad, Scientist (Hort.) observed mango girdler and rot at graft union in young orchards due to planting of graft joint below ground level at Koti, Korukonda mandal on 15.11.2014.
- Dr.K.Rajendra Prasad, Scientist (Hort.) visited capsicum crop in polyhouse and suggested fertilizer schedule at Peddapuram on 17.11.2014.
- Dr. G.Narasimha Murthy, Scientist (Hort.) observed stem and root borer in cashew and control measures were suggested at Narasapuram on 22.01.2015.
- Dr. G.Narasimha Murthy, Scientist (Hort.) found stem and root borer in cashew and control measures were suggested at Tatiwada and Burugubanda on 10.03.2015

Horticultural Research Station, Chintapalli

- Visited Choudupalli and Antarla villages and observed leaf spot infestation in turmeric during the months of October and November and advised to clip the disease infested leaves and also recommended mancozeb @ 3 g/l spray.

Horticultural Research Station, Lam, Guntur

- Dr.C.Sarada, Senior Scientist (Hort.) attended crop failure of chilli at Pedamakkena village of Sattenapalli mandal along with MAO and HO Sattenapalli on 14-05-2014.
- Dr.C.Sarada, Senior Scientist (Hort.) attended field visit on crop failure of bhendi at Grandhasiri village of Achempeta mandal along with officers of Dept. of Agriculture and Horticulture on 02.09.2014.
- Dr.C.Venkata Ramana attended a diagnostic survey on crop failure due to weedicide injury in brinjal crop at Cheruvu Madhavaram of G.Konduru Mandal of Krishna district on 05.09.2014.
- Dr.C.Sarada, Senior Scientist (Hort.) attended field visit to bitter gourd and beans crops at Narakodur village of Chebrolu mandal on 20.10.2014.
- Dr.L.Naram Naidu, Principal Scientist (Hort.), Dr.C.Sarada, Senior Scientist (Hort.), and Smt.T.Vijaya lakshmi, Scientist (Path.) attended diagnostic survey in Tulluru, Sattenapalli, Dachepalli mandals for recording pest and disease problems in chilli crop on 04.11.2014

Diagnostic field visit to chiili field by the Scientists of HRS, Lam, on 4.11.2014

Mango Research Station, Nuzvid

- Dr.R.Rajyalakshmi, Scientist (Hort.) & Head, MRS, Nuzvid participated in field visit along with officers of Department of Horticulture to mango gardens in Bhapulapadu and Agiripalli mandals on 04.02.2015 and 11-02-2015
- Dr.R.Rajyalakshmi, Scientist (Hort.) & Head, MRS, Nuzvid participated in field visit along with ADH, NESTHAM, NGO Director at G. Konduru mandal on 13-02-2015
- Dr.R.Rajyalakshmi, Scientist (Hort.) & Head, MRS, Nuzvid participated in field visit along with DDA, ADA, AO to different mango orchards at Musunuru (Musunuru mandal) on 20-02-2015
- Dr.R.Rajyalakshmi, Scientist (Hort.) & Head, MRS, Nuzvid participated in field visit along with ADH, NESTHAM, NGO Director at Kunaparajuparva (Reddygudem mandal) on 27-02-2015
- Dr.R.Rajyalakshmi, Scientist (Hort.) & Head, MRS, Nuzvid participated in field visit along with officers of Department of Agriculture in Visannapeta and Chatrai mandals on 11-03-2015
- Dr.R.Rajyalakshmi, Scientist (Hort.) & Head, MRS, Nuzvid participated in field visit along with officers of Department of Agriculture and Dr. M.Satyanarayana, Scientist, KVK, Ghantasala in Agiripalli on 13-03-2015
- Dr.R.Rajyalakshmi, Scientist (Hort.) & Head, MRS, Nuzvid participated in field visit along with officers of Department of Agriculture officers at A.Konduru (G.Konduru mandals) on 20-03-2015

Horticultural Research Station, Darsi

- Visited acid lime gardens at chinnarikatla village of Podili mandal on 15.5.2014
- Condcuted field diagnostic visit to chilli nursery in Yerragondapalem village on 8.8.2014 and suggested control measures for damping off in nursery.
- Participated in field visit to mango orchards in Donakonda village on 30.09.2014 and suggested pre seasonal operations in mango for inducing flowering.

Citrus Research Station, Tirupati

- Dr.K.T.Venkataramana, Principal Scientist (Hort.) & Head and Dr.L.Mukunda Lakshmi, Scientist (Hort.) along with a team of eleven scientists of different disciplines from RARS, Tirupati and Horticulture Department Officials conducted diagnostic survey in Kuppam, Gudipala, Rama Kuppam and Santhipuram mandals of Chittoor district from 24-07-2014 to 25-07-2014 and collected information on cultivation of horticultural crops and submitted a report.
- Dr.L.Mukunda Lakshmi, Scientist (Hort.) inspected nurseries of Horticultural Farm, Panagal and Sri Mulasthanamma Nursery, Chintaparthi as Assessment Committee member along with Deputy Director, NHB for recognition of Horticultural Nurseries under NHB Scheme.
- Dr.K.T.Venkataramana, Principal Scientist (Hort.) & Head and Smt.G.Sarada, Scientist (Ento.) have visited Sapota garden heavily infested with stem borer in Kayampeta (Vil.), Vadamalpeta mandal and suggested suitable remedial measures on 28-10-2014.

Horticultural Research Station, Anantapuramu

- Dr.B.Srinivasulu, Senior Scientist (Hort.), HRS, Anantapuramu surveyed Kuppam constituency for identifying problems of horticultural farmers on 25-07-2014 and 26-07-2014.
- Dr.B.Srinivasulu, Senior Scientist (Hort.), HRS, Anantapuramu visited Chigicherla, Ganagalakunta and Kammur villages for nursery inspection along with NHB team, New Delhi on 10-08-2014.
- Dr.B.Srinivasulu, Senior Scientist (Hort.), HRS, Anantapuramu visited grape gardens at Poolakunta, Hamsapalli, Jettipalli and Dharmavaram along with the Director, NRC on grape, Pune on 20-08-2014 and 21-08-2014.

Forty seven training programmes were conducted and scientists have participated in 83 training programmes conducted by the Department of Horticulture and other related institutions in all the districts of Andhra Pradesh to disseminate the knowledge and skills in improved production and protection technologies.

- Dr. B. Srinivasulu, Senior Scientist (Hort.), HRS, Ananthapuramu visited guava and ber orchards at Jutur village along with Hon'ble M.P., Anantapuramu on 27-12-2014.
- Dr.B.Srinivasulu, Senior Scientist (Hort.), HRS, Anantapuramu visited tuberose garden at Kamalapuram and Garladinne along with A.D.H on 03-03-2015.

Director, NRC on Grapes, Pune visit to grape gardens in Anantapuramu

Hon'ble Member of Parliament, Anantapuramu visit to guava and ber orchards

Horticultural ResearchStation, Anantharajupet

- Dr.C.Madhumathi and Dr.Syed Sadarunnisa, scientists of HRS and HC & RI, Anantharajupet attended diagnostic field visit in Chiyyavaram village of Kodur mandal to inspect the tomato crop infected with early and late blight and also Papaya and banana fields in B.Kammapalli of Obulavaripalli mandal on 25-11-2014.
- Dr.M.Raja Naik, Scientist (Hort.) participated in a diagnostic visit on leaf spot disease of turmeric at Chapadu (M), Y.S.R. distirctt on 25-11-2014.
- Dr.M.Raja Naik, Scientist (Hort.) participated in diagnostic visit on thrips, hoppers and flower drop problem in mango on 20-12-2014 at Nandalur on 23.12.2014 at Settigunta and on 02.01.2015 at Madhavampodu.
- Dr.M.Raja Naik, Scientist (Hort.) attended to diagnostic field visit in mango and melons on 10-02-2015 at Tallapaka (village), Rajampeta.
- Dr.M.Raja Naik, Scientist (Hort.) visited mango orchards at Lakkireddy palli area on 18-02-2015.
- Dr.M.Raja Naik, Scientist (Hort.), went on diagnostic field visit to severe fruit drop in mango at Gundlapalle village, T.Sundupalli Mandal on 01-4-2015 and suggested control measures.
- Diagnostic field visit was conducted on 9-06-2015 by Dr.C.Madhumathi, Sr. Scientist (Hort.) & Head, HRS and Dr.Syed Sadarunnisa, Assistant Professor (Hort.), HC & RI, Anantharajupeta in Papaya fields infected with collor rot at Bynapalli Village, near Kodur and recommended drenching with Ridomil MZ @ 2g/l.

Scientists of HRS, Anantharajupeta visited papaya gardens in YSR Kadapa district

Horticultural Polytechnic, Ramachandrapuram

- Sri M.Satti Raju, Vice-Principal has visited Yanam, Yedurlanka and met Reliance Foundation people and interacted with farmers in the month of June, 2014.
- Sri M.Satti Raju, Vice-Principal visited banana plots and observed panama wilt and explained about the disease management at Gonada on 04.08.2014.
- Sri M.Satti Raju, Vice-Principal visited mango and oil palm gardens and discussed various aspects with the farmers at Rameswarampeta and Seethanagaram on 30.08.2014.
- Sri M.Satti Raju, Vice-Principal participated in farmers interaction at Ravikampadu on 29.01.2015.
- Sri M.Satti Raju, Vice-Principal visited Horticulture Nursery and discussed various aspects with departmental officers at Thetagunta on 21.02.2015.

B. TRAINING PROGRAMMES CONDUCTED

Horticultural Research Station, Kovvur

- Dr.B.V.K.Bhagavan, Principal Scientist (Hort.) imparted training to sixty farmers from Kothavalasa mandal of Vizianagaram district on "Production technology of banana" at HRS, Kovvur on 11.03.2015.

Post Harvest Technology Research Station, Venkataramannagudem

- Dr.B.Prasanna Kumar, Principal Scientist (Hort.) & H ead conducted one day demonstration cum training as a part of training to the B.Sc. (Home Science) students of St. Theresa College, Eluru organized by KVK, V.R.Gudem on the functioning and utility of Integrated Pack House cum Cold Storage Unit of PHTRS on 22-4-2015.

Horticultural Research Station, Ambajipeta

- Sixty farmers from Krishna district accompanied by ADA Mylavaram made an exposure visit to Horticultural Research Station, Ambajipeta on 10.04.2014.
- Farmers from Srikakulam district along with scientists of KVK and DAATT centre visited HRS, Ambajipeta on 24.04.2014 and were briefed with the ongoing research activities by the scientists.
- Scientists of HRS, Ambajipeta organized two three day training and awareness programmes on Cocoa at Horticultural Research Station, Ambajipeta from 23rd – 25th June, 2014 and at Mukkamala from 30th June – 2nd July, 2014 funded by DCCD, Kochi. Dr.B.V.K.Bhagwan, Zonal Research Head, Coastal Zone-I of Dr.YSRHU attended the programme and acted as chief guest to the function. The scientists released a brochure on "Cocoa sagulo melakuvalu" during the inaugural session of the three day training programme.

Release of brochure on "Scientific cultivation in cocoa" and Scientist from CPCRI addressing the farmers

World Coconut Day (02.09.2014) was celebrated by HRS, Ambajipeta at Agricultural Market Committee, Ambajipeta in collaboration with Coconut Development Board, Andhra Pradesh Unit and Bharatiya Kisan Sangh, Konaseema.

- Farmers from Kurnool district along with water sez management directors visited Horticultural Research Station, Ambajipeta on 16.07.2014 and were trained on planting and management practices of coconut.
- Horticultural Research station, Ambajipeta and Central Plantation Crops Research Institute, Kasaragod, Kerala organized a Stakeholders meeting on coconut and cocoa farming at Mukkamala village of Ambajipeta mandal of East Godavari district on 3rd March, 2015. Dr.B.M.C. Reddy, Vice- Chancellor, Dr.YSRHU, VR'Gudem and Dr.P.Chowdappa, Director, CPCRI, Kasaragod. Dr.H.P.Maheswarappa, Project coordinator AICRP on Palms CPCRI, Kasaragod and Dr.J.Dileep Babu, Director of Research, Dr.YSRHU, V.R.Gudem participated in the meeting. Approximately 250 farmers participated in the programme, interacted with scientists and shared their experiences on coconut and cocoa cultivation.

Dr.P. Chowdappa, Director, CPCRI, Kasaragod and Dr.B.M.C.Reddy, Vice-Chancellor, Dr.YSRHU at Inauguration in Mukkamala village.

Dr.G.Ramanandam, Principal Scientist (Hort.) & Head, Dr.N.B.V. Chalapathi Rao, Senior Scientist (Ento.) Dr. A.Snehalatha Rani, Scientist (Pl.Path.) and Smt.E.Padma, Scientist (Hort.) conducted three training programmes to the coconut climbers (20 Nos. in each batch) as a part of FoCT programmes from 25.11.2014 to 30.11.2014, 05.01.2015 to 10.01.2015 and 23.03.2015 to 28.03.2015.

Celebration of World Coconut Day at HRS, Ambajipeta : Scientists of Horticultural Research Station, Ambajipeta participated in World Coconut Day at Agricultural Market Committee, Ambajipeta organized by Coconut Development Board, Andhra Pradesh Unit, Bharatiya Kisan Sangh, Konaseema and Horticultural Research Station, Ambajipeta where in Sri. T. Narasimham, Hon'ble Member of Parliament and member of Coconut Development Board was the chief guest on 02.09.2014.

Inauguration of 7th batch FoCT Training at HRS, Ambajipeta

Horticultural Research Station, Pandirimamidi

- Dr.K.Rajendra Prasad, Scientist (Hort.) conducted a training programme on "Cashew Production Technology" at Horticultural Research Station, Pandirimamidi on 03.07.2014.
- Dr.K.Rajendra Prasad, Scientist (Hort.) conducted a training programme on "Grafting techniques in Fruit crops" at Horticultural Research Station, Pandirimamidi on19.09.2014.
- Sri P.C. Vengaiah, Scientist (F&ST) conducted training for tribal youth on bakery items from palmyrah tuber flour and prepared bread and cake at Horticultural Research Station, Pandirimamidi on03.11.2014.
- Sri P.C.Vengaiah, Scientist (F&ST) and G.Narasimha Murthy, Scientist (Hort.) conducted training for tribal youth of 35 members on palmyrah utilization and value addition at Horticultural Research Station, Pandirimamidi on 24.03.2015.
- Sri P.C.Vengaiah, Scientist (F&ST) and G.Narasimha Murthy, Scientist (Hort.) & Head conducted field visit to palmyrah joggery making unit along with 35 no. of tribal youth at Ammigunta village of Chagallu Mandal in West Godavari district on 25.03.2015 and demonstrated neera collection, lime coating and palmyrah Joggery making and explained the economics of palmyrah joggery making.
- Dr.K.Rajendra Prasad, Scientist (Hort.) conducted training on "Training of young Cashew orchards" to tribal farmers at HRS, Pandirimamidi on 03.07.2014.

State level crop seminar on Chilli was organised on 9th January, 2015 at LAM, Guntur for which Dr. T. Janaki Ram ADG (Hort.), ICAR, New Delhi attended as chief guest and addressed the farmers.

Horticultural Research Station, Chintapalli

- Chandrasekhara Rao C, Senior Scientest (Hort.) organized a training programme on "Spices Cultivation" at HRS, Chintapalli to the tribal farmers of K.Kodisingi. Scientists of HRS, Kovvur, Assistant Director of Agriculture, Agriculture Officers, N.G.O organization and tribal farmers have participated in the training programme which was followed by a field visit. A pamphlet on "Ginger" was released in the training programme sponsored by DASD, Calicut, Kerala.
- Chandrasekhara Rao C, Senior Scientest (Hort.) organized a training programme on "Spices and Medicinal Plants cultivation" at HRS, Chintapalli. Scientists of HRS, Kovvur, Assistant Director of Agriculture, Agriculture Officers, N.G.O organization and tribal farmers have participated in the programme which was followed by a field visit to the tribal farmers.

Horticultural Research Station, Lam, Guntur

State level crop seminar on chillies was organized on 09-01-2015 at HRS, Lam for chilli growing farmers of Andhra Pradesh.

Dr.T.Janaki Ram, A.D.G. (Hort.), ICAR, New Delhi addressing the farmers during State Level Seminar on Chilli (09.01.2015)

Field visit in chilli crop by Dr.B.M.C. Reddy, VC; Dr.J. Dilip Babu, DR, Dr.YSRHU & Dr.M.Krishna Reddy, Prinicipal Scientist, IIHR along with scientists & Dept. Officers

Cashew Research Station, Bapatla

- Sri.K.Uma Maheswara Rao, Scientist (Hort.) & Head attended two district level seminars on "Cashew production technology" organized by KVK, Rastakuntabai and Amudalavalasa and delivered lectures on "Cashew Production Technology" on 07.11.2014 and 30.12.2014 respectively.
- District level seminar was organized on "Advanced production technology in Cashew" at Alluri Seetharamaraju museum, Koyyur, Koyyur mandal, Visakhapatnam district for the benefit of tribal farmers in agency area on 30.01.2015 sponsored by Directorate of Cashew nut and Cocoa Development, Cochin and attended by Dr.K.M.Yuvaraj, Senior Scientist (Hort.) & Head and Sri.K.Uma Maheswara Rao, Scientist (Hort.).
- Organized three days farmers training programme on production technology of cashew, production of quality planting material, rejuvenation of old orchards, fertilizer and irrigation management, value addition of cashew apple and pest and disease management at PCMA hall, Palasa, Srikakulam district from 18.03.2015 to 20.03.2015 sponsored by Directorate of Cashew nut and Cocoa Development, Cochin which was attended by Dr.K.M.Yuvaraj, Senior Scientist (Hort.) & Head and Sri.K.Uma Maheswara Rao, Scientist (Hort.).

Citrus Research Station, Tirupati

- Smt.G.Sarada, Scientist (Ento.) participated in the training programme organized by ATMA, Chittoor and enlightened the mango farmers about "Integrated Pest and disease management in mango" on 08-01-2015 at Damalacheruvu, Chittoor district.

Krishi Vigyan Kendra, Venkataramannagudem

- On 10.06.2014, Sri.Ch.Kiran Kumar, SMS (SS&AC), conducted on campus training programme on "Importance of Soil and Water quality Analysis and Interpretation of results".
- On 25.06.2014, an Interaction meeting with District Officials i.e. LDM, Project Director, ATMA, ADH of West Godavari district along with the farmers who has participated in Interstate Exposure visit on Post Harvest Technology of Cocoa was conducted to know the feasibility of establishing small scale processing units of cocoa in district.

- Sri.Ch.Kiran Kumar, SMS (SS&AC) and Kum.S.Vishala, RA (Hort.) conducted on campus training programme on "Mushroom cultivation" to the HC & RI, V.R.Gudem students on 08.07.2014.
- Dr.E.Karunasree, Programme Co-ordinator conducted a meeting with Cocoa farmers for CIG formation along with ATMA and Dept. Officials at Suryachandraraopeta on 10th July, 2014.
- Conducted a training programme on **"Effective Management of Horticulture & Field Crops"** to the staff of Zuari Agro Chemicals Limited, Vijayawada on 18.07.2014 at International Hostel, Dr.YSRHU, Venkataramannagudem. The programme was inaugurated by Dr.B.M.C.Reddy, Vice –Chancellor, Dr.YSRHU and interacted with the participants.

- Dr.E.Karunasree, Programme Co-ordinator, conducted a training programme on **"Pest and Disease Management in Vegetable crops"** at Nagualapalli village along with ADH, West Godavari District on 05.08.2014. In this programme KVK Scientific staff have also participated.

- Dr.E.Karunasree, Programme Co-ordinator, conducted an on campus training programme on **"Terrace Kitchen Garden"** on 27.08.2014 along with KVK technical team.

- Dr.E.Karunasree, Programme Co-ordinator organized a training programme on **"Irrigation management in Oil palm Cultivation"** at Telikicharla village on 30.08.2014 in collaboration with DOPR, Pedavegi.

- Dr.E.Karunasree, Programme Co-ordinator conducted a training programme on **"Cocoa for Women"** on 12.08.2014.

- Dr.E.Karunasree, Programme Co-ordinator conducted a training programme on **"Kharif Production technology in Vegetables"** at Telikicharla village on 27.08.2014. In this programme KVK technical team, Dr. P.Madhavi Latha, scientist (Hort.), HRS, Vijayarai, Sri P.Ashok, scientist (Hort.) and NAARM scientists have participated and delivered lectures on Nutrient Management, Improved management practices etc.

- Sri.Ch.Kiran Kumar, SMS (SS&AC), Kum.N.Santha Kumari, RA (Vety.Science) and Sri P.S. Suresh Kumar, RA (Fisheries) organized a training programme on **"Common fresh water fish diseases and preventive management practices"**, followed by a visit to the local fish ponds and identified Red disease and Argulosis and suggested control measures.

- Sri Ch.Kiran Kumar, SMS (SS&AC), Kum.S.Vishala, RA (Hort.), Kum M.Neela Rani, RA (Ento.) and Kum.V.Hema Latha, RA (Extn.), conducted an off campus training programme on **"Weed management in Vegetable crops"** at Telikicharla village on 20.09.2014 followed by distribution of literature pertaining to effective control of weeds in vegetables.

- Sri Ch.Kiran Kumar, SMS (SS&AC), Kum.S.Vishala, RA (Hort.), Kum M.Neela Rani, RA (Entomology) and Kum.V.Hema Latha, RA (Extn.), conducted on campus training programmes on **"Usage of Bio fertilizers in Vegetable cultivation "** on 23.09.2014 and 22-10-2014.
- Vocational training to rural young girls on **"Millet processing and value addition"** was conducted on 07.11.2014 by Dr.E.Karunasree, Programme Co-ordinator.
- Dr.E.Karunasree, Programme Co-ordinator and KVK technical team conducted five days vocational training programme on **"Vegetable Nursery Management"** from 18.11.2014 to 22.11.2014 to the farmers of Telikicharla.

- Conducted vocational training programme on **"Commercial Floriculture"** from 3rd to 6th December, 2014 by Dr.E.Karunasree, Programme Co-ordinator and Subject Matter Specialists of Krishi Vigyan Kendra, which was followed by a field visit.

- Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.) participated in the training programme on "Geospatial knowledge management of sustainable agriculture using open source GIS" at NAARM, Hyderabad from 02.10.2014 to 12.10.2014.

- Conducted vocational training programme on Friends of Coconut Tree (FoCT)" from 19th to 24th January, 2015 by Dr.E.Karunasree, Programme Co-ordinator and Subject Matter Specialists at Krishi Vigyan Kendra, Venkataramannagudem.

- Dr.E.Karunasree, Programme Co-ordinator conducted a training programme on "Terrace Kitchen Garden" on 03.02.2015. In this programme Dr.R.V.S.K.Reddy, Director of Extension, Dr.J.Dilip Babu, Director of Research, Dr.YSRHU Venkataramannagudem, Sri R.Venkateswara Rao, Project Director, ATMA have participated and distributed the material to the women trainees.

- Conducted vocational training programme on "Friends of Coconut Tree (FoCT)" from 23th to 28th February, 2015 by Dr.E.Karunasree, Programme Co-ordinator and Subject Matter Specialists of Krishi Vigyan Kendra, Dr.R.V.S.K.Reddy, Director of Extension and Dr.J.Dilip Babu, Director of Research, Dr.YSRHU Venkataramannagudem has distributed the climbing devices and certificates to the trainees.

- Dr.E.Karunasree, Programme Co-ordinator, S.Vishala, RA (Hort.) and V.Hemalatha, RA (Extn.) conducted a training programme on "Terrace Kitchen Garden" on 02.03.2015 at KVK, Venkataramannagudem. In this programme Dr.R.V.S.K.Reddy, Director of Extension, Dr.YSRHU Venkataramannagudem has participated.

- Krishi Vigyan Kendra, Venkataramannagudem has conducted three days HRD training programme on "Advances in Horticultural Crops" to the SMSs/RAs working in KVKs of Andhra Pradesh from 30.03.2015 to 01.04.2015. In this programme Dr.B.M.C.Reddy, Vice-Chancellor, Dr.B.Srinivasulu, Registrar, Dr.R.V.S.K.Reddy, Director of Extension and Dr.J.Dilip Babu, Director of Research, Dr.YSRHU and other scientists have delivered lectures and interacted with the trainees.

Krishi Vigyan Kendra, Pandirimamidi

- Conducted training programme on 06.06.14 in Musurumilli village of Rampachodvaram mandal on "Cultivation practices in field and Horticultural crops". Sri V.GovardhanRao, SMS (Pl.Path.) explained about the cultivation of paddy and pulses and Sri B.BhaskarRao, SMS (Hort.) explained about the cultivation pratices of vegetables and orchard crops.

- On 27.06.2014, a training and farmer interaction on cultivation of millets and vegetable crops was conducted in D.V.Kota village of Maredumilli mandal. In this programme Dr.A.Srinivas, Programme Coordinator oriented the importance of millets cultivation and Sri.V.Govardhan Rao, SMS (Pl.Path.) discussed about the cultivation of Sorghum, Ragi etc. Sri B.BhaskarRao, SMS (Hort.) explained about the importance and cultivation of *rabi* and summer vegetables.

- Conducted a Vocational training programme on "Baisc Garment Making" at Kovelapalem village, sponsored by Andhra Bank Institute of Rural Development, Rajahmundry for one month. After completion of the programme, trainees were provided with sewing machines by ITDA, Rampachodavaram as livelihood support activity for the tribal women.

- Conducted "Banana Farmers Meet" at Madipalli village of Devipatnam mandal on 30.03.2015 in collobaration with NRC Banana and HRS, Kovvur and explained about the latest technologies in banana cultivation.

NRC-Director addressing farmers and demonstration of banana fibre extraction from pseudo stem

C. TRAINING PROGRAMMES PARTICIPATED

Horticultural Research Station, Venkataramannagudem

- Smt.P.Sunitha, Scientist (Ento.) as resource person attended farmer's interaction meeting on "Kuragayala saagu lo melakuvalu" on 27-08-2014 organized by KVK at Telikicharla.
- Smt.P.Sunitha, Scientist (Ento.) participated in one day training programme on "Neem and Pongamia Soap preparation" at IIHR, Bengaluru on 27.12.2014
- Dr.P.Rama Devi, Scientist (Pl.Path.) as resource person attended a training programme on "Betelvine cultivation" on 03-02-2015.
- Dr.P.Rama Devi, Scientist (Pl.Path.) and Smt.P.Sunitha, Scientist (Ento.) participated in the training programme on "Coconut diseases and their management" to coconut harvesters on 23-01-2015 conducted by KVK.
- Smt.P.Sunitha, Scientist (Ento.) participated in the training programme on "Coconut pests & diseases management" to coconut harvesters on 27-02-2015 conducted by KVK.
- Dr.P.Rama Devi, Scientist (Pl.Path.) delivered a guest lecture on "Diseases of fruits and vegetables and their management" on 30-03-2015 and 31-03-2015 to the SMSs in KVK's of Andhra Pradesh.
- Smt.P.Sunitha, Scientist (Ento.) has given a guest lecture on "Pests in vegetables and their management" on 31-03-2015 to the SMSs in KVKs of Andhra Pradesh.
- Sri M.Ravindra Babu, Scientist (Hort.) have participated in the training programme on "Protected cultivation of High value vegetables" on 31.03.2015 to the SMSs in KVK's of Andhra Pradesh.

Horticultural Research Station, Ambajipeta

Three days training and awareness programmes (2 Nos.) were organised by Horticulture Research Station, Ambajipeta on "Cocoa cultivation" sponsored by DCCD, Kochi.

- Dr.N.B.V.Chalapathi Rao, Sr. Scientist (Ento.) participated in two days Cocoa training programme and delivered a lecture on "Insect Pest Management in Cocoa" organized by DCCD, Cochi at Mukkamala of East Godavari dist on 01.07.2014.
- Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.) participated in 3 days Cocoa training programme and delivered a lecture on "Identification of pest affected plants and curative measures" organized by DCCD, Cochi at Mukkamala of EGDt. On 02.07.2014.
- Dr.G.Ramanandam, Principal Scientist (Hort.) & Head participated in Farmers Field School at Ganti village organized by ATMA on 06.08.2014.

- Dr.G.Ramanandam, Principal Scientist (Hort.) & Head, attended training cum awareness programme organized by ICAR-KVK, Kalavacharla on 'Protection of Plant Varieties & Farmer Rights Act at CTRI, Rajahmundry on 29.01.2015.
- Dr.G.Ramanandam, Principal Scientist (Hort.) & Head and Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.), attended one day training programme on "Cocoa" sponsored by DCCD, Kochi organized by Agricultural College, Rajahmundry as resource persons on 29.03.2015.
- Dr.G.Ramanandam, Principal Scientist (Hort.) & Head, Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.) and Dr.A.Snehalatha Rani, Scientist (Pl.Path.), attended and delivered a lecture to the Subject Matter Specialists of KVKs on "Advances in Horticultural Crops" with special reference to plantation crops organized by KVK, Venkataramannagudem on 30.03.2015.

Horticultural Research Station, Kovvur

- Dr.B.V.K.Bhagavan, Principal Scientist (Hort.) participated in a training programme organized at Ambajipeta on 23.06.2014. About 60 farmers from different mandals have participated and trained on package of practices of cocoa.
- Dr.B.V.K.Bhagavan, Principal Scientist (Hort.) participated in a training programme on cocoa organized at Mukkamala on 30.06.2015.
- Dr.M.M.Naidu, Senior Scientist (Hort.) and Dr.T.Rajasekharam, Scientist (Pl.Path.) imparted training to the tribal farmers on spices cultivation on 4th and 5th September, 2014 at HRS, Chintapalli.

Horticultural Research Station, Lam, Guntur

- All the scientists of HRS, Lam attended and participated in ZREAC meeting of Coastal zone of Dr.YSRHU at CTRI, Rajahmundry on 29.04.2014.
- All the Scientists of HRS, Lam attended workshop on "Awareness on issues related to Genetically Modified Crops" organized by BCIL, New Delhi & ANGRAU at RARS, Lam on 27-10-2014.
- All the scientists of HRS, Lam attended AP-Tech2014-Technologies for Modern Agriculture, Conference and exhibition at RARS, Lam from 6th to 8th December, 2014.
- All the scientists of HRS, Lam attended seminar on "Spices and commercial crops–sustainable Agricultural practices" at RARS, Lam organized by Confederation of Indian Industry (CII) on 29-12-2014.
- Dr.L.Naram Naidu, Principal Scientist (Hort.) attended training Programme on "Production technology of oilpalm" at HRS, Vijayarai on 05-01-2015.
- Dr.L.Naram Naidu, Principal Scientist (Hort.) attended an interaction meeting with Sri Prakash Desai, Project Coordinator, Sri Fumiko ikagaya representative of Japan International Cooperative Agency (JICA) on "Problems and prospects of chilli cultivation in AP" on 10-03-2015.
- Dr.L.Naram Naidu, Principal Scientist (Hort.) and Smt.T.Vijaya Lakshmi, Scientist (Pl.Path.) as resource persons attended training programme for the field staff of Zuari Agro chemicals Ltd at RARS, Lam on 17-03-2015.

Mango Research Station, Nuzvid

- Smt.D.Aparna, Scientist (Hort.) & Head participated in fourteen training programmes on "Mango Production Technology" conducted by the Farmers Training Centre (FTC) and Regional Horticultural Training Institute (RHTI) in different villages in Krishna district.

- Dr.R.Rajyalakshmi, Scientist (Hort.) & Head particiatd in fifteen training programmes on “Mango Production Technology” conducted by the Farmers Training Centre (FTC), Regional Horticultural Training Institute (RHTI) and NESTAM, NGO in various villages in Krishna district.

Horticultural Research Station, Darsi

- Sri S.Narasimharao, Scientist (Pl.Path.) & Head has participated in training programme on “Pest, Disease and Nutrient Management in chilli” and “Dry root rot management in sweet orange” conducted by AMC, Yerragondapalem on 04.09.2014.
- Sri S.Narasimharao, Scientist (Pl.Path.) & Head has participated in six training programmes conducted by RHTI, Ongole and explained about improved package of practices in sweet orange, mango and other fruit crops grown under water shed area.

Citrus Research Station, Tirupati

- Dr.L.Mukunda Lakshmi, Scientist (Hort.) and Smt.G.Sarada, Scientist (Ento.) participated in farmers training on “Production technology and pest and disease management in acid lime” conducted by Department of Horticulture, Guntur from 21-08-2014 to 22-08-2014 in Guntur.
- Dr.K.T.Venkataramana, Principal Scientist (Hort.) attended farmers’ training on "Mango production technology and post harvest management" organized by M/s. Jain Processing Company at Gangadhar Nellore of Chittoor district during February, 2015.

Horticultural Research Station, Anantapuramu

- Dr.B.Srinivasulu, Senior Scientist (Hort.) attended training programme on “Mango cultivation” at Kalyandurgam on 19-07-2014.
- Dr.K.Subramanyam, Principal Scientist (Pl.Path.) & Head attended farmer’s training programme on "Cultivation, integrated management of pests and diseases in banana" organized by Regional Horticultural Training Institute Anantapuramu on 24-12-2014.
- Dr.K.Subramanyam, Principal Scientist (Pl.Path.) & Head attended Farmer’s training programme on "Cultivation, integrated management of pests and diseases in Pomegranate" organized by Regional Horticultural Training Institute Anantapuramu on 30-12-2014.
- Dr.K.Subramanyam, Principal Scientist (Pl.Path.) & Head attended training programme on "Cultivation and integrated management of pests and diseases in sweet orange" on 23-1-2015.

- Dr.K.Subramanyam, Principal Scientist (Pl.Path.) & Head attended training programme on "Cultivation and integrated management of pests and diseases in Pomegranate" on 06-02-2015
- Dr.B.Srinivasulu, Senior Scientist (Hort.) attended training programme on "Cultivation and integrated management of pests and diseases in Papaya" on 10-02-2015
- Dr.K.Subramanyam, Principal Scientist (Pl.Path.) & Head attended training programme on "Cultivation and integrated management of pests and diseases in Banana" on 19-02-2015.
- Dr.B.Srinivasulu, Senior Scientist (Hort.) attended training programme on "Cultivation and integrated management of pests and diseases in Onion and other Vegetables" on 23-02-2015.
- Dr.K.Subramanyam, Principal Scientist (Pl.Path.) & Head attended farmers training programme on "Mango and Sweet orange" on 03-03-2015.
- Dr.B.Srinivasulu, Senior Scientist (Hort.) attended Farmers training programme on "Protected cultivation of vegetables and flowers" at RHTI, Ananthapuramu on 17-03-2015.
- Dr.B.Srinivasulu, Senior Scientist (Hort.) attended training to extension workers on "Mango and sapota cultivation" organized by RF Ecology centre, Anantapuramu on 17.4.2015.
- Dr.B.Srinivasulu, Senior Scientist (Hort.) attended training programme to the farmers on "Cultivation of mango" at Obulareddy palli and Nangivandlapalli near Talupula, Kadiri on 2.4.2015.
- Dr.B.Srinivasulu, Sr. Scientist (Hort.) attended training programme to the farmers on "Cultivation of sweet orange" at Garladinne on 25.4.2015.

Horticultural Research Station, Anantharajupet

- Dr.C.Madhumathi, Senior Scientist (Hort.) & Head attended training programme on "Vegetable cultivation" at Ramachandrapuram, Chittoor organized by Department of Horticulture on 25.09.2014 to about 40 farmers.
- Dr.M.Raja Naik, Scientist (Hort.) attended training progreamme on "Maamidi mokkala punarudharana" organized by Dept. of Horticulture, Rly. Kodur on 18.10.2014 (No. of farmers attended 88).
- Dr.M.Raja Naik, Scientist (Hort.) attended training programme on "Chemanthilo aadhunika saagu padhatulu" at Kadapa organized by RHTI, Kadapa on 11.11.2014 (No. of farmers attended 62).
- Dr.M.Raja Naik, Scientist (Hort.) attended training programme on "Ulli, pasupu aadhunika saagu padhatulu" at Kadapa organized by RHTI, Kadapa on 25.11.2014 (No. of farmers attended 60).
- Dr.C.Madhumathi, Senior Scientist (Hort.) & Head attended training programme on horticultural crops at Guthivaripalli, Renigunta (m) organized by Department of Horticulture on 01.12.2014 (No. of farmers attended 35) and at Sanambathtla, Chadragiri (M) on 02-12-2014 (No. Farmers attended 50).
- Dr.M.Raja Naik, Scientist (Hort.) attended training programme on "Pootha, pinde dasalo maamidi yajamanyam" at Nandaloor organized by Dept. of Horticulture, Rajampeta on 20.12.2014 (No. of farmers attended 80).
- Dr. M. Raja Naik, Scientist (Hort.) attended training programme on "Pasupulo dumpa kotha anantharam yaajamanyam" at Kadapa organized by RHTI, Kadapa on 07.02.2015.
- Dr.M.Raja Naik, Scientist (Hort.) attended training programme on "Pinde, kaaya dasalo maamidi yaajamanyam" at Kadapa organized by RHTI, Kadapa on 07.02.2015 (No. of farmers attended 78) and on 27.02.205 (No.of farmers attend 64).
- Dr.M.Raja Naik, Scientist (Hort.) attended training programme on "Kaaya dasalo maamidi yaajamanyam" at T. Sundupalli organized by DOH, Rayachoti on 14.03.2015 (No. of farmers attended 54).

- Dr.C.Madhumathi, Senior Scientist (Hort.) & Head attended training programme on horticultural crops at RARS, Tirupati organized by ANGRAU on 31.03.2015 (No. of farmers attended 200) during Kisan mela.



Krishi Vigyan Kendra, Venkataramannagudem

- On 15.05.2014, Dr.E.Karunasree, Programme Co-ordinator, participated as resource person in the training programme on "Terrace Kitchen Garden" required in collaboration with ATMA at Mukkamala village.

- Dr.E.Karunasree, Programme Co-ordinator and Kum.S.Vishala, RA (Hort.), participated as resource persons in the training programme on "Cashew" conducted in collaboration with People's Action for Rural Development (PARD) at T.Gangannagudem village in Jeelugumilli mandal on 18th May, 2014.

- Dr.E.Karunasree, Programme Co-ordinator and Kum.S.Vishala, RA (Hort.), participated in training programme on "Paddy" organized by RARS, Maruteru at Doramamidi village of Buttaigudem mandal on 18th May, 2014.

➢ Dr.E.Karunasree, Programme Co-ordinator, participated in "Banana fiber extraction training" at Kovvur and visited cocoa gardens and turmeric nursery at Chagallu on 5th July, 2014.

➢ ARS scientists, NAARM, Hyderabad have conducted Institutional seminar on Field Experience Training in Telikicharla village data at KVK, Venkataramannagudem on 05.09.2014. In this programme Dr.J.Dilip Babu, Director of Research, Dr.Sandya Shenony (NAARM), P.Ashok, Scientist, HRS and Ch.Kiran Kumar, SMS (SS&AC) have participated and suggested important issues for preparation of final FET report.

➢ Dr.E.Karunasree, Programme Co-ordinator and Kum.M.Neela Rani, RA (Ento.), participated in training programme on "Rabi Vegetable cultivation" on 12.11.2014 at Khandavalli vegetable market yard.

➢ Dr.E.Karunasree, Programme Co-ordinator, participated in a training programme on "Awareness Rally and Campaign on Horticultural Education, Research and Extension" to HC & RI students at KVK, Venkataramannagudem. In this programme Dr.R.V.S.K.Reddy, Director of Extension, Dr.M.L.N.Reddy, Dean of Horticulture, Dr.D.Srihari, Controller of Examinations and Dr.A.Sujatha, Associate Dean have participated.

Horticultural Research Station, Mahanandi

- Dr.Ch.Ruth, Scientist (Pl.Path.) participated as resource person in the training programmes on 1. "Vegetables cultivation" in Somayajulapalli and Venkatapuram villages in Orvakallu mandal on 22.11.2014 along with Horticultural officer and conducted a field visit in tomato and field bean crops.
- Sri.M.Tagore Naik, Scientist (Hort.) participated in a farmers training programme on banana and turmeric crops in Gajulapalli village on 23.12.2014.
- Dr.Ch.Ruth, Scientist (Pl.Path.) & Head participated in a training programme on banana in Bukkapuram village on 09.01.2015.
- Dr.Ch.Ruth, Scientist (Pl.Path) & Head participated in State level seminar on Vegetable seed production technology in AP at AMC premises on 05.09.2014 at Kurnool under Mission for Integrated Development of Horticulture and delivered a lecture on Onion cultivation.
- Under Exposure visit, 50 farmers visited Horticultural Research Station, Mahanandi along with Technical Officer, NHRDF, Tamilnadu state on 18.09.2014, Dr.Ch.Ruth, Scientist (Pl.Path.) guided them on vegetable production aspect *viz*., seed production, marketing, post harvest handling and processing etc.
- Attended group discussion with farmers and discussed about the problems in banana and turmeric crops along with members of Ramkey foundation, Hyderabad on 10.10.2014.
- Twenty farmers visited Horticultural Research Station, Mahanandi, from Ramasamudrum (M), Chittor district on 27.11.204. Dr.Ch.Ruth, Scientist (Pl.Path.) & Head and M.Tagore Naik, Scientist (Hort.) explained them on "Tomato Cultivation to improve production".
- Dr.Ch.Ruth, Scientist (Pl.Path.) & Head attended field visit to coconut, mango and teak plants in Poluru village on 06.01.2015.
- Dr.Ch.Ruth, Scientist (Pl.Path.) & Head attended field visit on chillies and drum stick in Pandurangapuram and Sirevella villages on 20.02.2015.
- Dr.Ch.Ruth, Scientist (Pl.Path.) & Head and Sri M.Tagore Naik, Scientist (Hort.) attended ZREAC meeting at RARS, Nandyal, (ANGRAU) on 23.03.2015.

Citrus Research Station, Tirupati

- Dr.L.Mukunda Lakshmi, Scientist (Hort.) and Smt.G.Sarada, Scientist (Ento.) have participated in farmers training on "Production technology and pest and disease management in acid lime" conducted by Dept. of Horticulture, Guntur in the month of August, 2014.
- Dr.K.T.Venkataramana, Principal Scientist (Hort.) & Head has participated in India Geospatial Forum, 2015 at Hyderabad International Convention Centre, from 10th - 12th February, 2015.

Horticultural College & Research Institute, Venkataramannagudem

- Dr.K.Umajyothi, Professor (Horti.) participated in the training programme organised by KVK, at V.R.Gudem as resource person and gave a lecture on "Advances in vegetable production" to horticultural officers.

Horticultural College & Research Institute, Anantharajupeta

- Dr.Kode Swarajya Lakshmi, Associate Professor (Hort.) attended a farmers training programme organized by RHTI, Kadapa, on "Cultivation practices of chrysanthemum" on 16-09-2014.
- Dr.R. Nagaraju, Assistant Professor (Hort.) participated in a training programme on "Green house technologies and importance" on 07-02-2015.
- Dr.R.Nagaraju, Assistant Professor (Hort.) attended a training programme as resource person on "Capsicum cultivation" to the progressive farmers of YSR district at RHTI, Kadapa on 07-04-2015.

- Dr.R.Nagaraju, Assistant Professor (Hort.) as a resource person attended a training programme on "Loose flower cultivation" at RHTI, Kadapa on 08-05-2015.
- Dr.R.Nagaraju, Assistant Professor (Hort.) attended a training programme as resource person on "Rose and gerbera cultivation" to the progressive farmers of YSR district at RHTI, Kadapa on 25-02-2015.
- Dr.Syed Sadarunnisa Assistant Professor (Hort.) participated as a resource person for the training programme on "Production technology of betel vine" at RHTI, Kadapa on 6th February, 2015.

Horticultural Polytechnic, Madakasira

- Dr.M.Ramakrishna, Principal participated in Rythu Sadassu conducted by Department of Horticulture, Penukonda on "Boppayi Saagu-Avagahana Sadassu" under RKVY in Boksanpalli, Penukonda mandal on 24.06.2015.
- Dr.M.Ramakrishna, Principal participated in a farmers training programme on "Mamidipy Avagahana Sadassu" organized by Department of Horticulture, Hindupur under NREGS at Cherlopalli, Hindupur Mandal as well as at Kanchi Samudram, Lepakshi mandal.
- Dr.M.Ramakrishna, Principal participated in a training programme on "Drip irrigation in Horticultural crops" organized by Rural Development Trust, Anantapuramu to field officers at R.Anathapuramu, Madakasira mandal as a resource person.
- Dr.M.Ramakrishna, Principal participated in a training programme on "Danimma Saagu" organized by Rural Development Trust, Anantapuramu to field officers at R.Anatapuramu, Madakasira mandal on 02.02.2015.

The scientists from various disciplines were deputed to attend HRD trainings (8nos.) at various national institutions.

D.HRD TRAININGS

Krishi Vigyan Kendra, Venkataramannagudem

- Dr.E.Karunasree, Programme Co-ordinator participated in 21 days training on "Futuristic Agricultural Extension Approaches and Tools" from 3rd to 23rd September, 2014 sponsored by ICAR at CAFT, IARI, New Delhi.

Horticultural Research Station Anantharajupet

- Dr.M.Raja Naik, Scientist (Hort.) attended a training programme on "Recent developments in production of off season vegetables" from 9-9-2014 to 29-9-2014 at Dr.Y.S.Parmar University of Horticulture & Forestry, Nauni, Solan, Himachal Pradesh.
- Dr.M.Raja Naik, Scientist (Hort.) attended training programme on "Hi-tech interventions in fruits for enhancing productivity and value addition" from 8-1-2015 to 28-1-2015 at MPKV, Rahuri, Maharashtra.

Horticultural Research Station, Venkataramannagudem

- Dr.M.Rajasekhar attended the 21 days training programme on "Plant bio security and incursion management" at NIPHM, Hyderabad from 08.04.2014 to 28.04.2014.

Horticultural College & Research Institute, Venkataramannagudem

- Sri.B.Chennakesavvulu, Assistant Professor (Agril. Engg.) attended 21 days training programme on "Recent Advances in Micro Irrigation Systems and fertigation under open and closed cultivation for sustainable and enhanced crop production and productivity in vertisols" held at Central Institute of Agricultural Engineering from 09th to 29th September, 2014.

- Dr.K.UmaKrishna, Associate Professor (Statistics) has under gone 21 days training programme on "Advanced Statistical Techniques in Horticultural Science Research" held at Indian Agricultural Statistical Research Institute (IASRI), NewDelhi from 2nd Janusty, 2015-22nd January, 2015
- Dr.D.R.Salomi Suneetha, Associate Professor (Biochem) and Smt. P.Subbaramamma Assistant Professor (Pl.Physiology) attended 21 days training programme on"Genomics and proteomics of plants and microbes towards translational research" held at ICAR-Indian Institute of Spices Research, Kozhikode, Kerala from 21st January, 2015 to 10th February, 2015.

Horticultural College and Research Institute, Anantharajupet

- Dr.P.Syam Sundar Reddy, Assistant professor (Hort.), attended "Plant Bio-security & Incursion Management" at NIPHM, Hyderabad organized in collaboration with USDA for 21 days from 08-04-2014 to 28-04-2014.

E. METHOD DEMONSTRATIONS

Post Harvest Technology Research Station, Venkataramannagudem

- Demonstrated and explained various aspects of Integrated Pack house cum cold storage unit, it's functioning and importance to the progressive farmers of Karnataka on their visit on 07-10-2014 and also to the farmers of Srikakulam district on 17.06.2015.

Horticultural Research Station, Venkataramannagudem

- Dr.P.Ashok, Scientist (Hort.) conducted method demonstration on "Seed treatment in Tapioca" at Gokavaram, East Godavari district on 09.10.2014.

Horticultural Research Station, Pandirimamidi

- Dr.K.Rajendra Prasad, Scientist (Hort.) conducted method demonstration on "Prevention and control of cashew stem borer" to the farmers and department officials at Musurimilli village, Rampachodavaram mandal on 20.08.2014.

Cashew Research Station, Bapatla

- Demonstration on "Control of cashew stem and root borer" was organized at Cashew Research Station, Bapatla for the benefit of farming community on 15.05.2015.

Mango Research Station, Nuzvid

- Dr.R.Rajyalakshmi, Scientist (Hort.), conducted method demonstration in collaboration with department of horticulture on "Low cost technology for the control of fruit flies in mango". Dr.Srilatha, Principal Scientist, NIPHM and Dr.Narsi Reddy Senior Scientist, NIPHM attended the demonstration as resource persons followed by farmer scientist interaction on 18.03.2015.

Citrus Research Station, Tirupati

- Dr.L.Mukunda Lakshmi, Scientist (Hort.), RAWEP in-charge, conducted method demonstration on preparation of 1% Bordeaux mixture, seed treatment in vegetables with imidacloprid and mancozeb and production of vegetable seedlings in portrays in Githivaripalli village of Renigunta mandal and Sanambatla village of Chandragiri mandal, Chittoor district on 28.12. 2014 and 30.12.2014 respectively.

Krishi Vigyan Kendra, Venkataramannagudem

- On 19.04.2014, Dr.E.Karunasree, Programme Co-ordinator conducted demonstration on "Value Addition of Cashew fruits" at KVK, Venkataramannagudem.
- Scientists of KVK conducted demonstration on "Use of Pheromone traps in Guava crop" at Kadiyadda village on 05.08.2014, 06.08.2014 and 21.08.2014.

Dr.E.Karunasree, Programme Co-ordinator along with SMSs' conducted demonstration with easy planter for seedlings transplanting at Koyyalagudem and Dippakayalapadu on 16.08.2014.

Sri.Ch.Kiran Kumar, SMS (SS&AC) and Dr.P.Madhavi Latha, Scientist (Agro.), HRS, Vijayarai conducted method demonstration on "Post emergence herbicide application in Paddy" at Telikicharla village on 26.08.2014.

Scientists of Krishi Vigyan Kendra, Venkatara-mannagudem conducted method demonstration on "Micro Nutrient management in Oil Palm" at Telikicharla village on 11.09.2014.

Sri.Ch.Kiran Kumar, SMS (SS&AC) and Kum.M.Neela Rani, RA (Ento.) conducted method demonstration on "Ganoderma management in Oil Palm" by application of Propiconozol (Tilt) @ 1ml/l. water at Telikicharla village on 20.09.2014.

Horticultural College & Research Institute, Anantharajupeta

- Pine apple suckers of two varieties (Mauritius and Kew) bought from Pine apple research Station, Vellanikkara, Thrissur, Kerala Agricultural University were planted at HC&RI, Anantharajupeta for practical demonstration of the crop to the students.

Horticultural Polytechnic, Kalikiri

- Preparation of Bordeaux mixture, Bordeaux paste and cheshunt compound was demonstrated to the farmers on 04.04.2015 at Sanyasivandla palli village.

F. GROUP DISCUSSIONS

Horticultural Research Station, Kovvur

- Dr.B.V.K.Bhagavan, Principal Scientist (Hort.) attended the meeting at Collectorate of West Godavari district regarding the development of Software on vegetable production technology (IPM) during September, 2014 at Eluru.
- Dr.M.M.Naidu, Sr.Scientist (Hort.), participated in the meeting at cooperative society regarding the awareness programme on farm mechanization and interacted with the farmers and RHWEP students regarding the cultivation of various horticultural crops at Malakapalli village on 18.11.2014.
- Dr.B.V.K.Bhagavan, Principal Scientist (Hort.) attended the meeting on Post harvest losses in mango and banana and NICRA programme organized by the Project Coordinator, AICRP on tropical fruits from 13.12.2014 to 15.12.2014 at IIHR Bengaluru.
- Dr.B.V.K.Bhagavan, Principal Scientist (Hort.), accompanied QRT review team on AICRP on palms from 12.02.2014 to 13.02.2014 and attended the meeting at NRC oilpalm, Pedavaegi.
- Dr.B.V.K.Bhagavan, Principal Scientist (Hort.), Dr.M.M.Naidu, Sr.Scientist (Hort.) and Dr.T.Rajasekharam Scientist (Pl.Path.) attended the review meeting conducted by the Technical officer to Project Coordinator, AICRP on Tropical Fruits at V.R.Gudem on 21.02.2014.

Horticultural Research Station, Venkataramannagudem

- Project Coordinator, AICRP Tuber crops, Dr. James George and Dr. P Ashok, Scientist (Horti.) have participated in farmer's interaction with Cassava growers at Sudhigonda village of Gokavaram mandal in East Godavari district on 11.11.2014.

Project Coordinator, AICRP on
Tuber Crops interaction with cassava growers

Mango Research Station, Nuzvid

- Dr.R.Rajyalakshmi, Scientist (Hort.) & Head, MRS, Nuzvid participated in Scientific Advisory Committee meeting of KVK Garikapadu and Ghantasala, ANGRAU and DLCC meeting of DAATTC. Machilipatnam, ANGRAU at Vuyyur on 25.02.2015.

Citrus Research Station, Tirupati

- Dr.K.T.V.Ramana, Principal Scientist (Hort.), Dr.L.Mukunda Lakshmi, Scientist (Hort.) and Smt.G.Sarada, Scientist (Ento.) have attended the Citrus technical meet at NRC, Nagpur and presented the technical programme results of 2013-2014 on 2nd & 3rd September, 2014.
- Dr.L.Mukunda Lakshmi, Scientist (Hort.) participated in group discussion on transgenic crops at S.V.Agril. College, Tirupati on 14-07-2015.

Horticultural Research Station, Anantapuramu

- Scientitst of horticultural research station, Anantapuramu has condcuted focussed group discussions in Mallapuram and Kurlapalli villages of Anantapuramu distrcit and Bonthiralla and Yerraguntla villages of Kurnool district regarding the bio-diversity for nutritional security among rural farm families under a special project.

Table-1: Focus Group Discussions under Bioversity project organized in Anantapuramu district

S. No	Villages		Date		
		22-07-2014	09-09-2014	10-09-2014	28-09-2014
1.	Mallapuram				
	Participants				
	Men	14	12	12	31
	Women	36	10	10	9
	Total:	**50**	**22**	**22**	**40**
2.	Kurlapalli				
	Participants				
	Men	28	14	14	10
	Women	30	12	10	12
	Total:	**58**	**26**	**24**	**22**
3.	**Scientists**	Dr. K. Subramanyam	Dr. K. Subramanyam	Dr. K. Subramanyam	Dr. K. Subramanyam
	attended				
		Dr. B.Srinivasulu			Dr. B.Srinivasulu
		G. Adinarayana			Dr. S.B.Dandin
					G. Adinarayana

Table-2: Focus Group Discussions organized in Kurnool district under Bioversity project

S.No	Villages	Date			
		14-07-2014	08-09-2014	10-09-14	16-09-14
1.	Bonthiralla				
	Participants:				
	Men	45	10	10	30
	Women	37	13	13	30
	Total:	**82**	**23**	**23**	**60**
2.		Yerraguntla			
	Participants:				
	Men	36	12	12	24
	Women	36	10	10	13
	Total:	**72**	**22**	**22**	**37**
3.	**Scientists**	Dr. K. Subramanyam	Dr.B.Srinivasulu	Dr.B.Srinivasulu	Dr. K. Subramanyam
	attended				
		Dr.B. Srinivasulu			Dr.B.Srinivasulu
		Dr.S. B.Dandin			
		G. Adinarayana			G.Adinarayana

Meeting at Kurlapalli on Bioversity

Meeting at V. Bonthiralla

Sixteen field days were conducted to show case the performance of proven technologies in Horticultural crops.

G. FIELD DAYS

Horticultural Research Station, Kovvur

- Dr.B.V.K.Bhagavan, Principal Scientist (Hort.) and Dr.M.M.Naidu, Sr. Scientist (Hort.) attended the field day conducted by RAWEP students at Malakapalli village on 26.11.2014.

Horticultural Research Station, Amabajipeta

- Dr.G.Ramanandam, Principal Scientist (Hort.) & Head and Sri.K.Ravindra Kumar, Scientist (Hort.) attended field day on organic farming at Kandriga village of Kothapeta mandal organized by Abhyudaya Karshak Parishath, Mukkamala on 09.04.2014. Interacted and explained about the research activities of the station to the Chief General Manger, J.J. Mamman, NABARD, Andhra Pradesh, Hyderabad who was the chief guest for the programme.
- Dr.G.Ramanandam, Principal Scientist (Hort.) & Head attended field day on "Organic Farming" organized by the Department of Agriculture and ATMA, Kakinada on 06.08.2014.

Horticultural Research Station, Pandirimamidi

- G.Narasimha Murthy, Scientist (Hort.) & Head participated in the field day at D.N.Palem village of Devipatnam mandal on Maize production technology conducted by KVK, Pandirimamidi on 03.11.2014

Horticultural Research Station, Lam, Guntur

- Organized two field days in Suddapalli and Jonnlagadda villages on 24-03-2015 and 30-03-2015 respectively under CSS – NHM Programme

Field day on chilli- Suddapalli village

Organized Mass campaign programme on chilli production technology under CSS – MIDH Programme covering five villages in Guntur District is Srinivasapuram of Dachepalli mandal, Dhulipalla of Sattenapalli mandal on 22-07-2014, Mandapadu of Medikonduru mandal on 02-08-2014, Nidamarru of Mangalagiri mandal 04-08-2014, Phanidam of Sattenapalli mandal on 08-08-2014.

Mass campaign on chilli (CSS-MIDH Programme)

Srinivasapuram- Dachepalli Mandal

Dhulipalla- Sattenapalli Mandal

Mandapadu- Bellamkonda Mandal

Nidamarru - Nidamarru Mandal

Field visit at Phanidam

Phanidam - Sattenapalli Mandal

Citrus Research Station, Tirupati

- Dr.K.T.V.Ramana, Principal Scientist (Hort.) & Head and Dr.L.Mukunda lakshmi, Scientist (Hort.) conducted field day at Githivaripalli village of Renigunta mandal, Chittoor district on 28-12-2014.
- Dr.K.T.V.Ramana, Principal Scientist (Hort.) & Head, Dr.L.Mukunda Lakshmi, Scientist (Hort.) and Smt.G.Sarada, Scientist (Ento.) have conducted field day at Sanambatla village of Chandragiri mandal, Chittoor district on 30-12-2014.

Horticultural Research Station, Anantharajupet

- A group of 50 farmers and farm women visited HRS, Anantharajupet accompanied by DAATT Center scientists from ANGRAU, RARS, Lam farm, Guntur on 30-10-2014.

- Dr.C.Madhumathi, Senior Scientist (Hort.) & Head and Dr.M.Raja Naik, Scientist (Hort.) explaining about activities of the Research station and important crops grown in this region.
- Scientists explained about th\e advanced technologies of vegetable and flower crops to the Agriculture polytechnic students during the field visit to the station on 18-02-2015.
- Scientists explained about the advanced technologies of vegetable and flower crops to the Agriculture polytechnic students of Podalakur, Somasila of ANGRAU during the field visit to the station on 18-04-2015.

Krishi Vigyan Kendra, Pandirimamidi

- On 01.04.2014, Dr.A.Srinivas, Programme Coordinator and Sri V.GovardhanRao, SMS (Pl. Path.) conducted field day on Paddy variety MTU-1075 in Kangala Manohar Dora field at I.Polavaram village of Rampachodavaram for showing the advantages of the variety and for the horizontal spread of the technology in the village.

Field day on Paddy variety MTU-1075 at I.Polavaram village

Field day on Promotion of Maize Cultivation- Variety DHM-117

- On 21.04.2014, field day on Maize was conducted in Gadarada Village of Korukonda mandal. This programme was implemented in collaboration with Directorate of Maize Research, Hyderabad to introduce maize as remunerative crop in agency areas of East Godavari district.

- Conducted field day to show the performance of Sorghum variety CSV-15 at D.N.Palem and Pamugandi villages.

Sorghum- Field day – D.N.Palem

Horticultural College & Research Institute, Anantarajupeta

Field day was conducted on **cool season vegetable crops** by Dept. of vegetable Science, HC&RI, Anantharajupet.

Thirty nine radio programmes and 57 television programmes were broadcasted on various horticultural crops through All India Radio and Doordarshan as mass media support to Agricultural Extension.

H. MASS COMMUNICATION

With a view to reach a large number of farmers with the latest technologies and methods, scientists of the university are regularly giving radio talks, TV programmes and literature & publications through print media in local language, Kisan melas, guest lectures through various line departments, institutions and NGOs etc. The programmes attended by the scientists.

A. Radio Programmes

Date	Topic	Name of the scientist
23.02.2015	Tissue culture arati saagulo paatinchavalasina melakuvalu	Smt.R.Naga Lakshmi, Scientist (Hort.)
26.02.2015	Pasupu Kotha mariyu kotha anantharam teesukovalsina yajamanya padhathulu	Smt.K.Mamatha, Scientist (Hort.)
13.04.2014	maamidi yegumatiki patinchalsina nanyata pramanalu	Horticultural College & Research Institute, AR'Peta
04.04.2014	Tamalapakulo purugulu mariyu sasyyarakshna charyalu	Smt.P. Sunitha, Scientist (Ento.)
14.04.2014	Summer management in fruit, flower and vegetable gardens	Dr.B.Srinivasulu, Senior Scientist (Hort.)
09.06.2014	Important management techniques during early rainy season	Dr.B.Srinivasulu, Senior Scientist (Hort.)
12.06.2014	Boppai sagulo melakuvalu	Dr.M.Ramakrishna, Principal
20.06.2014	Kooragayala sagulo theesukovalasina jagrathalu	Sri V.Ramana Technical Officer (Hort.)
21.07.2014	Vyavasaya patasala – vividha cut flowers rakaala saagu vivaralu- marketing avakasalu	Dr.C.Madhumathi, Senior Scientist (Hort.) & Head
24.07.2014	Onion cultivation	Dr.Ch.Ruth, Scientist (Pl.Path.)
22.08.2014	Varshakalamlo nimma battai thotallo sasyarakshana	CRS, Petlur
06.09.2014	Packages of practices of Cabbage and cauliflower in *rabi* season	Dr.Ch.Ruth, Scientist (Pl.Path.)
22.09.2014	Important techniques in pest, disease, fertilizer and water management in fruit, flower and vegetable gardens	Dr.B.Srinivasulu, Senior Scientist (Hort.)
24.10.2014	Cultivation of coriander	Dr.Ch.Ruth, Scientist (Pl.Path.)
27.10.2014	Prastutha Paristitulalo Kobbarini Aasistunna purugulu – Yajamanya Paddathulu	Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.)
05.11.2014	Maamidilo pootha, pinde raavataniki thesukovalasina charyalu	Smt.D.Aparna, Scientist (Hort.)

Date	Topic	Name of the scientist
07.11.2014	Cultivation of Water melon and Musk melon	Sri.M.Tagore Naik, Scientist (Hort.)
08.11.2014	Tamalapakulo samasyalu nivarana	Dr.P. Rama Devi, Scientist (P.Path.)
10.11.2014	Important techniques in pest, disease, fertilizer and water management in fruit and vegetable gardens	Dr.B.Srinivasulu, Senior Scientist (Hort.)
17.11.2014	Boppayi Saagu- Vivaralu	Dr.C.Madhumathi, Senior Scientist (Hort.)
21.11.2014	Cultivation aspects in Chillies	Sri.M.Tagore Naik, Scientist (Hort.)
21.11.2014	Mamidilo Pootha samayamlo theesukovalasina jagrathalu	Dr.M.Ramakrishna, Principal
07th, 14th, 21th, 28th, Nov., 05th, 12th, 19th, and 26th Dec. 2014	Onion, Turmeric, Chillies and Field Bean crops	Dr.Ch.Ruth, Scientist (Pl.Path.)
15.12.2014.	Mirapalo sasya rakshana	Smt.T.Vijaya Lakshmi, Scientist (Path)
15.12.2014	Mirapalo adhika digubadiki suchanalu	Dr.C.Venkata Ramana, Scientist (Hort.)
17.12.2014	Cassava fertilizer management, weeding and intercultivation	Dr.P.Ashok, Scientist (Hort.)
23.12.2014	Cocoalo Komma Kattirimpu Saagu vidhaanam	Smt.E.Padma, Scientist (Hort.)
02nd, 09th, 16th, 23rd and 30th Jan. 2015	Tissue culture in Banana, Chillies and Onion for Polam Panulu	Dr.Ch.Ruth, Scientist (Pl.Path.) & Head
21.01.2015	Cassava Post harvest technology	Dr.P.Ashok, Scientist (Hort.)
30.01.2015	Ulli Sagulo adhunika padhathulu	Dr.M.Ramakrishna, Principal
6th, 13th, 20th and 27th Feb. 2015	Management of powdery mildew diseases in Chillies, Cucurbits and disease Management in Bhendi crop in summer etc.,	Dr.Ch.Ruth, Scientist (Pl.Path.)
23.02.2015	Cultivation of Horticultural Crops	Dr.K.Subramanyam, Principal Scientist (Pl.Path.)
6th, 13th, 20th and 27th March, 2015	Pest management in Bhendi, Tomato and cultivation of Ginger crop for Polam Panulu	Dr.Ch.Ruth, Scientist (Pl.Path.)
13.03.2015	Vesavilo Arati ThotalaYajamanyam	Dr.B.V.K.Bhagavan, Principal Scientist (Hort.)

Date	Topic	Name of the scientist
14.03.2015	Tube rose cultivation	Dr.C.Madhumathi, Senior Scientist (Hort.)
20.03.2015	Vesavilo Kooragayala Saagu	Sri V.Ramana Technical Officer (Hort.)
23.03.2015	Mirapalo vittanotpattiki Melyna yajamanya paddatulu	Smt.A.Rajani, Scientist (Hort.)
25.03.2015	Ginja sugandhadravyala sagulo Melyna paddatulu	Sri. K.Giridhar, Scientist (Hort.)
26.03.2015	Pandla thotallo sassyarakshna paddhathulu	Smt.P. Sunitha, Scientist (Ento.)

b. Television Programmes

Date	Topic	Name of th Scientist	Recorded by
08.04.2014	Preparation of vermi compost from coconut leaf	Sri.K.Ravindra Kumar, Scientist (Hort.)	ETV, Annadata
12.04.2014	Importance of green manure crops	Dr.G.Ramanandam, Principal Scientist (Hort.)	Doordarshan, Saptagiri
16.04.2014	Ginger	Sri.K.Ravindra Kumar, Scientist (Hort.)	Doordarshan, Saptagiri
19.04.2014	Insect Pests and Diseases of cocoa and their management	Dr.A.Snehalatha Rani, Scientist (Pl.Path.)	Doordarshan, Saptagiri
22.05.2014	Vesavilo Arati Thotala Yajamanyam	Dr.B.V.K.Bhagavan, Principal Scientist (Hort.)	Doordarshan Kendra, Hyderabad
23.05.2014	Cocoalo asinche purugulu – Samagra yajamanyam	Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.)	ETV, Annadata
23.05.2014	Cocoa pantanu Asinche tegullu– Samagra yajamanyam	Dr.A.Snehalatha Rani, Scientist (Pl.Path.)	ETV, Annadata on
30.06.2014	Cocoalo kayakullu mariyu gajji tegulu nivarana	Dr.A.Snehalatha Rani, Scientist (Pl.Path.)	Doordarshan, Saptagiri
08.07.2014	Characteristics of Chilli variety, LCA 625	Dr.L.Naram Naidu, Principal Scientist (Hort.)	DD Saptagiri
18.07.2014	Cultivation of inter crops in coconut gardens	Dr.G.Ramanandam, Principal Scientist (Hort.)	Doordarshan, Saptagiri
21.07.2014	Training on planting and management practices of coconut to the farmers of Kurnool district of Andhra Pradesh	Dr.G.Ramanandam, Principal Scientist (Hort.)	Doordarshan, Jaikisan

Date	Topic	Name of th Scientist	Recorded by
11.08.2014	Integrated nutrient management in sweet orange	Dr.L.Mukunda Lakshmi, Scientist (Hort.)	Express TV
12.08.2014	Kobbarilo melyna rakalu – Naate vidanam	Dr.G.Ramanandam, Principal Scientist (Hort.)	Doordarshan, Saptagiri
22.08.2014	Mirapa saagulo melakuvalu	Dr.L.Naram Naidu. Principal Scientist (Hort.)	DD-8, Saptagiri
25.08.2014	Kobbarilo eruvula Yajamanyam	Dr.G.Ramanandam, Principal Scientist (Hort.)	Doordarshan, Saptagiri
12.09.2014	Jeedimamidilo adhikadigubadulaku suchanalu	Sri K.Uma Maheswara Rao, Scientist (Hort.)	Doordarshan, Hyderabad
17.09.2014	Cheeni, nimma thotalo sasyarakshana	Smt.G.Sarada, Scientist (Ento.)	DD Saptagiri, Hyderabad
20.09.2014	Heliconia as intercrop in coconut gardens	Dr.G.Ramanandam, Principal Scientist (Hort.)	ABN Andhra Jyothi
22.09.2014	Papaya mealy bug management	Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.)	Doordarshan, Saptagiri
24.09.2014	Diseases of cocoa and their management	Dr.A.Snehalatha Rani, Scientist (Pl.Path.)	Express T.V.
24.09.2014	Management of rhinoceros beetle in coconut	Dr.N.B.V.Chalpathi Rao, Senior Scientist (Ento.)	Express T.V.
24.09.2014	Improved coconut cultivars for Andhra Pradesh	Dr.G.Ramanandam, Principal Scientist (Hort.)	Express T.V.
24.09.2014	Management of Rhinoceros Beetle in coconut	Dr.N.B.V.Chalpathi Rao, Sr. Scientist (Ento.)	ETV
30.09.2014	Cocoa as intercrop in coconut garden	Dr.G.Ramanandam, Principal Scientist (Hort.) & Head	Express T.V.
17.10.2014	Production of turmeric	Dr.S.Surya Kumari, Principal Scientist (Hort.)	DD Saptagiri
18.10.2014	Care to be taken during chilli planting	Dr.C.Sarada, Sr. Scientist (Hort.)	DD Saptagiri
18.10.2014	Precautions to be taken for virus management in chillies	Smt.T.Vijaya Lakshmi, Scientist (Pl.Path.)	DD Saptagiri
24.10.2014	Seed spices with special reference to coriander	Dr.S.Surya Kumari, Principal Scientist (Hort.)	Yadagiri Dooradarsan
11.11.2014	Cocoalo putha mariyu pinde raludu samasyalu – Nivarana	Dr.A.Snehalatha Rani, Scientist (Pl.Path.)	Doordarshan, Saptagiri
11.11.2014	Bark eating caterpillar, leaf chaffer beetles in cocoa	Dr.N.B.V.Chalapathi Rao, Sr. Scientist (Ento.)	Doordarshan, Saptagiri

Date	Topic	Name of th Scientist	Recorded by
14.11.2014	Fertilizer management in papaya	Smt. E. Padma, Scientist (Hort.)	Doordarshan, Saptagiri
20.11.2014	Fruit fly management in Horticulture crops though light trap	Dr. N.B.V.Chalapathi Rao, Sr. Scientist (Ento.)	Doordarshan, Saptagiri
21.11.2014	Plant protection measures to be taken in chillies	Smt.T.Vijaya Lakshmi, Scientist (Pl.Path.)	DD Saptagiri
21.11.2014	Mirapalo adhika digubadiki suchanalu	Dr.C.Venkata Ramana, Scientist (Hort.)	Yadagiri Dooradarsan
25.11.2014	Management of rhinoceros beetle in coconut	Dr. N.B.V.Chalapathi Rao, Sr. Scientist (Ento.)	ETV, Annadata
27.11.2014	Imparting FoCT Training to coconut farmers	Smt. E. Padma, Scientist (Hort.)	Doordarshan, Saptagiri
12.12.2014	Mamidilo pootha, pinde dashalo teesukovalsina jagrathalu	Dr.C.Madhumathi, Sr. Scientist (Hort.) & Head	Doordarshan
16.12.2014	cultivation of banana and Tuber crops.	Dr.B.V.K.Bhagavan, Principal Scientist (Hort.) and all other scientists	Saptagiri
17.12.2014	Jeevaniyantrana Paddathula dwara kobbarini aasinche Ganoderma tegulu sasyarakshana	Dr. A.Snehalatha Rani, Scientist (P.Path.)	ETV, Annadata
17.12.2014	Water management and Fertilizer management in coconut	Smt. E. Padma, Scientist (Hort.)	ETV, Annadata
31.12.2014	New technologies for increased production in Sweet orange cultivation	Dr.K.T.Venkataramana, Principal Scientist (Hort.) & Head	DD-Sapthagiri
08.01.2015	Stem bleeding disease and its management in coconut	Dr. A.Snehalatha Rani, Scientist (P.Path.)	ETV, Annadata
08.01.2015	Stem canker in cocoa and its management	Dr. A.Snehalatha Rani, Scientist (P.Path.)	ETV, Annadata
08.01.2015	Erramukku purugu chese nastam – Nivarana paddathulu	Dr. N.B.V.Chalapathi Rao, Sr. Scientist (Ento.)	ETV, Annadata
13.01.2015	Plant protection measures to be taken in chillies	Smt.T.Vijaya Lakshmi, Scientist (Pl.Path.)	DD Saptagiri
13.01.2015	Nallamutte Purugu – Yajamanyam	Dr. N.B.V.Chalapathi Rao, Sr. Scientist (Ento.)	Doordarshan, Saptagiri

Date	Topic	Name of th Scientist	Recorded by
13.01.2015	Kobbarilo cocoa antharapanta	Smt. E. Padma, Scientist (Hort.)	Doordarshan, Saptagiri
February, 2015	Polyhouse lo Roja pula sagu – vivaramulu	Horticultural College & Research Institute, AR'Peta	E.TV
04.02.2015	Cocoalo vividha rakala kayakullu tegullu – Nivarana	Dr. A.Snehalatha Rani, Scientist (Pl.Path.)	ETV, Annadata
05.02.2015	Phone in live programme on "Prastutha Tarunamlo Kobbarini Aasistunna purugulu – Samagra Yajamanya Paddathulatho Nivarana	Dr. N.B.V.Chalapathi Rao, Sr. Scientist (Ento.)	Doordarshan, Saptagiri
12.02.2015	Fruit rot and wilt management in chillies	Smt.T.Vijaya Lakshmi, Scientist (Pl.Path.)	DD Saptagiri
19.02.2015	Cultivation of Melons	Dr.B.Srinivasulu, Sr. Scientist (Hort.)	Doordarshan Vijayawada
21.02.2015	Top working in mango	Dr.K.Rajendra Prasad, Scientist (Hort.)	E TV
21.02.2015	Production technology of Cashew	Dr.G.Narasimha Murthy, Scientist (Hort.) & Head,	DD Saptagiri
08.03.2015	Pasupu saagu	Dr.S.Surya Kumari, Principal Scientist (Hort.)	DD Saptagiri
12.03.2015	Vesavilo Arati Thotala Yajamanyam"	Dr.B.V.K.Bhagavan, Principal Scientist (Hort.)	DD Saptagiri, Vijayawada
19.03.2015	Mirapa thotalo teesukovalasina jagrattalu	Dr.C.Sarada, Sr. Scientist (Hort.)	DD-8

I. RYTHU SADASSUS

Horticultural Research Station, Ambajipeta

- RAWEP students of HRS, Ambajipeta organized Rythu Sadassu and exhibited production and value addition technologies on 22.11.2014 for the benefit of the participant farmers and also organized farmer–scientist-student interaction to identify the field level problems in cultivation of various horticultural crops and suggested recommendations for the same.

Exhibition and Rythu Sadassu organized at HRS Ambajipeta

Horticultural Research Station, Lam, Guntur

- RAWEP students of HRS, LAM organized Rythu Sadassu and exhibited production and protection technologies of vegetables and fruit crops in Gundavaram village on 24.11.2014 for the benefit of the participant farmers and also organized farmer – scientist- student interaction to identify the field level problems in cultivation of various horticultural crops and suggested recommendations for the same.

- Four Programmes were conducted by the scientists in Marturu, Piduguralla and Parchuru villages on 20th , 22nd and 25th July on Chilli production technology and in Nutakki village on 4th September, on production technology of turmeric and grain spices respectively.

Mango Research Station, Nuzvid

- Smt.D.Aparna, Scientist (Hort.), MRS, Nuzvid participated in Rythu sadassu and exhibition organized at KVK, Ghantasala on 11-10-14 by RAWEP students of College of Agriculture, Bapatla.

Horticultural College & Research Institute, Anantharajupeta

- RAWEP students of HC&RI, Anantharajupeta organized Rythu Sadassu and exhibited production and protection technologies of vegetable and fruit crops during November, 2014 for the benefit of the participant farmers and also organized farmer – scientist- student interaction to identify the field level problems in cultivation of various Horticultural crops and suggested recommendations for the same.


Rythu Sadassus organized in RAWEP villages

Krishi Vigyan Kendra, Pandirimamidi

- Four mandal level rythu sadassu programmes were attended by the scientists in Addateegala, Gangavaram, Y. Ramavaram and Rajavommangi villages on 17th and 19th December, 2014 and on 6th and 8th January, 2015 on "Management of Horticultural Crops in the agency area" organized by Department of Horticulture and ITDA, Rampachodavaram division.

Addateegala- 17.12.2014

Gangavaram- 19.12.2014

Y.Ramavaram – 06.01.2015

Rajavommangi– 08.01.2015

- Participated in "Rythu Sadhikarata Sadassu" organized by Government of Andhra Pradesh at ITDA, Rampachodavaram on 05.11.2014 and displayed improved technologies in agriculture and horticultural crops and related enterprises. Sri.N.China Rajappa, Hon'ble Deputy Chief Minister, Govt. Of A.P., visited the stall and interacted about the KVK activities in agency area, Rampachodavaram.

Citrus Research Station, Tirupati

- Dr.L.Mukunda Lakshmi, Scientist (Hort.) and Smt.G.Sarada, Scientist (Ento.) have Participated in 'Kisan Mela' at RARS, Tirupati conducted by RARS, Tirupati of ANGRAU and a stall of Dr.YSRHU was also arranged followed by interaction with the farmers about various problems in cultivation of horticultural crops on 31-03-2015.

Horticultural Polytechnic, Madakasira

- Dr.M. Ramakrishna, Principal, participated in Rythu Sadassu conducted by Rural Development Trust, Anantapuramu on "Vakka Saagulo Melakuvalu" in Amarapuram mandal.

J. Polam Pilustondi/Rythu Kosam Chandranna programmes/T&V Programmes

Forty five 'Polam Pilustondi' and 'Rythu kosam Chandranna' programmes were conducted by involving scientists from Research Stations and Krishi Vigyan Kendras to provide crop based advisories to the farmers and departmental officers.

Horticultural Research Station, Kovvur

- Dr.M.M.Naidu, Sr. Scientist (Hort.), Smt.K.Mamatha, Scientist (Hort.) and Dr.T.Rajasekharam, Scientist (P.P.) participated in Polam Pilustondi and addressed the problems raised by farmers on different aspects of horticultural crops on 12th, 13th, 19th, 20th, 26th and 27th of August, 2014 and 2nd, 3rd, 9th, 10th, 16th, 17th, 23rd and 24th of September, 2014

Horticultural Research Station, Venkataramannagudem

- P.Sunitha, Scientist (Ento.) participated in Polam pilustondi programme in Veerampalem and Bangarupalem villages on 27.8.2014

Horticultural Research Station, Ambajipeta

- Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.) participated in 'Polam pilustondi' programme organized by Department of Agriculture in Kamzuvanilanka and Mukkamala of E.G.Dist on 19.08.2014 and explained about intercropping in coconut to the farmers.
- Dr.A.Snehalatha Rani, Scientist (Pl. Path.) participated in 'Polam pilustondi' programme in Pedapatnam and Appanapalli villages of Mamidikuduru mandal on 19.08.2014 and explained about the basal stem rot disease management and scientific management of coconut.
- Dr.G.Ramanandam,Principal Scientist (Hort.) & Head participated in polam pilustondi programme in Bandarulanka Village of Amalapuram mandal on 20.08.2014 and explained about multicropping system model in coconut and its advantages.
- Dr.G.Ramanandam, Principal Scientist (Hort.) & Head participated in polam pilustondi programme in Pulletikurru, Irusumanda villages of Ambajipeta mandal on 26.08.2014 and explained about intercropping in coconut to the farmers.
- Dr.G.Ramanandam, Principal Scientist (Hort.) & Head participated in polam pilustondi programme in Vanne Chintalapudi on 27.08.2014 and explained about scientific management of coconut.

- Dr.G.Ramanandam, Principal Scientist (Hort.) & Head participated in polam pilustondi programme in Munganda (V) of P. Gannavaram Mandal and Chirutapudi, Pasupalli, Vakkalanka of Ambajipeta mandal on 09.09.2014 and explained about integrated nutrient and pest and disease management for coconut, banana and cocoa and also high density planting of intercropping in coconut for sustained crop yields and net returns.
- Dr.G.Ramanandam, Principal Scientist (Hort.) & Head participated in polam pilustondi programme in Pasupalli and Vakkalanka villages of Ambajipeta mandal on 10.09.2014 and clarified the doubts raised by the farmers in cocoa, coconut and banana cultivation.
- Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.) participated in polam pilustondi programme in G.Agraharam village on 16.09.2014 and explained about package of practices in coconut.
- Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.) participated in polam pilustondi programme in market yard, Kothapeta on 18.09.2014 and attended the review meeting.
- Dr.G.Ramanandam, Principal Scientist (Hort.) & Head participated in polam pilustondi programme in Mosalapalli village of Ambajipeta mandal on 24.09.2014 and explained about package of practices of coconut.

Horticultural Research Station, Pandirimamidi

- Dr.G.Narasimha Murthy, Scientist (Hort.) participated in polam pilustondi programme in Madicherla on 12.08.2014, in Busigudem on 13.08.2015, in Tatiwada and Burugu banda on 03.09.2014, in Tamarapalli and Gopavaram on 10.09.2014. Visited Cashew gardens and interacted with the farmers on production technology of Cashew.
- Dr.K.Rajendra Prasad, Scientist (Hort.) participated in polam pilustondi programme in Koyyalagudem and Rakota on 19.08.2014, in Musurumilli and Peda Barangi on 20.08.2014, in Tallapalem & Bandapalli on 03.09.2014, in B.velemalakota & Jagametlapalem on 27.08.204 and in Peda gaddada & cheruvupalem on 23.09.2014 explained about establishment of cashew and mango orchards.

Horticultural Research Station, Chintapalli

- Visited Gondipakala and Rajupakala villages of Chintapalli mandal, GK Veedhi, Paderu, and Araku under Polam pilusthondi programme and identified Phytophthora foot rot disease in black pepper gardens. Recommended COC 0.3 % drenching and Potassium Phosphonate spray during the onset of monsoon, middle of the monsoon and end of rainy season along with GAP for the control of disease.

Horticultural Research Station, Lam, Guntur

- Dr.L.Naram Naidu, Principal Scientist (Hort.) participated in launching of polam pilustondi programme in Chinarajupalem of Bellamkonda mandal on 12.08.2014
- Dr.C.Sarada, Sr. Scientist (Hort.) partipated in polam pilustondi programme in Vipparla and Utukur of Krosur mandal on 19.08.2014 and in Achempeta and Grandhasiri of Achempeta mandal, Patibandla village of Pedakurapadu mandal on 02.09.2014.
- Dr.L.Naram Naidu, Principal Scientist (Hort.) participated in polam pilustondi programme in Lingaraopalem of Chilakaluripet mandal on 31.08.2014.
- Dr.S.Surya Kumari, Principal Scientist (Hort.) participated in polam pilustondi programme in Kottapalem and Kondaveedu of Yedlapadu mandal on 09.09.2014.
- Dr.C.Venkta Ramana, Scientist (Hort.) participated in polam pilustondi programme in Chirumamilla and Jangalapalle on 16.09.2014 and Tubadu of Nadendla mandal on 17.09.2014.

Mango Research Station, Nuzvid

- Smt.D.Aparna, Scientist (Hort.) participated in the following polam pilusthondi programmes organized by Department of Agriculture in various villages and explained about the management practices of fruit crops including mango;

Sl.No.	Date	Villages
1.	19-08-2014	Annavaram
2.	19-08-2014	Chittapur
3.	19-08-2014	Reddygudem
4.	20-08-2014	Venkatayapalam, Siddardhanagar

Horticultural Research Station, Darsi

- Sri S.Narasimha Rao, Scientist (Pl.Path.) participated in the following polam pilusthondi programmes organized by Department of Agriculture in various villages and explained about the management practices of fruit crops;

Sl.No.	Date	Villages
1.	12.08.2014	Kallur and Namasivayapuram
2.	19.08.2014	Naidupalem and Bayyaram
3.	20.08.2014	VY Palem and Dekanakonda
4.	26.08.2014	Kesinenipalli and Gollavandlapalli
5.	27.08.2014	Nadigadda and Deevapalli
6.	02.09.2014	Dupadu and Hasnapuram
7.	03.09.2014	Gollapalli
8.	09.09.2014	Vempalli
9.	24.09.2014	Medaphi and Kondareddy koshatalu
10.	01.10.2014	Mirampalli and Mudivemula

Cashew Research Station, Bapatla

Sri K.Umamheswara Roa, Scientist (Hort.) & Head, CRS, Bapatla visited betelvine, turmeric, cucurbits, banana, chrysanthemum, bhendi and acid lime fields of different villages in Bapatla mandal during "Polam pilustondi programme and suggested remedial measures for different problems faced by the farmers in cultivation and plant protection aspects on 12th, 13,th, 19th, 20th, 26th, 27th of August, 2014, 2nd, 3rd, 9th, 10th, 23th, 30th of September, 2014 and 8th, 28th, 29th of October, 2014.

Citrus Research Station, Tirupati

Dr.L.Mukunda Lakshmi, Scientist (Hort.) and Smt.G.Sarada, Scientist (Ento.) have attended "Polam pilustondi" Programme regularly on Tuesday and Wednesday from August-October in Tirupati division and educated the farmers about various management practices in horticultural crops.

Citrus Research Station, Petlur

- Dr.B.Prathap, Scientist (Agro.) participated in polam pilustondi programme in Nidigallu, Gajulapalli villages of Balayapalli mandal on 19.08.2014, in Nindali, Vakyam villages of Balayapalli mandal on 27.08.2014, in

Devulapalli, Madavayapalem village, Dakkili mandal on 10.09.2014, in Chaganam rajupalem, Chaganam villages, Sydapuram mandal on 01.10.2014 and in Mannegunta village, Venkatagiri mandal on 26.11.2014.

- Dr.P.T.Srinivas, Sr. Scientist (Hort.) participated in polam pilustondi programme in M.Yellampalli and Lingasamudram villages, Dakkili mandal on 20.08.2014 and Vendodu, Hastakaveri villages, Balayapalli mandal on 16.09.2014.
- Dr.M.Kavitha, Scientist (Pl.Path.) participated in polam pilustondi programme in Chuttu, Ammasamudram villages, Balayapalli mandal on 10.09.2014, in Kalganda, Kamakuru villages, Balayapalli mandal on 23.09.2014 and in Amaduru, Theerthampadu villages, Dakkili mandal on 24.09.2014.

Horticultural Research Station, Anantharajupet

- Dr.M.Raja Naik, Scientist (Hort.) participated in polam pilustondi programme in Bayanapalli, O.Kothapalli, Settingunta villages of Railway Kodur division on 19.08.2014, in Mysorivaripalli, Jyothi colony, Kukkaladoddi villages of Railway Kodur division on 20.08.2014, in Ananthayagari palli, Jaguvaripalli villages of Pullampeta division and Surapurajupalli village of Railway Kodur division on 26.08.2014 and in Railway Kodur on 02.09.2014 and 03.09.2014, in Mysorivari palle, Soorapurajugari palli villages of Railway Kodur division on 23.06.2015 and in Gangarajupodu, Jyothi colony village of Railway Kodur division on 24.06.2015.
- Dr.C.Madhumathi, Sr. Scientist (Hort.) & Head, participated in polam pilustondi programme in Gandhamvari palli, Obanapalli villages of Railway Kodur division on 08.11.2014.

Horticultural Research Station, Mahanandi

- M.Tagore Naik, Scientist (Hort.) participated in polam pilustondi programme in Bollavaram and Sitharampuram villages on 20.08.2014, in Thimmapuram and Abbipuram villages on 09.09.2014 and in Masidpuram and Nandipalli villages on 23.09.2014 along with officers of line departments.
- Dr.Ch.Ruth, Scientist (P.P.) participated in polam pilusthondi programme in Bukkapuram and Thamadapalli villages on 16.09.2014, in Bollavarum and Sitarampuram villages on 17.09.2014, in Gopavarum and Gajulapalli villages on 24.09.2014 and in Allinagaram and srinagaram on 01.10.2014 and Gopavaram on 04.10.2014 and 20.12.2014 along with line departments.
- Dr.Ch.Ruth, Scientist (Pl.Path.) & Head attended T&V meetings on 28.06.2014, 11.07.2014, 19.08.2014, 06.09.2014 and 28.02.2015 at RARS, Nandyal.
- Sri.M.Tagore Naik, Scientist (Hort.) attended T&V meetings at RARS, Nandyal on 28.10.2014 and 21.01.2015 at RARS, Nandyal.

K. EXPOSURE VISITS

Horticultural Research Station, Kovvur

- Twenty four 2nd year, B.Sc (Hort.), students of HC&RI, V.R.Gudem visited HRS, Kovvur to learn about various activities of the research station on 01.04.2014
- Twenty seven 3rd year, B.Sc (Ag), students of Agricultural College, Rajahmundry visited HRS, Kovvur and they were explained about various activities of the research station on 17.04.2014.
- Biotechnology students (25 nos.) of Government College, Rajahmundry visited the station on 10.02.2015 and R.Naga Lakshmi, Scientist (Hort) explained about the micro propagation techniques in banana.
- Fifty farmers from Salur, Bobbili, S.Kota, Gantyada and Badangi mandals of Vizianagaram district visited HRS Kovvur on 06.03.2015 and they were explained about the production technology of banana.

Krishi Vigyan Kendra, Venkataramannagudem

- Dr.E.Karunasree, Programme Co-ordinator conducted Inter State Exposure visit and training programme on "Post Harvest Technology of Cocoa" at CT0I, Mannuthy, KAU, Thrisur from 06th to 14th June, 2014 along with 20 farmers with the collaboration of ATMA, West Godavari District.

- Dr.E.Karunasree, Programme Co-ordinator, Krishi Vigyan Kendra, Venkataramannagudem conducted Exposure visit on "Mushroom Cultivation" for 20 members at Giddaluru village organized by Department of Horticulture, West Godavari District on 18.08.2014
- On 20.09.2014, Dr.Goenka College Students, Pentapadu visited KVK, Venkataramannagudem on an exposure visit. In this visit Kum.S.Vishala, RA (Hort.), Kum.M.Neela Rani, RA (Ento.) and Kum. V.Hema Latha, RA (Extn.) explained about the activities of KVK *viz*., Culture of Azolla, Vermicompost culture, different crops in KVK farm, green house/shadenet nursery raising in portrays.

Horticultural College & Research Institute, Venkataramannagudem

- Exposure visits were arranged to the final year students to Venkateswara Industries (Protected cultivation units) at Nuzvidu to learn about the cultivation practices of carnation, gerbera and capsicum crops grown under poly house.

Horticultural Polytechnic, Madakasira

- An exposure visit was taken up for the benefit of Second year students to Govindapuram, Pilligundla and nearby villages. Students visited various orchards, vegetable and flower crops and plantation crops and observed the pest and diseases and also collected disease, damaged and disorder specimens.
- An exposure visit to nearby fields was taken up for the benefit of first year students. They were taught on different propagation methods and demonstration on various layering, grafting and budding techniques was given.

"Udyana Panchangam" a publication in Telugu published by Dr. YSRHU, covering the production technologies of Horticultural corps was released by Sri. N. Chandra Babu Naidu garu, Hon'ble Chief Minister of Andhra Pradesh during State level Ugadi celebrations.

VI. PUBLICATIONS

(Books, Laboratory manuals, Technical bulletins, Research papers etc.)

University publications

"Udyana Panchangam 2015-16" was published by the Director of Extension and released by Sri N.Chandrababu Naidu Garu, Hon'ble Chief Minister, Govt. of Andhra Pradesh on the occasion of state function "Ugadi celebrations" on 21st March, 2015 at Ananthavaram village, Guntur District, A.P.

A. BOOKS/BOOK CHAPTERS

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E. LEAFLETS/PAMPHLETS

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Minisett technique in cassava, Dr P. Ashok and Dr M. Rajasekhar .

Thamalapaku sagu lo melakuvalu, M. Ravindra Babu, Scientist (Hort.)

Tamalapaku-yendu thegulu samagra yajamanyamu, P.Rama Devi, Scientist (P.P.).

Thamalapaku lo aggipurugu nivarana, P. Sunitha, Scientist (Ento.)

Seethakalamlo kobbarini aasisthunna purugulu – nivarana padhathulu, Chalapathi Rao, N.B.V. and Ramanandam G.

Scientific cultivation practices for higher yields in coconut, Ramanandam, G.

Kobbarilo antharapantaga cocoa saagu - atu kobbariki itu rythuku labhadayakam, Padma E., Snehalatha Rani A, Chalapathi Rao, N.B.V. and Ramanandam G.

F. POPULAR ARTICLES

Tissue culture Arati Saagu, B.V.K.Bhagavan, M M Naidu. K Mamatha, R Nagalakshmi and T.Rajashekharam 2014 September, Jai Kisan-Page No. 42-44.

"Establishment of Spices Laboratory to promote spices research" (Suganda dravya pantala pi parisodanalaku marinta upu) in Eenadu, Daily Telugu News Paper, Vizag District Edition: 1/4th Page 16 on 3rd May, 2014.

"Research on New varieties in Turmeric" in Eenadu, Daily Telugu News Paper, Vizag District Edition: Page5 on 24th June, 2014.

"Research on African Cherry cultivation in Chintapalli Agency (ITDA) area" in Andhra Jyothi, Daily Telugu News Paper, Vizag District Edition: Page 8 on 6th September, 2014.

"Spice Flavors in Agency (ITDA–Chintapalle) Area" in Eenadu, Daily Telugu News Paper, Vizag District Edition: Page 8 on 9th September, 2014

"Manyam coffee ki Kotta chikitya" in Eenadu, Daily Telugu News Paper, Vizag District Edition: Page 9 on16th November, 2014.

"Kaya kastam dachu ko vatchu" in Sakshi daily news paper on 15.10.2014.

Kasthuri benda saagu sasyarakshana, P.Sunita, B.TanujaPriya, P.Ramadevi and M.Rajasekhar. 2014, Swarna sedyam. May 2014, 10-11.

Kharif kuragayala saagu, Dr.R.V.S.K Reddy- 2014 June, Rythunestham, Hyderabad, 11-14

Aushada panta aswagandha saagulo melakuvalu, P.Sunitha, B.TanujaPriya, P. Ramadevi and M.Rajasekhar, Mana Rythuvani, July, 2014, 10-11.

Ulli Saagulo melakuvalu, Dr.R.V.S.K Reddy - 2014 August, Rythunestham, Hyderabad, 49-50

Cabbage, cauliflower saagulo melyna yajamanyam, Dr.R.V.S.K Reddy- 2014 September, Rythunestham, Hyderabad, 27-29

Tomato saagulo narumadi yajamanyma, K.Sirisha, P.Madhavilatha, M.Vijaya, R.V.S.K.Reddy, J.Dilipbabu- 2014 October, Annadata, Hyderabad, 58-59

Sapota totallo acharinchalsina sasyarakshna charyalu, P.Sunitha, B. Tanuja Priya, P. Ramadevi and M. RajaSekhar 2015, Annadata, February 2015, 28-29.

Vesavi Kuragayala saagulo melakuvalu, M.Ravindrababu, Dr.R.V.S.K.Reddy, Dr.M. Rajasekhar- 2015 March, Rythunestham, Hyderabad, 11-12.

Pootha kaapu samayamlo maamidi thotala yajamanyam, Ravindra Babu M, Rajasekhar M, Ramadevi P, Sunitha- Rytheraju, March 2015, 32-33.

Manu mikkili, melu unnatam, Vengaiah, P C, Murthy, G N, Prasad, K R and Usha, K.U 2014, Sakshi, July 20th , 2014.

Tatimunjelu upayogalu, Vengaiah P C, Murthy, G N., Prasad, K R and Usha, K.U 2014, Agriclinic, May 2014.

Tatimunjelu pradhanyata, Vengaiah P C, Murthy, G N., Prasad, K R and Usha, K.U 2014, Rytunestam, April 2014.

"Vesavi lo kooragayala saagu" D.Aparna in Rythulokam agricultural magazine April, 2014.

"Sasya Rakshana Charyalu Mamidiki Sriramaraksha" D.Aparna Sakshi News August, 2014

Kuragayala naarumadula thayari lo melaina yajamanya padhathulu, S.Visala, Ch. Kiran kumar & E. Karuna sree November, 2014, Agri gold swarna sedhyam, Swarna sedhyam, 14-16.

Nela aarogyam-susthira vyavasaya uthpathi lo keelakapathra, Ch. Kiran kumar, E. Karuna sree & S.Visala- February, 2014, Sedhya phalam, Sedhya phalam, 8-10

"Bathai, Nimma thotallo Sukshma dhatu lopalu, L. Mukunda Lakshmi, K.Gopal, K.T.Venkataramana, G. Sarada and T. Naga Lakshmi - Yajamanyam" Annadata, May, 2014.

Dhanimma kayalaku rasam peelche purugula bedada, Dr.Vempalli Lakshmi Reddy and Dr.B.Srinivasulu– Rythu Nestam, June, 2014.

Chini, nimma rakala mokkala yennikalo melakuvalu, Dr.Vempalli Lakshmi Reddy and Dr.B.Srinivasulu– Rythu Nestam, July, 2014.

Pantalaku plastic mulching avashayakata, Dr.Vempalli Lakshmi Reddy and Dr.B.Srinivasulu – Rythu Nestam, August, 2014.

Mamidi chettulo kommala katharimpulu, Dr.Vempalli Lakshmi Reddy and Dr.B.Srinivasulu–Rythu Nestam, September, 2014.

"Sastriya Paddathlo Arati Saagu" Dr.Ch.Ruth, Scientist (P.P.) & Head published an article in Eenadu daily news paper.

"Mirapalo Sasyaraksha" News paper coverage on Sakshi dairy News paper, dt. 26.11.2014 by Sri M.Tagore Naik, Scientist (Hort.).

"Pandlathotala Pempakamlo Tesukovalsina Jagrathalu" News paper coverage on in Sakshi daily news paper, dt. 25.02.2015 by Dr.Ch.Ruth, Scientist (P.P.) & Head.

"Vesavilo kuragayala sagu yajamanya paddatulu" News paper coverage on Sakshi daily news paper, dt. 05.03.2015 by Sr. M.Tagore Naik, Scientist (Hort.).

"Bhenda sagu benga teru" News paper coverage on sakshi daily News paper, dt. 11.03.2015 by.) Sri M.Tagore Naik, Scientist (Hort.)

"Pasupulo ela chasta manic rupu" News paper coverage on Sakshi daily News paper, dt. 20.03.2015 by Sri M.Tagore Naik, Scientist (Hort.).

"Vesavilo ulli sagu yajamanya paddatulu" News paper coverage on Sakshi daily news paper, dt. 26.03.2015 by Dr.Ch.Ruth, Scientist (P.P.) & Head.

Cultivation of Jamun, V.Sudha Vani, M.Supriya, C.P.Viji, S.Neeharika, 2014. Agri Gold Swarna sedyam, July, 2014 pp 48.

Munaga saagu lo melakuvalu, V.Sudha Vani C.P.Viji, 2014, Annadata August, 2014, 66-67.

Role of potassium in development of quality fruits. P. Subbaramamma, D.R.S.Suneetha and A.Sujatha, 2014. Annadata 09:54-55.

Anaasa saagu vivaralu, V.Sudha Vani and C.P.Viji, 2014. September, 2014. Vyavasayam, 26-28.

Munaga saagulo vivaralu, V.Sudha Vani, C.P.Viji, K.Phani kumar 2014. Agri Gold Swarna sedyam, December, 2014 30-31.

Nimma thotallo pradhana samasyalu yaajamaanyam, M.Raja Naik, Rythu Nestham, April, 2014.

Heliconia saagulo soochanalu, Raja Naik, Annadata- May, 2014.

G. PARTICIPATION OF TEACHERS/SCIENTISTS IN INTERNATIONAL AND NATIONAL CONFERENCES/ SYMPOSIUMS/WORKSHOPS & HRD PROGRAMMES.

Smt.K.Mamatha, Scientist (Hort.) participated in 14th Annual Group Meeting of AICRP on tuber crops at BAU Ranchi from 19th to 22nd May 2014 and presented the work done during the year 2013-2014.

Dr.B.V.K.Bhagavan, Principal Scientist (Hort.) participated in Cocoa seminar on 24.06.2014

Dr.B.V.K.Bhagavan, Principal Scientist (Hort.) & Head and Dr M.M.Naidu, Senior Scientist (Hort) participated in the Annual Group meeting of AICRP on palms at Hyderabad from 22.7.14 to 26.07.2014.

Dr.B.V.K.Bhagavan, Principal Scientist (Hort.) & Head, participated and organized the Anuual group meeting on AICRP on Cashew from 16.12.2014 to 20.12.2014.

Dr.B.V.K.Bhagavan, Principal Scientist (Hort.) participated in Chilli Day organized at HRS, Lam on 09.01.2015

Dr.B.V.K.Bhagavan, Principal Scientist (Hort.) and T. Rajashekharam, Scientist (Pl Path) attended review meeting for finalization of technical programme pertaining to banana, AICRP on Fruits at NRC banana, Trichy on 28 & 29 January, 2015.

Dr.B.V.K.Bhagavan, Principal Scientist (Hort.) and Dr T. Rajashekharam, Scientist (Pl Path) attended "Group Discussions of AICRP on Fruits organized at Maharana Pratap University of Agriculture and Technology, Udaipur from 26th to 1st March 2015 and presented the experimental results.

Dr.G.Ramanandam, Principal Scientist (Hort.) & Head, Dr.N.B.V.Chalpathi Rao, Senior Scientist (Ento.), Sri.K.Ravindra Kumar, Scientist (Hort.) and Dr.A.Snehalatha, Rani Scientist (Pl.Path.) conducting XXIII Annual Group Meeting of AICRP on Palms at DOR, Hyderabad and participation in the technical sessions from 25.07.2014 to 28.07.2014.

Dignitaries on the Dias releasing the technical bulletins during the XXIII annual group meeting on 25.07.2014

Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.) participated and presented a paper in the National Seminar on "Sustainability and profitable advances and way forward" at CPCRI, Kasaragod on 22.08.2014 & 23.08.2014.

Dr.A.Snehalatha Rani, Scientist (Pl.Path.), HRS, Ambajipeta attended a net work project on "Organic farming in plantation crops" at CPCRI, Kasaragod on 14th & 15th Sep'2014.

Dr.A.Snehalatha Rani, Scientist (P.P.) attended National Symposium on "Plant Health for Sustainability in the field and horticultural crops & Annual Meeting" of INSOPP. CRS, Tirupati, Andhra Pradesh, 18th – 20th November, 2014 and presented Abstract "Early Detection of basal stem rot disease of coconut" Pp-2: P.21.

Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.) attended International Symposium on Plantation crops Placrosym XXI held at Kozhikode, Kerala, 10th – 12th December, 2014 and presented an abstract "Large scale validation of

integrated nutrient management approach in the management of coconut eriophyid mite and the posters presented in PLACROSYM XXI and ECOBASM conference.

Dr.A.Snehalatha Rani, Scientist (P.P.) attended International Symposium on Plantation crops Placrosym XXI held at Kozhikode, Kerala, 10th – 12th December, 2014 and presented an abstract "Large scale demonstration of *Trichoderma viride* based bio management of basal stem rot disease of coconut" and the posters presented in PLACROSYM XXI and ECOBASM conference.

Dr.G.Ramanandam, Principal Scientist (Hort.) & Head attended International Symposium on Plantation crops Placrosym XXI held at Kozhikode in Kerala, 10th – 12th December, 2014, presented an abstract "Standardization of fertigation on coconut in East Godavari district of Andhra Pradesh, India" and the posters presented in PLACROSYM XXI and ECOBASM conference.

Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.) attended National Conference on emerging challenges and opportunities in biotic and abiotic stress management (ECOBASM) held at Directorate of Rice Research, Rajendranagar, and Hyderabad from 13th – 14th December, 2014, presented an abstract. "Recent out breaks of coconut defoliators in coastal districts of Andhra Pradesh and their management through light traps" published and the posters presented in PLACROSYM XXI and ECOBASM conference.

Sri.K.Ravindra Kumar, Scientist (Hort.) attended National Conference on emerging challenges and opportunities in biotic and abiotic stress management (ECOBASM) held at Directorate of Rice Research, Rajendranagar, Hyderabad, 13th – 14th December, 2014 and presented an abstract "Impact of management practices on revival of coconut palms as affected by 'Helen' cyclone in East Godavari district of Andhra Pradesh" and the posters presented in PLACROSYM XXI and ECOBASM conference.

Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.) participated in National seminar on cocoa from 30 & 31st January, 2015 held at UAHS, Shivamogga organized by University of Agricultural and Horticulture sciences in association with DCCD, Kochi and made oral presentation on "Emerging pests and disease problems in cocoa".

A.Snehalatha Rani, Scientist (P.P.) attended National Seminar on "Green chemistry – its impact on environmental protection (GCIED) Eluru, West Godavari District, Andhra Pradesh on 6th February 2015.

Dr.G.Ramanandam, Principal Scientist (Hort.) & Head, attended one day "National workshop on quality planting material production in coconut – Issues and Strategies" on 10.02.2015 at CPCRI, Kasaragod, Kerala.

Dr.A.Snehalatha Rani, Scientist (P.P.) participated in "National Conference on Emerging Trends in Agrinanotechnology (Agrinano-2015) – Institute of Frontier Technology" at Regional Agricultural Research Station, ANGRAU, Tirupati on 11th & 12th March 2015.

Dr.A.Snehalatha Rani, Scientist (P.P.), HRS, Ambajipeta participated and presented abstract for "Large scale demonstration of Trichoderma viride based bio management of basal stem rot disease of coconut" in International Symposium on Plantation crops Placrosym XXI held at Kozhikode, Kerala, 10th – 12th December, 2014.

Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.) participated in the National Seminar on Cocoa and gave presentations on "Pests & Diseases of Cocoa" & "Cocoa cultivation in open" organized under the aegis of University of Agricultural and Horticultural Sciences in association with DCCD, Kochi on 30th and 31st January 2015 at UAHS, Shivamogga.

Dr.G.Ramanandam, Principal Scientist (Hort.) & Head and Dr.N.B.V.Chalapathi Rao, Senior Scientist (Ento.), HRS, Ambajipeta visited CDB seed production farm, Vegiwada attended and displayed technologies during the work shop on cocoa advanced production technology at NIOPR being organized by DCCD, Kochi on 04.03.2015.

Dr.A.Snehalatha Rani, Scientist (P.P.), HRS, Ambajipeta participated and presented abstract for National Symposium on Plant Health for Sustainability in the field and horticultural crops & Annual Meeting of INSOPP. CRS, Tirupati, Andhra Pradesh, 18th – 20th November, 2014.

Snehalatharani, A., Chalapathi Rao, N.B.V., Ramanandam, G. and Maheswarappa, H.P, 2014. Early detection of basal stem rot disease of coconut: Abstract in National Symposium on Plant Health for Sustainability in the field and horticultural crops & Annual Meeting of INSOPP. CRS, Tirupati, Andhra Pradesh, 18th – 20th November, 2014, PP-2: P.21 published and the posters presented in PLACROSYM XXI and ECOBASM conference.

Chalapathi Rao, N.B.V, Snehalatharani, A., Ramanandam, G. and Maheswarappa, H.P, 2014. Large scale validation of integrated nutrient management approach in the management of coconut eriophyid mite: Abstract in International Symposium on Plantation crops Placrosym XXI held at Kozhikode, Kerala, 10th – 12th December, 2014, Pp-166:P.137 published and the posters presented in PLACROSYM XXI and ECOBASM conference.

Snehalatharani, A., Chalapathi Rao, N.B.V., Ramanandam, G. and Maheswarappa, H.P, 2014. Large scale demonstration of *Trichoderma viride* based bio management of basal stem rot disease of coconut: Abstract in International Symposium on Plantation crops Placrosym XXI held at Kozhikode, Kerala, 10th – 12th December, 2014, Pp-165 : P.136 published and the posters presented in PLACROSYM XXI and ECOBASM conference.

Ravindra Kumar, K., Padma, E., Ramanandam, G., Kalpana, M. and Maheswarappa, H.P, 2014. Standardization of fertigation on coconut in East Godavari district of Andhra Pradesh, India : Abstract in International Symposium on Plantation crops Placrosym XXI held at Kozhikode, Kerala, 10th – 12th December, 2014 Pp-83: P.79-80 published and the posters presented in PLACROSYM XXI and ECOBASM conference.

Chalapathi Rao, N.B.V., Snehalatharani, A., Emmanuel, N., Ramanandam, G. and Maheswarappa, H.P.2014. Recent out breaks of coconut defoliators in coastal districts of Andhra Pradesh and their management through light traps : Abstract in National Conference on emerging challenges and opportunities in biotic and abiotic stress management (ECOBASM) held at Directorate of Rice Research, Rajendranagar, Hyderabad, 13th – 14th December, 2014 : P.45-46 published and the posters presented in PLACROSYM XXI and ECOBASM conference.

Ravindra Kumar, K. Padma, E. Ramanandam, G. Chalapathi Rao, N.B.V. and Snehalatha Rani, A. 2014. Impact of management practices on revival of coconut palms as affected by 'Helen' cyclone in East Godavari district of Andhra Pradesh: Abstract in National Conference on emerging challenges and opportunities in biotic and abiotic stress management (ECOBASM) held at Directorate of Rice Research, Rajendranagar, Hyderabad, 13th – 14th December, 2014: P.25-26 published and the posters presented in PLACROSYM XXI and ECOBASM conference.

Dr.M.Rajasekhar and Dr.B.Ramesh Babu participated in 2nd Annual group meeting of AICRP (Fruits) held at Maharana Pratap University of Agriculture & Technology, Udaipur from 26.02.15 to 01-03-2015.

Dr.M.Rajasekhar and Dr.R.Rajyalakshmi attended the Pre ZREAC meeting at HRS, Kovvur and ZREAC meeting at CTRI, Rajahmundry from 10.04.2014 and 29.04.2014.

Dr.M.Rajasekhar, Senior Scientist (Hort.) participated in 23rd annual group meeting of AICRP on palms held at Hyderabad 25.07.2014 to 28.07.2014.

P.Rama Devi, Scientist (Pl.Path.) and P.Sunitha, Scientist (Ento.) participated in XXII Group meeting on AICRP on MAP & Betelvine at Bengaluru from 17-09-2014 to 20-09-2014.

M.Ravindra Babu, Scientist (Hort.) participated in "National Meet on Distant Hybridization in Horticultural Crop Improvement" at IIHR, Bengaluru from 22-01-2015 to 23-01-2015.

M.Ravindra Babu, Scientist (Hort.) attended review meeting on Model Nursery on Medicinal Plants at APMPB, Hyderabad on 30.03.2015.

Dr.P.Ashok, Scientist (Hort.) attended14th Annual Group meeting on AICRP Tuber crops from 20th to 22nd May, 2014 at BAU, Ranchi, Jharkhand 20th to 22nd May, 2014.

Dr.P.Ashok, Scientist (Hort.) participated in Midterm Review Meeting at CTCRI, RC, Bhubaneswar, Orissa on 24th Sept, 2014 on 24th September, 2014.

R.Rajyalakshmi, M.Rajasekhar and L.Naram Naidu, 2014. Evaluation of brinjal (*Solanum melongena* L.) germplasm for elite accessions at National conference on Emerging trends in value addition to plants and plant products" held at St. Joseph's college for women, Visakhapatnam 24.07.2014 to 25.07.2014.

R.Rajyalakshmi and M.Rajasekhar, 2014 Standardization of enzymatic digestion of sapota pulp for preparation of RTS at National conference on Emerging trends in value addition to plants and plant products" held at St. Joseph's college for women, Visakhapatnam from 24.07.2014 to 25.07.2014.

G.Narasimha Murthy, Scientist (Hort.) and Vengaiah, P C, Scientist (F&ST) participated in the 23rd Annual group meeting on AICRP on Palms at Directorate of Oil seed Research Hyderabad from 23rd to 29th July, 2014.

Dr.G.Narasimha Murthy, Scientist (Hort.) participated in the XXI PLACROSYM(plantation crops symposium) held at The Gateway Hotel, Kozhikode, Kerala, India from 10-12 December, 2014.

Vengaiah P.C., Scientist (F&ST) participated in Development of value added food products from Palmyrah Tuber (*Borassus flabellifer* L). ECOBASM2014 at DRR, Hyderabad, India from 13-14 December, 2014.

Vengaiah P,C,, Scientist (F&ST) participated in Studies on nutritional values of plamyrah fruit pulp (*borassus flabellifer* L.). 46th Annual National Conference of Nutrition Society of India (NSICON2014) at Dayanand Medical College and Hospital, Ludhiana on 6th-8th November, 2014.

G. Satish, Y.Soujanya & E. Karuna Sree, February, 2015. Traditional Agricultural Practices with Cattle Excretment for sustainable and zero budget farming – A case study, Global Social Science Conference, 2015, OUAT, Bhubaneswar, February, 2015, International Society of Extension Education, Nagpur, pp.14-15.

E. Karuna Sree K. Bhagya lakshmi, Ch. Kiran kumar & S. Vishala, February, 2015. Extension approaches for sustainable livelihood through vegetable cultivation in West Godavari district of AP., Global Social Science Conference, 2015, OUAT, Bhubaneswar, February, 2015, International Society of Extension Education, Nagpur, pp.59-60

C.Sarada, Senior Scientist (Hort.) attended XXXII Annual group meeting of AICRP on Vegetable Crops held at IGKV, Raipur from 24th to 27th June, 2014.

Dr.L.Naram Naidu, Principal Scientist (Hort.) attended the 8th Annual Review meeting of the National Horticulture Mission programmes implemented through the Directorate of Arecanut and Spices Development, Calicut, at the College of Horticulture, Kerala Agricultural University, Thrissur, Kerala from 24th to 25th June, 2014.

C.Sarada, Senior Scientist (Hort.) and Dr.C.Venkata Ramana, Scientist (Hort.) attended and participated in National Symposium on Precision Horticulture for small and marginal farmers held at IGKV Raipur to present posters from 24th to 25th June, 2014

Smt.T.Vijaya Lakshmi, Scientist (P.P.) attended training on Disease Forecasting models at Indian Institute of Horticultural Research, Hessaraghatta, Bangalore from 27-28 August 2014.

Dr.L.Naram Naidu. Principal Scientist (Hort.), Dr.C.Sarada, Senior Scientist (Hort) and Dr.C.Venkta Ramana, Scientist (Hort.) attended Asian Solanaceous Round Table meeting at Bangalore organized by Asian and Pacific Seeds Association (APSA) and Society for Promotion of Horticulture (SPH) from 9th-11th September, 2014.

Dr.S.Surya Kumari, Principal Scientist (Hort.) and Sri.K.Giridhar, Scientist (Hort.) attended XXV workshop of AICRP on Spices, UBKV, Pundibari, West Bengal from 24th-28th September, 2014.

Sri.K.Giridhar, Scientist (Hort.) attended interface meeting of UGC, Project on Characterization and finger printing of extant varieties of turmeric at New Delhi from 31st December to 2nd January, 2015.

Dr.C.Sarada, Senior Scientst (Hort.) and Smt.T.Vijaya Lakshmi, Scientist (P.P.) attended 2nd International Conference on "Bio-resource and stress management" at ANGRAU, Hyderabad for oral presentation of research papers from 7th -10th January, 2015

Dr.L.Naram Naidu, Principal Scientist (Hort.) and Dr.C.Venkata Ramana, Scientist (Hort.) attended National Meet on Distant Hybridization in Horticultural Crop Improvement at IIHR, Bangalore from 22nd to 24rd January, 2015.

Dr.S.Surya Kumari, Principal Scientist (Hort.) and Sri.K.Giridhar, Scietist (Hort.) attended National seminar on Nano technology at Tirupati, ANGRAU for oral presentation of research papers from 11th to 12th March, 2015.

Dr. K.M.Yuvaraj, Senior Scientist (Hort.) & Head and K.Uma Maheswara Rao, Scientist (Hort.) attended the National Seminar on Cashew-2015 at Menzes Braganza Hall, Panjim, Goa from 13th-14th March, 2015 organized by DCCD, Cochin

Dr.K.T.Venkataramana, Principal Scientist (Hort.), Dr.L. Mukunda Lakshmi, Scientist (Horticulture) and Smt. G.Sararda, Scientist (Ento.), have organised and attended National Symposium on "Plant health on sustainability in field and horticultural crops" from 18-11-2014 to 20-11-2014, at S.V. Veterinary Auditorium, Tirupati and presented poster on "Duplex PCR based assay on simultaneous detection of bud wood transmissible diseases (Citrus greening and citrus yellow mosaic) in sweet orange budlings".

Dr.L.Mukunda Lakshmi, Scientist (Hort.) participated in the workshop on "Mango production, promotion of post harvest technologies and marketing of mango" on 08-01-2015 at Vadamalapet, Chittoor dist and delivered a lecture on production technology of mango organized by Department of Horticulture, Chittoor.

Smt.G.Sarada, Scientist (Ento.) attended one day workshop on "Post harvest technologies in mango for processing and export" at Chittoor, conducted by the Dept. of Horticulture on 17-06-2014 and educated the farmers about the post harvest mango plant protection techniques.

Dr.L.Mukunda Lakshmi, Scientist (Horticulture) participated in winter school on "Protected cultivation" sponsored by ICAR, New Delhi at UAS, Dharwad, Karnataka from 04.12.2014 to 24.12.2014.

Smt.G.Sarada, Scientist (Ento.) attended 3 days short course on "Nematode identification and Management" conducted by Dept. of Plant pathology, SV Agricultural College, Tirupati on 22nd -24th September.

Dr.B.Srinivasulu, Senior Scientist (Hort.), HRS, Ananthapuramu attended short course on "Advances in water management and fertigation in fruit and vegetable crops in hot arid region in India" from 22-09-2014 to 01-10-2014 at Central Institute for Arid Horticulture, Bikaner, Rajasthan.

Dr.K.Subramanyam, Principal Scientist & Head and Dr. B. Srinivasulu, Senior Scientist (Hort.) HRS, Ananthapuramu attended Research workers Annual Meet, 2014 at Jobner, Rajasthan from 12-12-2014 to 14-12-2014.

Dr.K.Subramanyam, Principal Scientist & Head and Dr. B. Srinivasulu, Senior Scientist (Hort.) HRS, Ananthapuramu attended workshop on "Bioversity – ICAR collaborative activity" at New Delhi on 12-03-2015.

Dr.K.Subramanyam, Principal Scientist & Head and Dr.B.Srinivasulu, Senior Scientist (Hort.) HRS, Ananthapuramu attended National Seminar on "Challenges and opportunities for production and supply chain of pomegranate at University of Horticulture Sciences, Bhagalkot, Karnataka.

National Symposium on plant health for sustainability in the field and horticultural crops 17th-20th November, 2014 at Tirupati. Attended and participated Dr.B.Govinda Rajulu, Principal Scientist (PP), Dr.M.Kavitha, Scientist (Pl.Path.) & Dr.B.Prathap, Scientist (Agro.)

Dr.M.Raja Naik, Scientist (Hort.) attended workshop of AICRP on Palms from 25-7-2014 to 28-07-2014 at DOR, Rajendranagar, Hyderabad.

Dr.M.Raja Naik, Scientist (Hort.) attended Indian Horticulture Congress and presented a poster at Coimbatore from 6th to 9th November, 2014.

Dr.M.Raja Naik, Scientist (Hort.) attended National symposium on "Plant health for sustainability in the field and horticultural crops" from 18th to 20th November, 2014 at Tirupati, presented a poster and received 3rd best poster award.

Dr.M.Raja Naik, Scientist (Hort.) attended ISPP South Zonal seminar on "Crop physiology emerging challenges and opportunities for sustainable agriculture" on 03-03-2015 at Sri Venkateswara Agricultural College, Tirupati.

Dr.C.Madhumathi, Senior Scientist (Hort.) attended ISPP South Zonal seminar on "Crop physiology emerging challenges and opportunities for sustainable agriculture" on 03-03-2015 at Sri Venkateswara Agricultural College, Tirupati.

Dr.C.Madhumathi, Senior Scientist (Hort.) & Head, assisted in organizing the "National Symposium on plant health for sustainability in the field and Horticultural crops" conducted from 18-11-2014 to 20-11-2014 at Veterinary Auditorium, Tirupati as a chairman of Registration committee and also arranged exhibition at the venue.

Dr.C.Madhumathi, Senior Scientist & Head, HRS, Anantharaujpet and Dr.D.Srinivasulu Reddy, Sceintist (Ento.), HC&RI, Anantharajupet participated in the interactive meet/workshop with Japanese international co-operative Agency (JICA) (Govt. of Japan organization) on Agri value chain in India with focus on post harvest management of Horticultural crops (mango, tomoto) on 24-06-2015 at office of deputy director of Horticulture (AEZ), Chittoor and involved in group discussion with progressive farmers of mango & tomato, processing industrial and department personnel.

Dr.Ch.Ruth, Scientist (Pl.Path.) & Head participate in "National Symposium on Plant Health for Sustainability in the field of Horticultural Crops from 18th-20th November, 2014 and presented poster "Influence of Weather Variables on Incidence of Groundnut Bud Necrosis Virus in Tomato (GBNV-TO)" at Citrus Research Station, Dr.YSRHU, Tirupati.

Dr.R.V.Sujatha, Assistant Professor (Ag. Econ.) attended 21 days training programme on "Recent Advances in Educational Technology" held at NAARM, Hyderabad from 2nd to 22nd July, 2014.

Dr.A.V.D.Doraji Rao attended a workshop on "Emerging Ttrends in Nanotechnology" held at Regional Agricultural Research Station, Tirupathi, from 11th to 12th March, 2015.

Dr.A.Sujatha, Associate Dean attended the Round Table Discussions on "Conogethes" (Fruit Borer) held at IIHR, Bangalore from 16-08-14 to 20-08-14.

Dr.A.Sujatha, Associate Dean attended the 24th Annual Group Meeting from 26th to 29th May, 2015 on AICRP on Palms (ICAR), held at ICAR-Central Coastal Agricultural Research Institute, Ela, Old Goa, Goa.

K.Phani kumar, C.P.Viji and V.Sudha Vani, 2014. Insect pests of value added products and their management at National Seminar on Emerging trends in value addition to plants and plant products held at St.Joseph's College for women, Visakhapatnam from 24-25 July, 2014.

R.Bindu Praveena, V.Sudha Vani and M.Rajasekhar, 2014. Influence of packaging and ventilations on the quality of sapota (Manilhara achras(Mill))Cv Kalipatti under low temperature at National seminar on Emerging trends in value addition to plants and plant products held at at St.Joseph's College for women,Visakhapatnam from 24-25 July, 2014.

Usha Kumari.K, Rajendra Prasad, R.Naga Laxmi, E.Padma and V.Sudha Vani, 2014. Exotic tropical plants-Heliconia an emerging cut flower in India at National seminar on E merging trends in value addition to plants and plant products held at St.Joseph's College for women,Visakhapatnam from 24-25 July, 2014.

Srividya S, Syam Sundar Reddy P Uma jyothi, Sudhavani V and Ramanjaneya Reddy.A, 2014 Effect of different gauges of LDPE packaging material on shelf life and nutrional quality of Tomato Cv Lakshmi Under Ambient Conditions held at National seminar on E merging trends in value addition to plants and plant products St.Joseph's College for women,Visakhapatnam from 24-25 July, 2014.

Srividya S, Syam Sundar Reddy P Uma jyothi, Sudha vani V and Ramanjaneya Reddy A, 2014. Effect of different types of pacing materials on shelf life and quality of Tomato Cv Lakshmi Under Ambient Conditions. National seminar on Pre/Post Harvest Losses and value addition in vegetables at IIVR ,Varanasi on 12-13 July , 2014

V.Sudha Vani, 2014. Infuence of different ventilations and gauges of polybags on shelf life and quality of baby corn held at room temperature at National seminar on Pre/Post Harvest Losses and value addition in vegetables at IIVR, Varanasi on 12-13 July, 2014.

N.Sudheer, M.B.Nageswara Rao,V.Sudha Vani and P.Subbaramamma Effect of post harvest treatments on shelf life and quality of Acid Lime(*Citrus aurantifolia*) Cv Balaji stored at room temperature at 6th Indian Horticulture Science congress An International event Horticulture for inclusive growth from November 6-9 November, 2014.

P.Kiranmayi, K.Uma Jyothi, K.Usha Kumari, V.Sudha Vani and D.R.Salomi Suneetha, 2014. Effect of NAA, 4 CPA and boron on growth and yield of green chilli (*Capsicum annuum* L.) var LCA-353 in summer at 3rd International Conference on Agriculture and Horticulture held at Hyderabad International Convention Centre, India from 27th - 29th October 2014.

V.Indira, V.SudhaVani, K.Uma jyothi, K.SasiKala, 2014. Infuence of Plant densities and nitrogen levels on curd yield, nitrogen uptake and economics of Cauliflower Cv Pusa Sharad at 6th Indian Horticulture Science congress. An International event Horticulture for inclusive growth from November 6th-9th November, 2014.

R.Bindu Praveena, V.Sudha Vani, M.Rajasekhar, P.Vinod Kumar and M.Madhavi, 2014. Influence of packaging and ventilations on the quality of ethrel treated sapota (*Manilhara achras* (Mill)) Cv stored at ambient conditions at Indian Horticulture Science congress. An International event Horticulture for inclusive growth from 6th – 9th November, 2014.

M.SaiPriya, K.Uma jyothi, V.Sudha Vani and M.Paratpara Rao, 2014. Effect of nitrogen and potassium on the growth and yield of taro (*Colocasia esculentum* var *antiquorum*) Cv KCS -3 at Indian Horticulture Science congress. An International event Horticulture for inclusive growth from 6th -9th November, 2014.

Kiran Kumar, V.Sudha Vani and K.Uma Jyothi, 2014. Influence of plant growth regulators on flower yield and vase life of china aster (*Callistephus chinensis*) cv Kamini in coastal districts of Andhra Pradesh at National Conference on Emerging challenges and opportunities in Biotic and Abiotic Stress manangement (ECOBASM 2014) held at DRR, Hyderabad from 13-14 December 2014, 142.

N.Sudheer, N.R.Chitla, Santhoshini, M.B.Nageswara Rao, V.Sudha Vani and P.Subbaramamma, 2014. Effect of packing with different gauge LDPE covers with ventilations on shelf life and quality of Acid Lime (*Citrus aurantifolia*) Cv Balaji at room temperature at National Conference on Emerging challenges and opportunities in Biotic and Abiotic Stress manangement (ECOBASM 2014) held at DRR, Hyderabad from 13-14 December 2014, 247.

R.Hema, B.V.K.Bhagavan, V.Sudha Vani and K.Uma Krishna, 2015. Effect of organic manures and biofertilizers on growth and productivity of banana cv.Grand Naine (AAA) at Second International Conference on Bio-Resource and stress Management held at PJTSAU, Hyderabad from7 to 10 Jan 2015, 61.

K.Ratna Kumari, M.B.Nageswara Rao, V.Sudha Vani and P.Subbaramamma, 2015. Rooting response of cuttings of pomegranate (*Punica granatum* L.) cv. Bhagwa as effected by rooting media and IBA under shade net conditions" at Second International Conference on Bio-Resource and stress Management held at PJTSAU, Hyderabad from7 to 10 Jan 2015, 62.

P.Usha, B.V.K.Bhagavan, V.Sudha Vani, D.R.Solomi Sunnetha, I.Priyanka, 2015. Influence of plant growth regulators and antioxidants on in vitro multiplication of banana cv. Karpurachekkarakeli at Second International Conference on Bio-Resource and stress Management held at PJTSAU, Hyderabad from7 to 10 Jan 2015, 62.

M.Supriya, V.Sudha Vani, S.K.Pattanayak, 2015. Impact of INM on vegetative and fruit characters of papaya (*Carica papaya* L.) Variety: Ranchi dwarf at Second International Conference on Bio-Resource and stress Management held at PJTSAU, Hyderabad from 7th to 10th Jan, 2015, 64.

M.Sai Priya, K.Uma Jyothi, V.Sudha Vani and M.Paratpara Rao, 2015. Effect of nitrogen and potassium on the growth and yield of taro (*Colocasia esculentum* var. *antiquorum*) Cultivar KCS-3 at Second International Conference on Bio-Resource and stress Management held at PJTSAU, Hyderabad from 7th to 10th Jan 2015, 229.

V.Sudha Vani, Bindu Praveena, M. Raja Sekhar and D. R. Salomi Suneetha, 2015. Effect of packaging and ventilation on the post harvest shelf life and quality of ethrel treated sapota (*Manilkara achras* (Mill.)) Forsberg) cv. Kalipatti at Ambient Conditions at Second International Conference on Bio-Resource and stress Management held at PJTSAU, Hyderabad from7 to 10 Jan 2015, 417.

J.Jyothi, V.Sudha Vani, K.Uma Jyothi and P. Subbaramamma, 2015. Influence of 1-methyl Cyclopropene (1-MCP) on the shelf life and quality of banana cv. Grand Naine under Ambient Conditions at Second International Conference on Bio-Resource and stress Management held at PJTSAU, Hyderabad from 7 to 10 Jan 2015, 426.

J.Ravi, V.SudhaVani, M.Hannamani & C.P.Viji, 2015. Osmotic dehydration of fruits and Vegetables-A review at XII Agricultural Science Congress Sustainable livelihood Security for small farmers held at 3rd – 6th Feb 2015 NDRI Karnal, 2.

J.Jyothi, V.SudhaVani, K.UmaJyothi and P.Subbaramamma, 2015. Studies on the effect of 1-Methylcyclopropene (1-MCP) on the shelf life and quality of banana cv.Grand Naine at XII Agricultural Science Congress Sustainable livelihood Security for small farmers held at 3-6 Feb 2015 NDRI Karnal, 5.

I.Priyanka, V.Sudha Vani, B.V.K.Bhagavan and K.Uma Krishna, 2015. Influence of denavelling and stalk end application of nutrients on shelf life and quality of banana cv. Dwarf Cavendish at XII Agricultural Science Congress Sustainable livelihood Security for small farmers held at 3-6 Feb 2015 NDRI Karnal, 8.

V.Indira, V.SudhaVani, K.U.Jyothi and K.Sasikala, 2015. Response of plant densities and nitrogen levels on growth and curd yield of cauliflower (*Brassica Oleracea* var. *Botrytis* L.) Cv. Pusasharad at XII Agricultural Science Congress Sustainable livelihood Security for small farmers held at 3-6 Feb 2015 NDRI Karnal, 9.

Ch.Bindhu, M.B.Nageswara Rao, K.Umajyothi, K.Umakrishna and V.Sudha Vani, 2015. Effect of phenotypes and levels of nitrogen on yield of kakrol (*Momordica dioica* Roxb) at XII Agricultural Science Congress Sustainable livelihood Security for small farmers held at 3-6 Feb 2015 NDRI Karnal, 10.

R.Hema, B.V.K.Bhagavan, V.Sudhavani and K.Umakrishna, 2015. Effect of organic manures and biofertilizers on yield and fruit quality of banana cv. Grand naine at XII Agricultural Science Congress Sustainable livelihood Security for small farmers held at 3-6 Feb 2015 NDRI Karnal, 10, 78.

RatnaKumari, M.B.Nageswara Rao, V.Sudha Vani and P.Subbaramamma, 2015. Rooting response of cuttings of pomegranate (*Punica granatum* L.) cv. Bhagwa as effected by rooting media and IBA under shade net conditions naine at XII Agricultural Science Congress Sustainable livelihood Security for small farmers held at 3-6 Feb 2015 NDRI Karnal, 10, 111.

J.Ravi, V.Sudha Vani and Hannamani, 2015. Impact of Climate change in Indian Horticulture-A review at Seminar on Sustainable Environment through green energy held on 27-28 February 2015 at Loyola College,Vijayawada.

Sivaji T and Sudha Vani V, 2015. Effect of Type of Cuttings on the Propagation of Fig (Ficuscarica) Cv. Poona Fig under Polyhouse Conditions at ISSP South Zonal Seminar on "Crop Physiology-Emerging Challenges and Opportunitiesfor Sustainable Agriculture" 3rd March 2015 at S.V. Agricultural College, Tirupati, 172.

J.Jyothi, V.Sudha Vani , K.Uma Jyothi, P Subbaramamma and B.V.K.Bhagavan, 2015. Effect of 1-Methylcyclopropene (1-MCP) on the shelf life and quality of banana Cv.Grand Naine" at ISSP South Zonal Seminar on "Crop Physiology-Emerging Challenges and Opportunitiesfor Sustainable Agriculture" 3rd March 2015 at S.V. Agricultural College,Tirupati , 176.

K.Ratna Kumari, M.B.Nageswara Rao, V.Sudha Vani and P.Subbaramamma, 2015. Effect of Rooting Media and IBA on Vegetative Growth of Cuttingsof Pomegranate (*Punica granatum* L.) Cv.Bhagwa under Shade Net Conditions at ISSP South Zonal Seminar on "Crop Physiology-Emerging Challenges and Opportunitiesfor Sustainable Agriculture" 3rd March 2015 at S.V. Agricultural College,Tirupati , 177.

Ravi, J., Sudha Vani, V., Hannamani, M. and Viji, C.P., 2015. Performance of different varieties of African Marigold (*Tagetes erecta* L.) at different levels of nitrogen at ISSP South Zonal Seminar on "Crop Physiology-Emerging Challenges and Opportunities for Sustainable Agriculture" 3rd March 2015 at S.V. Agricultural College,Tirupati .

I.Vijay, M.B.Nageswara Rao, V.Suchitra C.P.Viji, and V.Sudha Vani, 2015. Amla – the wonder of ayurvedic medicine at ISSP South Zonal Seminar on "Crop Physiology-Emerging Challenges and Opportunitiesfor Sustainable Agriculture" 3rd March 2015 at S.V. Agricultural College,Tirupati, 177.

P.Usha, B.V.K.Bhagavan, V.Sudha Vani, D.R.Salomi Suneetha and I.Priyanka, 2015. Tissue culture shoot multiplication of banana cv. karpurachekkarakeli (AAB) at National Conference on Reinvigorating Agricultural Innovations for Farmers Empowerent and Development May 3-4, 2015 University Auditorium, PJTSAU, Hyderabad.

I.Priyanka. I, V. Sudha Vani, B.V.K.Bhagavan, K.Uma Krishna, 2015. Influence of denavelling and stalk end application of nutrients on yield of banana cv. dwarf Cavendish at National Conference on Reinvigorating Agricultural Innovations for Farmers Empowerent and Development May 3-4, 2015 University Auditorium, PJTSAU, Hyderabad.

K.Ravi Kumar, V.Sudha Vani, K.Umajyothi and K.Sasikala, 2015. Influence of plant densities and phosphorus levels on the growth and yield of vegetable cowpea (*Vigna Unguiculata* L.) at National Conference on Reinvigorating Agricultural Innovations for Farmers Empowerent and Development May 3-4, 2015 University Auditorium, PJTSAU, Hyderabad.

V.S.Vani, C.P.Viji, and K.P.Kumar, 2015. Bael-A Wonder at Fruit 3rd InternationaL Symposium on Minor Fruits, Medicinal & Aromatic Plants. 20–21 May 2015, Bangladesh Agric. Univ., Mymensingh, Bangladesh.

T.Sivaji, V.S.Vani, B.T.Priya, C.P.Viji, and A.R.Reddy, 2015. Influence of type of cuttings and IBA concentration on the rooting of fig under open conditions at 3rd International Symposium on Minor Fruits, Medicinal & Aromatic Plants. 20–21 May 2015, Bangladesh Agric. Univ., Mymensingh, Bangladesh.

S.Shalini, M.B.N.Rao, M.R Sekhar, D.R.S.Suneetha, and V.S.Vani, 2015. Effect of Post Harvest Application of Growth Regulators on Shelf Life of Sapota (*Manilkara achras* (Mill.) Fosberg) cv. Kalipatti at 3rd International Symposium on Minor Fruits, Medicinal & Aromatic Plants. 20–21 May 2015, Bangladesh Agric. Univ., Mymensingh, Bangladesh.

News coverage on "Adopt scientific cultivation methods in growing Horticultural crops–One day training to the farmers Clubs of Chintapalle & G.K. Veedi mandals supported by NABARD at HRS- Chintapalle" in Eenadu, Daily Telugu News Paper, Vizag District Edition: Page 5 on 29th January, 2015.

News coverage on "Adopt scientific cultivation methods in growing Horticultural crops–One day training to the farmers Clubs of Chintapalle & G.K. Veedi mandals supported by NABARD at HRS- Chintapalle" in Eenadu, Daily Telugu News Paper, Vizag District Edition: Page 5 on 29th January, 2015.

News coverage on "Govt. Degree College- NSS Programme Special camp–Youth should respond to the social problems" in Eenadu, Daily Telugu News Paper, Vizag District Edition: Page 5 on 20th February, 2015.

News coverage on "Floriculture Industry in Chintapalle" in Eenadu, Daily Telugu News Paper, Vizag District Edition: Page 5 on 20th February, 2015.

News coverage on "Govt. Degree College- NSS Programme Special camp–Horticultural crops cultivation - Farmers should adopt improved production technologies" in Eenadu, Daily Telugu News Paper, Vizag District Edition: Page 5 on 22nd February, 2015.

VII. FINANCE AND BUDGET

The major financial grants to Dr.Y.S.R.Horticultural University comes from the A.P. Government under Plan by way of grants-in-aid for running the institution. The bulk grants approved in the budget for the year 2014-15 was Rs. 49,73,39,081, including salaries grant and other grants-in-aid.

The ICAR assistance was Rs.8,91,01,063 (including NAIP) and the Govt. of India assistance was Rs. 41,04,146 while the amount received from other agencies was Rs.1,05,73,872 and Departmental sponsored schemes (RKVY) Rs.8,75,00,000

Thus, the total budget of the University for the year 2014-15 was Rs. 49,73,39,081 (Rupees forty nine crores seventy three lakhs thirty nine thousands eighty one only).

VIII. AWARDS AND HONOURS

Horticultural Research Station, Kovvur

- AICRP Fruits, Kovvur centre has received **the Best Centre Award** at the 2nd Annual group meeting held at Udaipur, Rajasthan from February, 26th 2015 to 1st March, 2015.

Horticultural Research Station, Venkataramannagudem

- Dr.M.Rajasekhar, Senior Scientist (Hort.) & Head HRS, VR'Gudem has awarded as **Best Scientist Award** for the year 2014-15 in 1st Annual Convocation held at Dr.Y.S.R.Horticultural University campus on 27.03.2015.
- AICRP on tuber crops received **"The Best All India Coordinated Centre on Tuber Crops Award" for the year 2013-14"** during 14th Annual Group meeting on AICRP Tuber crops from 20th to 22nd May, 2014 at BAU, Ranchi, Jharkhand.

Horticultural Research Station, Ambajipeta

- Dr. N.B.V.Chalapathi Rao, Senior Scientist (Ento.) was awarded **outstanding achievement award in Entomology** in National Conference on emerging challenges and opportunities in biotic and abiotic stress management (ECOBASM) held at Directorate of Rice Research, Rajendranagar, Hyderabad from 13th – 14th December, 2014.
- Dr. N.B.V.Chalapathi Rao, Senior Scientist (Ento.) was awarded Rastra Ratan award in National Seminar on "Individual achievements for economic and social development" held at New Delhi on 27.02.2015

Horticultural Research Station, Lam, Guntur

- Dr.C.Sarada, Sr. Scientist (Hort.), Dr.K.Giridhar, scientist (Hort.) and Smt. T.Sujatha, Senior Assistant have received the meritorious awards from District Collector, Guntur on the eve of republic day, 2015.

Citrus Research Station, Tirupati

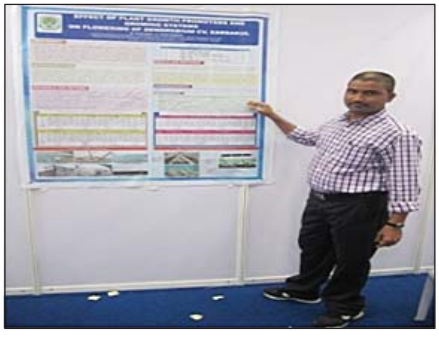
- Citrus research Station, Tirupati was awarded with first prize in the citrus biodiversity category for the fruit samples presented in the fair in 'National Citrus Diversity Fair' during Rastriya Kisan Mela on citrus organized by ICAR- National Research Centre for Citrus, Nagpur during October 30th-31st , 2014.
- Dr.L.Mukunda Lakshmi, Scientist (Hort.) and Dr.K.T.Venkataramana, Principal Scientist (Hort.) received best poster award for "Duplex PCR based assay on simultaneous detection of bud wood transmissible diseases (Citrus greening and citrus yellow mosaic) in sweet orange budlings" in National Symposium on "Plant Health on sustainability in field and horticultural crops" at S.V. Veterinary Auditorium, Tirupati.

Vegetable Research Station, Rajendranagar

- Dr. R.V.S.K. Reddy, Principal Scientist (Hort.) Received Padma Sri Dr. I.V. Subbarao Memorial Ritunestham Puraskaram for the year 2014.

Horticultural Research Station, Anantarajupeta

- Dr.M.Raja Naik, Scientist (Hort.), HRS, Anantharajupeta, received best poster award during National Symposium on "Plant health for sustainability in the field and horticultural



crops" held from 18-11-2014 to 20-11-2014 at Tirupati, on "Symbiotic association and radio isotope labeling (32p) to study the structural, functional linkage between Dendrobium cv. Earsakul and Piriformaspora indica" - A study.

Horticultural College & Research Institute, Venkataramannagudem

- Ms. M. Lakshmi Durga (2007 Batch) and Ms. K. Deepika (2008 Batch) were awarded **"Smt. Anne Shikamany Memorial Gold Medal"** for securing highest OGPA in UG Programme in the first convocation of Dr YSRHU, conducted on 27.03.15.
- Ms. M. Tripura (2014) got Pratibha award for securing highest marks in Intermediate course.
- Smt. R. Bindu Praveena (2008 Batch), Ms M. Anita (2011 Batch) and Ms. Ch. Bindu (2012 Batch) were awarded **"Sri. T. B. Dasaradhi Gold Medal for securing highest"** OGPA in their PG programme in the first convocation of Dr YSRHU, conducted on 27.03.2015.
- Best poster award for Dr.P.Subbaramamma for "Effect of Blending of Cashew apple Annacardium occidentale L.) juice with mango, pineapple and sapota juice for the quality of RTS beverage and its economic feasibility" presented in National Seminar on "Strategies for conservation, improvement and utilization of underutilized fruits" from 1st - 3rd December, 2014 at CHES, Chettalli.

Horticultural College & Research Institute, Anantharajupeta

- Dr.K.Gopal, Associate Dean, HCRI, Anantharajupeta was elected as President of Indian Society of Plant Pathologists, Ludhiana for the period 2015-17.
- Dr.Kode Swarajya lakshmi, Assoc. Professor (Hort.) of HC&RI Anantharajupeta got **"Best Teacher –Award"** for the year 2014 in the First convocation of Dr. YSRHU.
- Smt.Lalitha Kadiri, Asst. Professor (Agro.) received best poster presentation award for paper on **"Feasibility and profitability of legume intercrops in banana"** authored by Lalitha Kadiri, B.Srinivasulu, C.Madhumati, S.Sadarunissa, D.Srinivasa Reddy and K.Gopal at ISPP South Zonal Seminar on March, 2015 at Tirupati

- Smt.Lalitha Kadiri, Asst. Professor (Agro.) received best poster presentation award for paper on "Trend analysis of rainfall over three decades at Anantharajupet, Railway Kodur, Andhra Pradesh" authored by Lalitha Kadiri, D.Srinivasa Reddy, B.Srinivasulu, K.Gopal and M.L.N.Reddy at 'National Conference on Reinvigorating Agricultural Innovations for farmers Empowerment' during May 3rd to 4th at Hyderabad.
- Smt.Lalitha Kadiri, Asst. Professor (Agro.) received best oral presentation award for the paper on "Studies on pruning and foliar spray of zinc sulphate and urea in mango cv. Baneshan" authored by Lalitha Kadiri, B.Srinivasulu, S.Sadarunissa, C.Madhumati, K.Gopal and M.L.N.Reddy at 'National Conference on Reinvigorating Agricultural Innovations for farmers Empowerment' during May 3rd - 4th at Hyderabad.

IX. BUILDING AND CONSTRUCTION PROGRAMMES

Post Harvest Technology Research Station, Venkataramannagudem

- Established "TOMATO KETCHUP/SAUCE AND PCIKLE LINE" at PHTRS, V.R.Gudem under RKVY project with an out lay of Rs.52.54 Lakhs.

Horticultural Research Station, Venkataramannagudem

- Construction of a new laboratory cum office building for HRS, Venkataramannagudem was initiated with funding from RKVY and AICRP on Tuber crops.

Horticultural Research Station, Lam, Guntur

- Construction of administrative cum laboratory building was completed and yet to be inaugurated.

Dr. T. Janakiram, ADG (Hort), ICAR, New Delhi, visited the
Integrated Pack House cum Cold Storage Unit of PHTRS, VR Gudem

Vegetable & Fruit Processing line at PHTRS, VR Gudem

Integrated pack house at PHTRS, V.R. Gudem

X. OTHER SIGNIFICANT EVENTS IF ANY

Vegetable Field Day:

Vegetable Field Day was organized on 10th December, 2014 at University Campus, in a befitting manner. Sri P.Manikyala Rao, Minister for Endowments, Government of Andhra Pradesh was the Chief Guest. Sri.Ganni veeranjaneyulu, MLA, Unguturu, Sri.Vetukuri Venkata Sivarama Raju, MLA, Undi, Sri M.Papi Reddy Commissioner of Horticulture, several local leaders, farmers, industry people and departmental officials have participated in this event.

Several field demonstrations were organized by the scientists and students of Dr.YSRHU on improved management practices in vegetable cultivation. Field demonstrations on cole crops like cauliflower, cabbage, red cabbage, sprouting broccoli, brussel's sprout and knol-khol were organized. Improved varieties and hybrids of various vegetable crops developed by SAUs and ICAR institutes were grown in the demonstration plots to show the performance of these varieties. Field demonstrations on integrated pest management in chilli, okra, cabbage and cauliflower were organized with all the components of IPM like border crops, trap crops, Pheromone traps, light traps, yellow sticky boards, tricho cards etc. Demonstrations on improved technologies like polythene mulching, drip and fertigation systems, trellising in vegetable crops were organized for the benefit of farmers and departmental officers. Exhibition depicting varieties and value added products along with improved technologies was organized involving all line departments including farm mechanization

"Vegetable Field Day" was successfully organized by teaching and non-teaching staff of Dr.YSRHU under the guidance of Vice-Chancellor, Dr.B.M.C.Reddy and was appreciated by all the delegates and participants.


సమగ్ర పస్య రక్షణ క్షేత్రము

The university library building was inaugurated by Dr.S.Ayyappan, Director General, ICAR on 27.03.2015 during the visit made to the campus on the occasion of the first convocation of the university.

Dr. S. Ayyappan, Director General, ICAR and Dr. B M C Reddy, Hon'ble Vice-Chancellor Inaugurating the University Library on 27-03-2015

Horticultural Research Station, Kovvur

- Dr.BMC.Reddy, Hon'ble Vice-Chancellor and Dr.J.Dilip Babu, Director of Research, visited HRS, Kovvur on 21.8.2014 to review the progress of research work.
- Dr.James George, Project Coordinator, AICRP on tuber crops visited HRS, Kovvur on 11.11.2014 to review the technical programme of work pertaining to AICRP on tuber crops.

Dr.James George Project Coordinator, AICRP on tuber crops visit to HRS, Kovvur on 11.11.2014

- Tissue culture banana cultivation was introduced in Khammam district under Tribal sub plan activities for the year. The plant material, fertilizers and chemicals with a cost of Rs. 75,000/- per acre were provided to four tribal farmers and demonstrated the technology.


Tissue Culture Banana of Tribal sub plan in Khammam district

- Greater yam entry TGY 12-3 has performed well under initial evaluation trial and Elephant foot yam entry A14 has performed well under Multi Location trial conducted during this year.


- Among the various banana clones evaluated at Horticultural Research Station, Kovvur, the performance of NRCB-08, H531 and BCB-1 were found to be promising during the year 2014-15.

Promising clones of banana


NRCB-08


H531


BCB -1

Horticultural Research Station, Ambajipeta

- Dr.H.P.Maheswarappa, Project Coordinator visited the Horticultural Research Station, Ambajipeta on 04.02.2015, reviewed the technical work carried out by the scientists for the year 2014-2015 and participated in Farmer-Scientist interaction meeting on coconut at Munganda village of East Godavari District.

Dr.H.P.Maheswarappa, Project Co-ordinator (Palms) addressing the farmers

- Dr.B.A.Jerard, Principal Scientist (Hort.) and Dr.P.Subramaniyan, Principal Scientist (Agro.) from Central Plantation Crop Research Institute, Kasaragod, Kerala visited HRS, Ambajipeta on 30.06.2014 and conducted internal review of the progress made in the AICRP projects and their implementation at field level at AICRP Centre, Ambajipeta.
- Dr.P.Chowdappa, Director, CPCRI, Kasaragod. Dr.H.P.Maheswarappa, Project coordinator AICRP on Palms, CPCRI, Kasaragod visited Horticultural Research station, Ambajipeta and reviewed the technical work being carried out at HRS Ambajipeta for the year 2014-15 and also participated in Stakeholders meeting on coconut and cocoa farming at Mukkamala village of Ambajipeta mandal of East Godavari district on 3rd March, 2015.

Dr. P. Chowdappa, Director, CPCRI, Kasaragod interacting with Dr B.M.C. Reddy, VC, and scientists of Ambajipeta

Horticultural Research Station, Pandirimamidi

Scientists from Navsari Agricultural University, Gujarat visited the research station on 08.11.2014 and interacted with tribal farmers at Pedagaddada village about palmyrah utilization.

Post Harvest Technology Research Station, Venkataramannagudem

- Mr.Sudhakar, Manager, APEDA, Hyderabad along with Dr. Dilip Babu, Director of Research visited Integrated Pack House cum Cold Storage Unit on 24-01-2015.

- Dr.T.V.Ramana Rao, Professor, Sardar Patel University, Gujarat visited the IPHC unit on 04-02-2015 and lauded the infrastructure created for the post harvest studies of fruits and vegetables.
- Dr.B.Prasanna Kumar, Principal Scientist (Hort.) as a member along with Deputy Director, National Horticulture Board, Hyderabad and ADH, Tirupati inspected low cost ripening chambers for mango and also various eligible processing units in Chittoor District and submitted the report to the Commissioner of Horticulture, Department of Horticulture, Govt. of A.P, Hyderabad on 17-03-2015.

Dr. B. Prasanna kumar along with the officials of department of horticulture at fruit processing unit in Chittoor

- Students of St. Theresa's College for women, Eluru undergoing vocational training in processing technologies at KVK, VR Gudem were given hands on experience training at Post Harvest Technology Research Station, Venkataramannagudem.

Practical training in use of fruit washer and eazy drier utilization

Horticultural Research Station, Venkataramannagudem

- Nursery activity for propagation of mango, jack and sapota varieties was taken up with an enhanced capacity upto 1,00,000 grafts for this year
- Smt.P.Sunitha, Scientist, Entomology and Co PI of CRP on Borers project, HC & RI, VR'Gudem (Survey and expedition of integrated pest management strategies for the management of Mango fruit Borers in Andhra Pradesh) initiated the project work with survey and pest collection from different orchards in Krishna, East & West Godavari districts for mango fruit borer, and other borer pests on guava, pomegranate and sapota.

Horticultural Research Station, Lam, Guntur

- HRS, Lam has released two pamphlets on Coriander during AICRP (Spices) workshop at UBKV, Pundibai, West Bengal (24.09.2014-28.09.2015)
- Dr.N.K.Krishna Kumar, Deputy Director General (Hort.), ICAR, New Delhi along with theVice-Chancellor, Dr.YSRHU have visited HRS, Lam on 20.12.2014 and interacted with the scientists regarding the technical programmes and field condition of crops grown in the station.

AICRP (Spices) workshop at UBKV, Pundibai, West Bengal

Dr.N.K.Krishna Kumar, Deputy Director General (Hort.), ICAR, New Delhi, visited HRS,Lam

- Dr.S.K.Malhotra, Commissioner of Horticulture, Govt. Of India, New Delhi visited HRS, Lam on 10.01.2015 and discussed about various grain spices grown in this region and their performance.

Dr.S.K.Malhotra, Commissioner of Horticulture, Govt. Of India, New Delhi visit to HRS, Lam

- An interaction meeting with officials of World Spice Organization (WSO) was organized at HRS, Lam on 13.02.2015 in which Hon'ble Vice-Chancellor, Director of Research, Director of Extension, Dr.YSRHU; Dr.A.Satyanarayana, former Director of Extension, ANGRAU along with scientists of HRS, Lam has participated.

Cashew Research Station, Bapatla

- The Annual Group Meeting of Scientists of AICRP on Cashew was jointly organized by Directorate of Cashew Research (DCR), Puttur, Karnataka and Dr.YSR Horticultural University, Venkataramannagudem, West Godavari District at Cashew Research Station, Bapatla from 18th to 20th December, 2014 to review the experimental results for the year (2013-14) and to finalize the new Technical Programmes of work for the year 2014-15.

Horticultural Research Station, Anantapuramu

- Dr.S.K.Sharma, Project Coordinator and Director, Central Institute of Arid Horticulture, Bikaner visited HRS, Anantapuramu on 29-01-2015.

- All India Coordinated Research Project on fruits at Horticultural Research Station, Anantharajupeta was inaugurated by Dr.N.K.Krishna Kumar, Deputy Director General (Horti.) on 11-06-2015. In the presence of Dr.B.M.C.Reddy, Vice-Chancellor, Dr.YSRHU, Dr.M.Lakshmi Narayana Reddy, Dean of Horticulture, Dr.Prakash Patil, Project Coordinator (Fruits), ICAR-AICRP on fruits, IIHR, Bengaluru, Dr.M.R.Dinesh, Principal Scientist (Horti.) & Head, Division of fruits, IIHR, Bengaluru, Dr.K.Gopal, Associate Dean, HC&RI, Dr.K.T.Venkataramana, Zonal Research Head (Rayalaseema), CRS, Tirupati, Dr.C.Madhumathi, Senior Scientist (H) & Head and teaching staff of HRS and HC&RI, Anantharajupeta.

Inauguration of AICRP-Fruits Project by Dr. N.K. Krishna Kumar, DDG, Horticulture, ICAR

- On this occasion a Mango Diversity Fair was organized by HC&RI and HRS, Anantharajupeta and about 120 mango varieties were collected and displayed. A farmers' interaction programme was also organized with Dr.N.K.Krishna Kumar, Deputy Director General (Horti.), ICAR along with the dignitaries and scientists present during the occasion.

Mango diversity exhibition organized by HRS, Ananatharajupeta

Horticultural Research Station, Mahanandi

- Dr.Narayana Bhat, Principal Scientist, NCIPM, New Delhi visited the research station on 05.12.2014 and on 31.01.2015 and visited the IPM chilli fields in Regadaguduru village along with Dr.Ch.Ruth, Scientist (P.P.) & Head. Conducted a farmers meeting on "Farmers Field School on IPM in Chillies" and observed wilt in Non-IPM fields.

Horticultural College & Research Institute, Venkataramannagudem

- Dr.Kannan, Principal Scientist, TNAU visited as external examiner to M. Sc (Horti.) students in Floriculture and Landscape Architecture division on 7.3.15 and delivered a guest lecture on "Precision farming of vegetables and flowers".
- Dr.N.N. Reddy, Principal Scientist, CRIDA has visited as external examiner to M. Sc (Horti.) & Ph D (Horti.) students in fruit science division on 10.03.2015 and delivered a guest lecture on "climate change".
- Dr.C.K.Venugopal, Professor (Horticulture), UAS, Dharwad has visited as external examiner to M.Sc (Horti.) & Ph.D (Horti.) students in Plantation, Spices, Medicinal and Aromatic Crops division on 17.03.2015.

Horticultural College & Research Institute, Anantharajupeta

- Students Activities Cell was established with ICAR grants at HC&RI, Anantharajupeta, where student's achievements and talents are displayed.


- Centralized Lab Facility was established at HC&RI, Anantharajupeta with ICAR grant to provide the research facility to the PG students as well as to the faculty to carry out their research work.
- Reading Room in Boy Hostel Horticulture Technology Cell at HCRI, Anantharajupeta were established with ICAR grants.
- Electronic Surveillance system was established at HC&RI, Anantharajupeta for creating complete ragging free zone and protecting the college properties.



- Coaching classes were conducted for the students regarding ICAR-JRF and Bank exams at HCRI, Anantharajupeta.
- Personality Development Training programme was arranged to the students regarding personality development and communication skills at HCRI, Anantharajupet.

Obituary:

- Dr.P.Baburathan, Associate Dean i/c, HC&RI, Anantharajupeta passed his life on 06-07-2014 due to ill health. A Condolence meeting was organized at university campus on 08-07-2014 to offer tributes to the scientists. Dr.P.Baburathan was born in the year 1967 and joined as scientist in the university in the year 1993. He achieved higher positions due to his hard work and commitment. He was kept as Associate Dean i/c of HC&RI, Anantharajupeta from 2010 and played a key role in creating new infrastructure facilities during his tenure and facilitated the peer review team visit from ICAR as a part of giving accreditation to the university.
- Sri.U.Subbarayudu, Office subordinate, expired on 23-11-2014 due to ill health. A condolence meeting was conducted at HC&RI, Anantharajupeta on 24-11-2014.

Infrastructure Facility at University Library and other Colleges:

About Rs.100 lakhs as ICAR grants were received towards strengthening of library and was utilized to create good infrastructure for the libraries in the university. Necessary furniture and facilities were created to provide congenial atmosphere for students and procured 4882 volumes of books for strengthening the libraries.

Inauguration of Library by Smt. Usha Rani, Ex-officio secretary & Commissioner of Horticultrue on 27.3.2015

Gilmpses of library facilities development in the university

Furniture and Equipment provided at the University Library and other college Libraries