



# CITRUS NEWSLETTER



## ICAR - CENTRAL CITRUS RESEARCH INSTITUTE, NAGPUR

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January to March, 2017

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### From the Director's Desk.....



### Dear Readers,

**New phase of Citrus Research in NEH Region :** ICAR-Central Citrus Research Institute (CCRI) has started its first Regional Research Centre for Citrus (RRCC) at Biswanath Chariali in Assam and it is a beginning of new phase of Citrus Research under CCRI in NEH region. The Centre has already been operationalized with permanent staff. The RRCC has good road, rail and air travel connectivity from Guwahati and Kolkata. There is a lot of thrust on NEH region for the development from the Govt. of India and ICAR. With the operationalizing of this Centre of ICAR-CCRI at Biswanath



Signing of lease deed for land of RRCC Biswanath Chariali

in NEH region maximum activities of development shall be undertaken through this Centre and the staff posted at the Centre and also at the CCRI main campus at Nagpur shall do its best for the development of the NEH region through NEH funds. The Assam Agriculture University, Jorhat has leased out 42.5 acres of land at Biswanath College of Agriculture, Biswanath for the Centre which is functional from March, 2017. The Lease-Deed was signed between Dr. M. S. Ladaniya, Director, CCRI Nagpur and Shri. A.K. Saikia, Registrar, AAU at Jorhat in the presence of Hon'ble Vice-Chancellor Dr. K. M. Bujarbaruah. Memorandum of Understanding (MoU) was also signed between Dr. Ladaniya and Dr. Tapan Baruah, former Associate Dean, College of Agriculture, Biswanath. The Centre was approved by Indian Council of Agricultural Research, New Delhi in XII Plan. This Regional Centre will be providing all required technical guidance and assistance to citrus growers of particularly Assam and its seven sisters. This Centre will propel the citrus production particularly of Khasi mandarin further in the

region with scientific eco-friendly technologies, transfer of technology programmes and disease-free planting material production.

The address and other details for contact at RRCC are ICAR-Regional Research Centre for Citrus, Campus of Biswanath College of Agriculture, Biswanath Chariali -784176, Assam. Office Phone : 03715-230014, 230015; E-mail : rrc.biswanath@gmail.com

**CITRUS SECTOR**

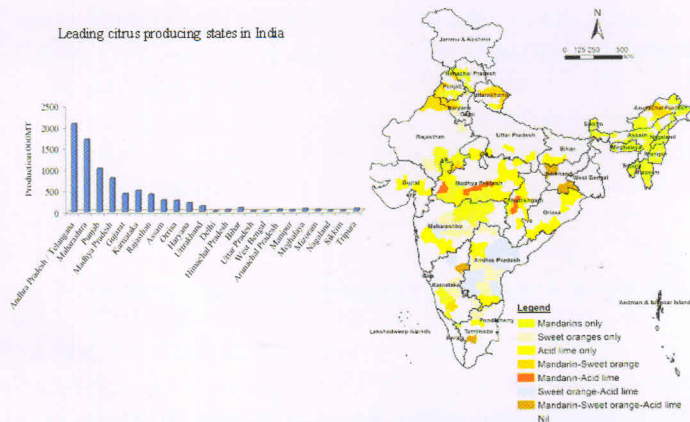
Mechanized handling of citrus fruits has become a commercial practice in India with many units operational in Punjab, Haryana and Rajasthan for Kinnow mandarin and in Maharashtra for Nagpur mandarin. In these units, citrus fruits are regularly being washed, wax coated, graded and packed on commercial scale. These practices have significantly brought down post-harvest losses. More than 100 small and big units operate in Kinnow belt of north-west India. In small units, fruits are brushed (dry brushing) to remove dust and graded before packing. In medium and big units fruits are washed with water and coated with fungicidal shellac-based coatings to improve shine and to reduce water loss and decay. In Maharashtra, “Mahaorange” an organization under Maharashtra State Agriculture Marketing Board (MSAMB) has taken initiative and exported containers to Shri Lanka after wax coating and precooling in 2014-15. “Mahaorange” has also taken on lease one packinghouse at Karanja Ghadge and started providing pack-house to traders from Delhi.

**FROM THE INSTITUTE**

**Research Highlights**

**Micronutrient Management in Horticultural Crops for Enhancing Yield and Quality**

i. Delineation of cultivar specific crop boundary and subsequent super-imposition over nutrient specific spatial variograms and identified multiple nutrient constraints on country wide basis to enable identify in spatial distribution of nutrient constraints and



Boundary map of citrus producing states of India

accordingly to be used as an aid for fertilizer recommendation.

ii. A repository of morphological descriptors in the form of different expressions of micronutrient deficiencies (chlorotic patterns) was developed through survey of Nagpur mandarin orchards in Nagpur and Amravati districts and added in existing digital photo-library of nutrient deficiency and toxicity symptoms.

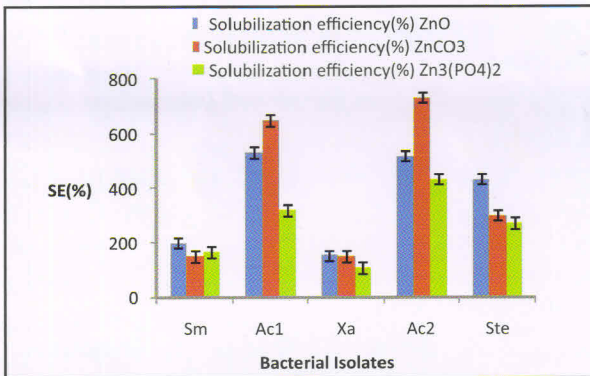


iii. Treatment involving foliar spray of 0.50% FeSO<sub>4</sub> + 0.50% MnSO<sub>4</sub> + 0.50% ZnSO<sub>4</sub>+0.25% borax + ammonium molybdate + 10ppm 2, 4-D + 1% urea at anthesis, pea size, marble size and initiation of fruit enlargement, produced much superior response on different growth parameters, fruit yield, fruit quality parameters, plant assimilable nutrients in soil, leaf nutrient composition, in addition to rhizosphere microbial diversity.

iv. On the basis of morphological and biochemical characteristics total 12 potent bacterial isolates were isolated and tentatively identified. *Acinetobacter sp.* (2) showed maximum solubilisation efficiency on zinc substrate and *Xanthomonas sp.* Showed maximum solubilisation efficiency on Pikovaskay's agar. Phosphate solubilising microorganisms were also capable of solubilising zinc substrate regardless of there chemical nature. But, these microbes failed to solubilise Fe-substrates.

Zinc solubilisation efficiency suggested zinc oxide was most preferred zinc substrate for *Acinetobacter sp.* (1), and zinc carbonate as well as zinc phosphate for *Acinetobacter sp.* (2) over other microbial cultures. *Xanthomonas sp.* showed maximum phosphate solubilization. *Acinetobacter sp.*(1) was found for maximum zinc solubilization on the media containing

were equally good in zinc oxide and *Acenetobacter* sp.(2) was for maximum efficiency of zinc solubilization on the media containing zinc carbonate and zinc phosphate. Further identification of isolates are in progress.

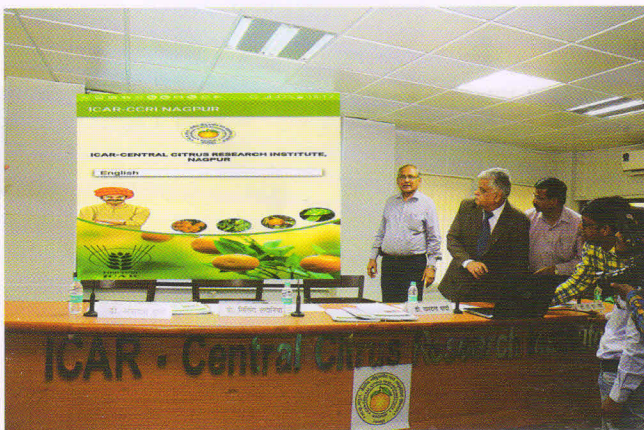


**Solubilization Efficiency of different Bacterial Isolates**

### Institute Activities / Events Organized

#### A Mobile app on Citrus launched

Institute launched a mobile app “CCRI-Citrus” on 10<sup>th</sup> February, 2017 at the hands of Dr. C.D. Mayee, Ex. Chairman, Agricultural Scientist Recruitment Board, New Delhi for enabling the growers for the effective and accurate citrus cultivations practices, monthly operations, etc. This provides online and offline information to the farmers. The mobile app in English, Hindi and Marathi can be downloaded from the CCRI website ([www.ccringp.org.in](http://www.ccringp.org.in)) on any android based cell phone 4.0 and above versions.



**Dr. C.D. Mayee, Ex. Chairman, ASRB, New Delhi launching the Mobile App**

### Training Programmes

#### On-Campus

- Seven-day training on 'Advances in Production System of Citrus' was organized for 20 farmers of Himachal Pradesh

during 3-9 Feb, 2017. The training was sponsored by Deputy Director (Horticulture), Distt. Mandi, (Himachal Pradesh).

- Four-day training on 'Commercial Citrus Production' was organized for citrus growers of Gujarat during 7-10 March 2017. The programme was sponsored by Dy. Director (Horticulture), Distt. Mehsana, Gujarat in which 21 citrus growers and 2 officers participated.



**Dr. SVC Kameshwara Rao, General Manager, RRSC (ISRO), Nagpur, Chief Guest distributing the certificates to trainees**

#### Trainings under Tribal Sub-Plan

- Four-day training on 'Production & Nursery management in citrus' was organised for citrus growers, field functionaries and horticulture officers from West Garo Hills (Meghalaya) during 10-13 January, 2017 under Tribal Sub Plan. Ten citrus growers participated in the programme.



**Dr. M. S. Ladaniya, Director addressing the trainees**

#### Meetings organised

**IMC meeting :** The XXXIII meeting of IMC of ICAR-CCRI, Nagpur was held on 30<sup>th</sup> March, 2017 under the Chairmanship of Dr. M. S. Ladaniya, Director, CCRI,

Nagpur. The members present were Dr. B.N. Srinivas Murthy, Pr. Sci. (Hort) & I/c. Head, Div. of Fruit Crops, IIHR, Bengaluru, Member; Dr. P.S. Tiwari, Head, Agricultural Mechanization Div. CIAE, Bhopal, Member; Dr. Jagdish Prasad, Pr. Sci. & Head, Soil Resource Studies, NBSS&LUP, Nagpur, Member; Dr. D.K. Ghosh, Pr. Sci., (Virology), CCRI, Nagpur, Member; Sh. Y.V. Sorte, AF&AO, CCRI, Nagpur, Invitee; Sh. Yogesh Kadian, AO, CCRI, Nagpur, Member Secretary. Dr. B. N. Srinivas Murthy, Pr. Sci. (Hort) & I/c. Head, Div. of Fruit Crops, IIHR, Bengaluru, visited the primary and secondary nurseries, experimental blocks and plantation on raised-bed with fertigation for reduced *Phytophthora* incidence and higher yield and blocks where mechanised pruning and automatic spraying with imported machinery were demonstrated. The Chairman also showed him high density planting system and other facilities. The talk on 'Citrus breeding initiatives at CCRI, Nagpur' was delivered by Dr. A. A. Murkute, Sr. Scientist (Hort.).

**IJSC meeting :** The IJSC meeting was held on 27<sup>th</sup> March, 2017 under the Chairmanship of Dr. M.S. Ladaniya, Director and various issues concerning staff were sorted out

**Rajbhasha Meeting :** The Rajbhasha meeting was held on 16<sup>th</sup> January, 2017 under the Chairmanship of Dr. M.S. Ladaniya, Director

### Skill development and Capacity Building of CCRI Staff :

- Dr. C. N. Rao, Pr. Scientist (Ento.) : Competency Enhancement programme for Effective Implementation of Training Function by HRD Nodal officers of ICAR at ICAR-NAARM, Hyderabad, 16-18 February, 2017.
- Dr. C. N. Rao, Principal Scientist (Ento.) : Regional workshop on 'Skill Development in Agriculture' at MANAGE, NAARM, Hyderabad, 20 February, 2017.
- Sh. Manoj Sayam, Tech. Asstt. (Jeep Driver) : Automobile maintenance, road safety and behavioural skills at ICAR-CIAE, Bhopal, 20-24 February, 2017.
- Sh. Yashwant Sorte, AF&AO : Module of Public Finance Management System (PFMS) organised by Institute

of Government Accounts & Finance (INGAF), New Delhi at VANAMATI, Nagpur 8-9<sup>th</sup> March, 2017.

- Skilled Supporting Staff, Sh. Pramod Patil, Sh. Sunil Kharche, Sh. Namdeo Thakre and Sh. Anil Shaneshwar: Nursery, cultivation, rejuvenation and Post-harvest handling of citrus fruits organised by TMC, Vidarbha during 7-10 February, 2017.

### Publications :

#### Research Papers (In peer Reviewed Journals)

##### International

- George, A, Rao C N, Ghike Sonali and Dhengre V. (2017). Relative susceptibility of citrus leaf miner (*Phyllocnistis citrella* Stainton) to commonly used insecticides in Maharashtra, India. *J. Econ. Entomol.* (Accepted: DOI 10.1093/jee/tow311).
- Ghosh, D K, Bhose, S, Sharma, P, Warghane, A J, Motghare, Ladaniya, M S, Krishna Reddy, M, Thorat, V, and Yadav, A (2017). First report of a 16SrXIV group Phytoplasma associated with Witches' Broom Disease of Acid Lime (*Citrus aurantifolia*) in India. *Plant Disease*, 101(5) : 835.
- Marathe, R A, Sharma Jyotsana, Murkute, A A and Dhinesh Babu, K (2017). Response of nutrient supplementation through organics on growth, yield and quality of pomegranate. *Sci. Hort.* 214: 114-121.
- Nerkar, S G and Das, A K (2017). Extracellular Cystatin-like Protease Inhibitor (EPIC1) Gene Based PCR Primers for Specific Detection of Phytophthoranicotianae Infecting Citrus. *Plant Pathol. J.* 16(1) : 54-61.

##### National

- Anavrat V, and Mokde, M (2017). Perception of Sathgudi orange growers on contract farming. *Agri. Update*, 12 (2) : 244-248
- George A, Rao C N, Chavan V.T., Wazire N.S. and Dhengre V.N. (2017). Incidence of bark eating caterpillar, *Indarbela* sp. infesting major citrus cultivars in Maharashtra and Rajasthan, India. *Ecol. Envir. Conserv.* 23 (February Suppl.): pp. 321-325.
- Bhagat, K.P., Bal S K, Singh Yogeshwar, Potekar S, Sunayan Saha, Ratnakumar P, Wakchaure G C and Minhas P S (2017). Effect of reduced PAR on growth and photosynthetic efficiency of soybean genotypes. *J. Agrometeorol.*, Vol 19 (1): 1-9.
- Marathe, R.A., Dhinesh Babu, K. and Chaudhari, D.T. (2017). Response of pomegranate (*Punicagranatum*) to drip irrigation systems in light textured soils of semi-arid region. *Indian J. agric. Sci.* 87(1):56-61.
- Panigrahi, P and A. K. Srivastava (2017). Water and nutrient management effects on water use and yield of drip irrigated citrus in Vertisol under a sub-humid region.



The IMC meeting in progress

Dr. B.N. S. Murthy, member, visiting high density plantation

*Journal of Integrative Agriculture* 160: 60345-60352

- Panigrahi, P. Srivastava, A. K., Panda D.K. and A.D. Huchche (2017) Rainwater, soil and nutrients conservation for improving productivity of citrus orchards in a drought prone region. *Agric. Wat. Mgmt.* 185 : 65-77.

#### **Paper Presented (Oral) in Seminar/ Symposia/ Conference etc.**

- Ghosh D K. (2017). Biotechnological tools for detection, characterization and management of systemic diseases of citrus. Lead lecture presented at National Convention on Agriculture held at Dr B S Konkon Krishi Vidyapeeth, Dapoli during 16-18 March, 2017.
- Singh H.P. and Srivastava A.K. (2017). Use of water soluble fertilizers on fruit crops in India, Symposium on NPK and Water Soluble Fertilizers India 2017 at New Delhi organised by Fertilizer Association of India (FAI) held during 9-10 February, 2017. (Key Note Lecture)

#### **Papers/Abstracts in Proceedings/ Souvenir of Seminar/ Symposia/ conferences etc.**

- Rao C.N., George Anjitha, Ghike Sonali and Dhengre V.N. (2017). Evaluation of certain modules against *Phyllocoputrutra oleivora* (Ashmead) and *Brevipalpus rugulosus* Chaudhari Akbar and Rasool in Nagpur mandarin. In: *Souvenir cum Abstracts of National Seminar on Enhancing Productivity of Fruit Crops- Mitigating major challenges* held on 8<sup>th</sup> January, 2017 at ICAR-IIHR, Bengaluru. pp. 224.
- Srivastava A.K. (2017). Soil fertility management in perennial fruits: paradigm shift towards better soil healthcare. In Souvenir of 20<sup>th</sup> Annual Convention of CMSI and the National Conference on Harnessing Clay Science for Human Welfare, organised by The Clay Minerals Society of India, New Delhi and ICAR-NBSS&LUP, Nagpur. pp.21-28

#### **Books / Book chapters :**

- Kumar D., Ladaniya M.S. and Ram L. (2017). Nanotechnology Interventions in post-harvest management of Horticultural crops. In : K. L. Chadha, S. K. Singh, P. Kalia, W. S. Dhillon, T. K. Behra, Jai Prakash (Eds.). *Doubling Farmers Income through Horticulture* (pp. 633-639). Daya publishing House- A Division of Astral International Pvt. Ltd., New Delhi-110012.
- Ladaniya, M.S. (2017). Canopy management, high density planting and advanced production systems in citrus. In : K. L. Chadha, S. K. Singh, P. Kalia, W. S. Dhillon, T. K. Behra, Jai Prakash (Eds.). *Doubling Farmers Income through Horticulture* (Pp 205-214.). Daya publishing House - A Division of Astral

International Pvt. Ltd., New Delhi-110012.

- Malik, S.K., I. P. Singh, Susheel Kumar and Rekha Chaudhury (2017). Revisiting Citrus Genetic Resources of Notheast India. In. *Doubling Farmers Income Through Horticulture* (Edited by KL chadha, SK Singh, P. Kalia, WS Dhillon, TK Behera and Jai Prakash). Published by Daya Publishing House, New Delhi, pp. 947-950

#### **Popular Articles**

- Murkute, A.A., Ladaniya, M.S. and Marathe, R.A. (2017). Sudharit Tantratun Limbuwargiya Phal Utpadan Wadh Shakya (In Marathi). *Sakal Agrowon*, 16, March, 2017.

#### **Participation of Scientist in conferences / workshop / symposia/meeting etc.**

- Dr. I. P. Singh, Pr. Scientist (Hort.) and Dr. P. S. Shirgure, Pr. Scientists (SWCE) : National Seminar on enhancing fruit productivity : Mitigating challenges, 8<sup>th</sup> January, 2017 at ICAR-IIHR, Bengaluru.
- Dr. A. K. Srivastava, Pr. Scientist (Soil Science) : Technical Advisory Committee meeting of Central Institute of Horticulture as Member, 14<sup>th</sup> January, 2017 at Medziphema, Nagaland.
- Dr. M. S. Ladaniya, Director : Director's Conference meeting, 14-15 February, 2017 at NASC complex, New Delhi.
- Dr. I. P. Singh, Pr. Scientist (Hort.) : 11<sup>th</sup> Review meeting of DUS centres organized by PPV&FRA, New Delhi, 27-28<sup>th</sup> February, 2017 at IGKV, Raipur.
- Dr. M. S. Ladaniya, Director : Review meeting of MIDH, 17<sup>th</sup> March, 2017 at New Delhi.
- Dr. I. P. Singh, Pr. Scientist (Hort.) : Management of Plant Genetic Resources of Fruit Crops organized for the AICRP on fruits partners from ICAR Institute and University, 22-25<sup>th</sup> March 2017 at NBPGR, New Delhi.

#### **AICRP (Fruits) : Citrus research**

- Dr. M.S. Ladaniya, Director, Dr. A.K. Srivastava, Pr. Sci. (Soil Sci.), Dr. I.P. Singh, Pr. Sci.(Hort.), Dr.P.S. Shirgure, Pr. Sci.(SWCE), Dr. C.N. Rao, Pr. Sci. (Ento.) participated in 4<sup>th</sup> Group Discussion of the ICAR-AICRP on Fruits held at IIHR, Bengaluru during 4-7<sup>th</sup> January, 2017.

#### **Lectures delivered in training at other Institute/ Organisation**

- Das, A. K. (2017). "Disease Management in Citrus" in the training programme on 'Advances in citrus cultivation and polyhouse technology' organized by NABARD & CIRCOT, Nagpur on 15-16 February, 2017 at GTC, CIRCOT, Nagpur.
- Marathe R. A., (2017). Soil nutrition and water management in orange cultivation. In training programme on Advances in citrus production and polyhouse technology. NABARD sponsored programme organized

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by Ambedkar Agricos Association, Nagpur on 16<sup>th</sup> February, 2017.

- Das, A. K. (2017). "Integrated Disease Management in Citrus" in "Training under HORTSAP program" on 15-16 March, 2017 at VANAMATI, Nagpur.

### Other Activities

#### Exhibition

The institute jointly with TMC participated in Agricultural/ Krishi exhibitions and disseminated technologies to thousands of farmers through sale of publications and display of exhibits in the following events :



**Hon'ble Banwarilal Purohit, Governor of Assam at CCRI & TMC stall in International Agri-Horti. Show, Guwahati, Assam**

- 4<sup>th</sup> Agri-Horti show-2017 at Guwahati, Assam during 6-9 January, 2017.
- Science Expo at Raman Science Centre, Nagpur during 18-22 January, 2017.'
- Kutuhall' exhibition organized by Vigyan Bharti at Dharampeth Science College, Nagpur during 4-5 February, 2017.



**Kisan Unnati Mela-2017 at ICAR-IARI, Pusa Campus, New Delhi**

- Kisan Unnati Mela-2017 at ICAR-IARI, Pusa Campus, New Delhi during 15-17 March, 2017.

#### Visit to CCRI

During the quarter, the number of farmers, students and trainees visited CCRI, Nagpur as follows:

#### Farmer's

The details of farmers' visits to the CCRI during the quarter are as follows :

States	No. of Famers
Gujarat	83
Karnataka	108
Madhya Pradesh	70
Maharashtra	3
Odisha	25
Tamil Nadu	5
<b>Total</b>	<b>294</b>

#### Students

- Sixty students with three staff from college of horticulture and forestry Dr. Yashwant Singh Parmar University of Horticulture & Forestry, Neri, Himachal Pradesh (5<sup>th</sup> January, 2017).
- Orientation / Exposure visit to Plantation managers and plantation agencies of National Green Highways Mission of NHAI, Govt. of India (22<sup>nd</sup> February, 2017).

#### Trainees

- Thirteen trainees undergoing training on Market Extension Service course at Directorate of Marketing and Inspection, GoI, Nagpur (12<sup>th</sup> January, 2017).
- Twenty farmers undergoing training at Ambedkar Agricos Association (15<sup>th</sup> February, 2017).
- Twenty-five trainees undergoing refresher training on Integrated pest management at Centreal Integrated Pest Management Centre, GoI, Nagpur (1<sup>st</sup> March, 2017.)



**Visit of Officers undergoing training at CIPMC, Nagpur**

## Distribution of disease-free planting material under CCRI

- A total of 4,871 disease free planting material of citrus rootstocks, fruits and seed distributed and revenue of Rs.1,07,555/- generated.

## Awards, Honours and Recognition

- Institute has received FSSAI registration No. 2151725-9000455 for sale of beverages for a period of 5 years (17.3.2017 to 16.3.2022).
- Dr. M.S. Ladaniya, Director received additional charge of Director, ICAR - Central Institute of Cotton Research, Nagpur w.e.f 16th March, 2017 vide council order no. 14(2)/2008-Per.III dated 15<sup>th</sup> March, 2017.
- Dr. R. A. Marathe, Pr. Scientist (SSSP) has been elected as Councillor (Central Zone) for the two years 2017 and 2018, Executive council of Indian Society of Soil Survey and Land Use Planning, Nagpur.

## Distinguished Visitors

### International

- Mr. Taesun Min, Professor and Mr. Kwan Jeong SONG, Professor from Jeju National University, South Korea visited the Institute especially Plant Virology laboratory of Dr. D. K. Ghosh on 10<sup>th</sup> February, 2017.



Visitors from South Korea at the Institute

### National

- Dr. H. P. Maheswarappa, PC (Palms) and Dr. Prakash Patil, PC (Fruits) visited on 20<sup>th</sup> January, 2017.
- Dr. K. S. Shivashankar, Dr. B. K. Pandey, Dr. S. D. Mohapatra, Dr. Kirti Sharma, Dr. G.L. Kaul and Dr. Ajay Arora visited on 17<sup>th</sup> February, 2017.
- Dr. V. N. Sharda, Member ASRB, New Delhi visited on 18<sup>th</sup> February, 2017.

## Technology Mission on Citrus (TMC) for Vidarbha, Marathwada and Chhindwara

During the quarter following activities were undertaken :

### Skill development

#### Vidarbha (Maharashtra)

- Four-day training on 'Integrated production and Post-harvest technology of citrus' was organized during 7-10 February, 2017 at ICAR-CCRI, Nagpur in collaboration with TMC for Vidarbha. Twenty-eight trainees from five districts of Vidarbha participated.
- The ICAR-CCRI, Nagpur is affiliated with Agriculture Skill Council of India (ASCI). The NSDC Reg. No. 15733 was received on 24<sup>th</sup> January, 2017. Under TMC, Vidarbha 200 hrs. Skill Development training was organized on 'Citrus Production and Post-harvest Management' (ASCI Qualification Pack : Citrus Fruit Grower) during 1-30 March, 2017. A total of 13 trainees from different districts of Vidarbha were trained.



Participants having hands on practice on the various activities

#### Marathwada (Maharashtra)

- Two training programmes were organized during 7-10 March and 21-24 March, 2017 in which 47 and 51 citrus growers participated, respectively.

#### Chhindwara (Madhya Pradesh)

- One-day training programme was organized at Pandhurna and Sausar block of the district on 6<sup>th</sup> January, 2017. Farmers were given the practical training particularly on preparation of Bordeaux paste, irrigation basins, application of fertilizer, identification of pest and diseases and spraying techniques. Solutions to the problems of farmers were given by the experts. A total of 105 citrus growers participated.
- Four-day training programmes were organized to acquaint the extension officers of Horticulture Department of Madhya Pradesh with the recent advances of citrus cultivation and skill development. Number of officers trained were as follows :

