



# CITRUS NEWSLETTER



## ICAR - CENTRAL CITRUS RESEARCH INSTITUTE, NAGPUR

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### CONTENTS

- From the Director's Desk..... 1
- Citrus Sector..... 1
- From the Institute ..... 2
- Feedback ..... 4

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



### Dear Readers,

Citrus crops are grown across the country and lot of planting material is being provided by state agricultural departments to citrus growers under various schemes. This material is produced by private nurseries in most cases and these suppliers do not follow standard norms with respect to quality and freedom from diseases. Planting material is also being sent from Vidarbha to north-eastern states. Many private nurseries in NEH region do not follow standard norms and material is infected. Systemic diseases like viral and greening diseases are carried through planting material and this is one reason of early decline in young plantations. This is the case in many citrus growing states. It appears that officials of state agriculture/ horticulture departments have not taken this issue seriously and it is a time to sound an ALERT in this regard. The

infection could be of *Phytophthora*, a soil born pathogen also. If spread of Greening and viral diseases and *Phytophthora* is not prevented then situation may go out of hand and can cause decline of citrus trees on large acreage. The decline of citrus in most states including NEH region is due to neglect of plantations, scarcity of water, insect-pests and planting of infected material. Lack of resources and awareness about plant protection technologies are also important reasons.

It is pertinent to mention that ICAR-CCRI, Nagpur provides training to Agriculture University staff in disease diagnostics and advanced nursery management.

In this quarter, as a part of technology transfer, ICAR-CCRI has signed MoU with M/S. H. U. Gugle Agro Biotech Co., Jamkhed- 413201, Dist. Ahmednagar (M.S.) to handover technology of shoot-tip-grafting (STG) and nursery production of disease-free planting material.

### CITRUS SECTOR

Citrus crops particularly Nagpur mandarin (*Citrus reticulata* Blanco) recorded expansion in areas of Madhya Pradesh and Rajasthan on large scale and governments of respective states have given lot of importance to this crop. Recently a Centre of Excellence (CoE) has been established at Kota in Rajasthan. Another CoE for citrus is being planned at Jhalawar in the state. Similarly CoE has been established at Khanaura, Hoshiarpur, Punjab, under Indo-Israel work plan for technology standardization and demonstration. New varieties of mandarin (Michal, Murcott, W. Murcott, Daisy, Pearl-Tangelo, Fremont and Fairchild), grapefruit (Sweetie) and sweet orange (Shamouti, Early Gold, Itabori, Westin, Ruby Nucellar, Trovita, Valencia Olinda, Washington Navel, Newhall Navel, Lane Late Navel) have been planted. Among rootstocks, Volkamer lemon, X-639 and Carrizo are being evaluated. A CoE for citrus has also been established at Mangiana, Sirsa in Haryana and exotic varieties as mentioned above are being evaluated. Similarly, at Nagpur, under Dr. PDKV, Akola, a CoE has been established during 2011-14 under Indo-Israel work plan. A nursery for production of disease-free planting material and plantation on 1 metre high ridges are being evaluated. In Mizoram, a

tigh-tech nursery has been established for production of disease-free planting material at Aizwal under Indo-Israel work plan.

### FROM THE INSTITUTE

#### Research Highlight

#### Development of RTS (ready to serve) from Acid lime fruits: RTS drink was prepared from acid lime using 6% juice.

Fruits were washed thoroughly and juice was extracted using hydraulic press. Extracted juice was filtered and pasteurized (90°C, 30 sec), with sudden cooling to room temperature. The amount of juice and water calculated and added with cooled syrup. TSS of RTS was maintained to 14°Brix. As a class II preservative 100 ppm of Potassium metabisulphite (E224) was added to it and mixed thoroughly, then the RTS was filled and sealed in 250 ml PET bottles, labelled and storage study was conducted. The product acidity was 0.35% with vitamin 'C' content (5 mg/100ml) and Non Enzymatic Browning (NEB) 0.136. SO<sub>2</sub> content was 48 ppm. The product was as per the standards of FSSAI, Govt. of India, New Delhi. Shelf life study indicated that product was free from yeast, mould and bacteria up to six months. Hunter lab parameters for colour were also recorded as L, a, b and a/b ratio and product was appealing and appearance was very much acceptable.



*RTS from acid lime*

#### Development of lime juice based carbonated drink: Acid lime juice was extracted with the help of hydraulic press,

pasteurised at 90°C for 30 seconds, centrifuged and mixed with syrup. Potassium Metabisulphite was added as class II preservative. Purified water was chilled at 4°C. CO<sub>2</sub> gas was released up to 2.5 kg/cm<sup>2</sup> on the carbonation tank gauge. The chilled water was transferred to CO<sub>2</sub> mixing tank. The carbonated water was released to filler head tank and finally to the partially filled (with calculated amount of syrup mixture) PET bottles with enhanced pressure up to 3.5 kg/cm<sup>2</sup>. The sniffing time was standardised. After filling the bottle was sniffed with CO<sub>2</sub> and immediately capped. The juice content was kept 6%. The cost: benefit ratio was also calculated.



*Carbonated drink from acid lime fruits*

The physico-chemical parameters were recorded as acidity (0.35%), vitamin 'C' content (5 mg/100ml) and non-enzymatic browning (NEB) 0.141. SO<sub>2</sub> content was 48 ppm. The product was as per the standards of FSSAI, Govt. of India, New Delhi. Shelf life study indicated that product was free from yeast, mould and bacteria up to six months at 6°C. Hunter lab parameters were also recorded as L, a, b and a/b ratio and product appearance was very much acceptable.

#### Development of mandarin juice based carbonated drink :

The juice of Nagpur mandarin was extracted with the help of Screw type juice extractor and pasteurised at 90°C for 30 seconds, centrifuged and mixed with syrup. Potassium Metabisulphite was added as class II preservative. Additional colour and essence were added. Purified water was chilled at 4°C. CO<sub>2</sub> gas was released up to 2.5 kg/cm<sup>2</sup> on the carbonation tank gauge. The chilled water was transferred to CO<sub>2</sub> mixing tank. The carbonated water was released to filler head tank and finally to the partially filled (with calculated amount of syrup mixture) PET bottles (pressure up to 3.5 kg/cm<sup>2</sup>). The sniffing time was standardised. After filling the bottle was sniffed with CO<sub>2</sub> and immediately capped. The juice content in the product was 15% and the total TSS of the product was maintained at 20°Brix. The cost : benefit ratio was also calculated.



*Carbonated drink from Nagpur mandarin fruits*

The physico-chemical parameters were recorded as acidity (0.3%) with vitamin 'C' content (5 mg/100ml) and Non Enzymatic Browning (NEB) was (0.978). SO<sub>2</sub> content was 48 ppm. The product was as per the standards of FSSAI, Govt. of India, New Delhi. The shelf life study indicated that product was free from yeast, mould and bacteria up to six months at 6°C temperature. Hunter lab parameters were also recorded as L, a, b and a/b ratio and product was appealing with very much acceptable appearance.

#### Institute Activities/Events Organised

- The institute observed Anti-terrorism day on 21<sup>st</sup> May, 2015.

#### Technology commercialized

- Technologies on "Shoot Tip grafting" and other tissue culture techniques for plant multiplication of citrus was commercialized and the MoU agreement has been signed with M/s. H.U. Gule, Agro Biotech Company, Jamkhed, Distt. Ahmednagar, Maharashtra on 6<sup>th</sup> April, 2015.
- Consultancy on storage of acid lime/ lemons fruits was given to Mr. Suresh N. Mungalpara, Gujrat.



*MoU agreement to transfer STG technology*

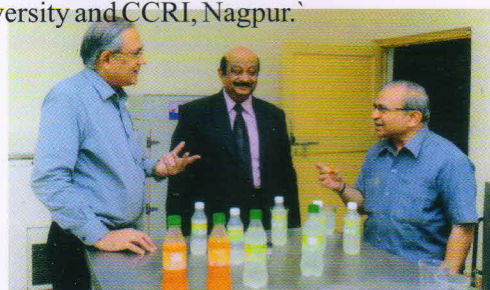
### Distinguished Visitors

- Dr. Ju-Hee Rhee, Scientist, Regional office, Kuala Lumpur, Biodiversity International, visited the institute on 5<sup>th</sup> May, 2015.
- Dr. A. K. Singh, Managing Director, National Horticulture Board (NHB), Gurgaon visited the CCRI and TMC Nurseries on 3<sup>rd</sup> May, 2015.



*Dr. A.K. Singh and other dignitaries visiting the nursery*

- Dr. Mohan Khedkar, Vice-Chancellor, Amravati University visited CCRI, Nagpur on 8<sup>th</sup> June, 2015 for initial discussion for collaboration between Amravati University and CCRI, Nagpur.



*Dr. M. S. Ladaniya explaining the processed products to visiting dignitaries of Amravati University*

### Other Extension Activities

#### Exhibition :

- The Institute participated in the Krushi Vikas Agriculture Expo-2015 held at Amravati during 10-13 April, 2015 which was organized by Krushi Vikas Pratishthan. The scientists delivered lectures on Citrus Cultivation and Cold Chain Management.

#### Survey

- In response to the request received from Shri Laisam Simai, MLA, 51-Nampong (ST) Dr. Mohesh Chai,



*Dr. A. K. Das with Dr. Mohesh Chai, MLA, Tezu, Arunachal Pradesh*



*A Khasi mandarin tree branches affected with lichens and mosses at Kanjang vill. Wakro*

MLA, 44-Tezu (ST) and Shri Kaling Moyong, MLA 38-Pasighat East (ST), Dr. A.K. Das, Pr. Scientist (Plant Pathology) undertook a survey of Khasi mandarin growing areas of Arunachal Pradesh during 19-27 May, 2015. The primary reasons for early decline of Khasi mandarin trees were lack of awareness among growers/farmers about disease and insect pest management, non-availability of disease-free planting material and lack of proper nutrition and water management.

- On request of State Agriculture Department, Dr. M.S. Ladaniya, Director, Dr. A.K. Srivastava, Pr. Scientist (Soil Sci.) and Dr. A. D. Huchche, Pr. Scientist (Hort.) surveyed the land at Mauza Umerkhed Ta. Morshi Distt. Amravati for establishing the Centre of Excellence (CoE) for citrus on 19<sup>th</sup> June, 2015. This CoE is proposed to be established by Maharashtra State Agri. Department. Report was submitted to the Agriculture Department.

### Visit of farmers to CCRI

- Sixty women farmers from Dindori district, MP were explained acid lime cultivation on 14<sup>th</sup> April, 2015.
- One hundred and twenty two farmers from various districts of Madhya Pradesh visited the Institute on 4<sup>th</sup>, 13<sup>th</sup>, 15<sup>th</sup>, 24<sup>th</sup> April and 14<sup>th</sup>, 18<sup>th</sup>, 20<sup>th</sup> May, 2015.
- Two farmers from Akola and Seven farmers from Yeotmal district of Maharashtra visited the Institute on 10<sup>th</sup> April and 2<sup>nd</sup> May, 2015, respectively.

### Recognition

- Dr. M.S. Ladaniya, Director was Chief Guest at the CSIR-NEERI 58<sup>th</sup> Foundation Day on 8<sup>th</sup> April, 2015. Dr. M.S. Ladaniya expressed concern over the environmental issues and stressed need of public participation. He praised the achievements of CSIR-NEERI.
- The MD, MSHMPB and Commissioner of Agriculture, Maharashtra had requested ICAR-CCRI to undertake the assignment of evaluation of the Centre of excellence (CoE) for Citrus established at College of Nagpur under Indo-Israel work plan. Dr. (Mrs.) N. Vijayakumari, Dr. A. D. Huchche and Dr. A. K. Das along with the Professors of College of Agriculture reviewed the work of CoE on 20<sup>th</sup> May, 2015.

### Meetings Organised

- **Rajbhasha Meeting :** The quarterly Rajbhasha meeting was held on 4<sup>th</sup> April, 2015.
- **Institute Research Committee Meeting:** The twenty-seventh Institute Research Committee meeting of CCRI, Nagpur was held during April 16-17, 2015 under the Chairmanship of Dr.M.S. Ladaniya, Director of the Institute which was attended by all scientists and Dr. A.K. Das, Member Secretary. Subject experts Dr. T.B.S. Rajput, Emeritus Scientist, WTC, IARI, New Delhi, Dr. R. Palaniappan, Retd. Pr. Scientist (IIHR), Bengaluru, Dr. C. Aswath, Pr. Scientist, Division of Floriculture, IIHR, Bengaluru attended the IRC meeting. A total of 57 research programmes were deliberated.



*Dr. M.S. Ladaniya, Director & Chairman, IRC along with experts & scientists*

- Citrus Farmers Meet :** Technology Mission on Citrus (TMC) for Chhindwara organized a Citrus Farmers Meet at J.N.K.V.V., Zonal Agricultural Research Station, Chhindwara on 18<sup>th</sup> April 2015 for guidance on technologies for the citrus growers. Dr. M.S. Ladaniya, Director CCRI, Nagpur & Mission Leader, TMC was the Chief Guest. Dr. S.S. Tomar, Director Research Services, J.N.K.V.V., Jabalpur presided over the meet which was attended by more than 50 citrus growers.



*Dr. M. S. Ladaniya, Director Visit of farmers to citrus nursery addressing the gathering*

- Institute Management Committee Meeting :** The 31<sup>st</sup> meeting of IMC of CCRI, Nagpur was held on 23<sup>rd</sup> June, 2015 under the Chairmanship of Dr. M.S. Ladaniya, Director, CCRI, Nagpur. The members present were Dr. D.M. Mankar, Director of Research, Dr. PDKV, Akola; Sh. Sunil S. Shinde, Ex-MLA, Sawargaon, Narkhed, Nagpur; Dr. Sandhya Kranthi, Head, Division of Crop Protection, CICR, Nagpur ; Dr. A. K. Srivastava, Pr. Sci., Soil Science), CCRI, Nagpur ; Dr. Nachiket Kotwaliwale, Principal Scientist (AS&PE), CIAE, Bhopal; Sh.R.B. Chalwade, SAO, Nagpur Division ; Sh. Y.V. Sorte, AF&AO and Member Secretary, Sh. S. M. Sahare, AO, CCRI, Nagpur.

The work on 'Micro-irrigation and Fertigation'



*The IMC meeting in progress*

*Dr.D.K.Ghosh, Pr.Sci.interacting with the IMC members.*

presented to IMC and discussed various issues regarding institute management.

- A meeting was organized by the State Agriculture Deptt., Nagpur to discuss the future policies on Climate Change, disease-free planting material etc. on 24<sup>th</sup> June, 2015 which was Chaired by Shri Atul Patne, IAS, Director (Hort.), GOI and Dr. M.S. Ladaniya, Director, CCRI, Nagpur.



*Shri Atul Patne and other dignitaries visiting the nursery*

### Human Recourse Development

- Dr. A.A. Murkute, Sr. Scientist (Hort.) attended the training programme on 'Priority Setting, Monitoring and Evaluation (PME)' of Agriculture Research Projects at NAARM, Hyderabad from 2-6<sup>th</sup> June, 2015.

### Good Governance/Swachh Bharat Mission :

- A water sump got prepared for providing clean drinking water to the staff members of the institute.
- Green and Blue bins were provided to all the laboratories, sections and farm for collecting the wet and dry waste, respectively.

### Personnel

#### Appointment

- Ms. Neha A. Thakre joined on 10<sup>th</sup> April, 2015 as a SRF under outreach project on *Phytophthora*.

**FEEDBACK:** Summer is very crucial for water management in citrus crops. Hasta bahar of acid lime, Ambia crop (of Nagpur mandarin and Mosambi) needed to be watered properly as the temperature shot up to 47<sup>o</sup>C in Central India and many other parts of the country. In central and north-west plains, water required in bearing trees is as high as 230–250 litres/tree/ day depending on fruit bearing and age of the trees. In younger plants water requirement is lesser. In cooler areas where plantations are on hills, like southern and north-eastern parts, the delay in monsoon resulted in stress. Citrus Plantations in hilly areas is solely dependent on natural rains only and rains used to arrive by April in these areas. With changing climatic conditions, arrival of rains getting delayed over the years that leads to stress to the plant and its early decline. This calls for immediate adoption of drip system of irrigation and required policy changes to make it affordable for the small and marginal farmers.

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