



CITRUS NEWSLETTER



ICAR - CENTRAL CITRUS RESEARCH INSTITUTE, NAGPUR

Vol. 25

No. 2

April - June, 2019

CONTENTS

- From the Director's Desk 1
- Citrus Sector..... 1
- From the Institute 2
- Feedback 8

From the Director's Desk.....



Dear Readers,

There was a dire need of creation of additional water supply to the farm of the ICAR-CCRI and it was pending since 2008-09, some times due to lack of funds or some times due to increase in cost estimate for intake well to be constructed in Ambazari lake. ICAR-CCRI farm receives its irrigation water from the sole supply of this lake. There is no ground water available to sustain

plantation on 250 acres of farm of the institute. Old facility with floating pump of 25 HP with the pipeline was insufficient keeping in view expanding plantation and nursery activity. During 2012-17 EFC allocation provision was made by the ICAR and intake well was constructed in Ambazari lake to draw water from the lake in to the well and then pump it through 6 inch pipe line to the institute 3 km away. Intake well construction with installation of 25 HP pumps was complete in 2017-18 with laying of additional 6 inch pipeline covering 3 km distance passing through forest land. Old low tension (LT) electricity supply line could not take load to run two pumps of 25 HP simultaneously (old floating pump & new pump at intake well) and hence High Tension (HT) overhead electricity line covering 3 km distance was separately installed with the help electricity department. Now from 2019 onwards with HT line, 2 pumps of 25 HP can run simultaneously and can provide required water supply through 2 pipelines at a time and fulfill water requirement of the institute's farm. Long felt & very important need is thus fulfilled.

CITRUS SECTOR

Several citrus fruit varieties have received GI (Geographical Indications) due to their unique taste and agro-climatic conditions in which they are grown since many centuries. These fruits are wealth of our country due to their unique characters. Growers of these varieties in respective regions can reap benefits of GI if this certification is properly exploited for the purpose

Table : Registration details of GI for Citrus fruits

S.No	Appli- cation No	Geogra- phical Indica- tions	Goods (As per Sec 2 (f) of GI Act 1999	State
April 2005 – March 2006				
27	33	Coorg Orange	Agri- cultural	Karna- taka
April 2009 – March 2010				
113	131	Devanahalli Pummelo	Agri- cultural	Karna- taka
April 2013 – March 2014				
215	385	Nagpur Orange; mandarin that is famous world over	Agri- cultural	Mahara- shtra
April 2014 – March 2015				
221	375	Arunachal Orange	Agri- cultural	Arunachal Pradesh
231	465	Khasi Mandarin; mandarin that derives name from Khasi hills	Agri- cultural	Megha- laya
232	466	Kachai Lemon Unique lemon from Ukhrul dist of Manipur, grown by entire village	Agri- cultural	Manipur
April 2015 – March 2016				
236	437	Memong Narang (<i>Citrus indica</i>) a citrus species indige- nous to India	Agri- cultural	Megha- laya
April 2016 – March 2017				
266	495	Jalna Sweet Orange	Agri- cultural	Mahara- shtra

Source : Registered Geographical Indicators Oct. 2017; Geographical Indicators Registry. Deputy Registrar of Geographical Indications, Intellectual Property Office Building, G.S.T Road, Guindy, Chennai – 600 032.

and farmers are trained and informed about legal procedures. This will also fetch benefits during exports.

FROM THE INSTITUTE

RESEARCH HIGHLIGHTS

Technologies for Monsoon (*Mrig*) cropping in Nagpur mandarin and Sweet orange

Out of the three major flushes viz. *Ambia Mrig* and *Hasta* crop which concurrently give out vegetative and reproductive flushes under favourable phenological conditions, the *Mrig* crop in Nagpur mandarin and Mosambi sweet orange matures in the months of February through April and fetches premium prices due to limited availability of other fresh fruits in the markets.

Among the growth regulators studied, the gibberellins have been found to have a definite role in flower bud formation in citrus plants. Anti-gibberellin chemical compounds such as chlormequat chloride (CCC) and paclobutrazol have been observed to induce flowering in citrus. Citrus plants tend flower and fruit profusely under optimum stress conditions followed by proper irrigation and fertilization.

Ideal conditions for flowering of *Mrig* crop of Nagpur mandarin and sweet oranges are water deficit stress of 3-6 weeks depending on soil type in the month of May-June, 30°C temperature and rainfall more than 250 mm during 15th June to 15th July with RH 70% or more.

Use of growth regulators: It is observed that in high clay soils water deficit stress of more than 50 days is also insufficient. In such problematic soils before starting water deficit stress at the end of April month, soil drenching with 6 gram of growth retardant paclobutrazol mixed in 5 litres of water may be done followed by light irrigation and the plants may be exposed to water withholding till arrival of monsoon. Alternatively two foliar applications of 2000 ppm chlormequat chloride may be done at 15 days interval starting from second week of May.

During the water deficit stress period till end of May month if the untimely rains occur, then soil drenching with paclobutrazol @ 6 gram/plant as mentioned above may be done. Alternatively two foliar applications of 2000 ppm chlormequat chloride may be given at 15 days interval starting from second week of May.

Managing the orchard during flowering period: In the absence of ideal conditions of rainfall and temperature as mentioned above, the orchardist can use supplementary irrigations, sprinklers in and around the orchard to simulate such conditions during dry spells and high maximum temperatures. Application of gibberellic acid 10 ppm and urea 1% helps in concentrated bloom of flowering. Thus even a moderate flowering in July month can ensure a good crop of 15-25 tonnes/ha in mandarins and sweet oranges.



Mrig crop fruiting in Nagpur mandarin after crop regulation treatments.

Institute Activities / Events Organized

International Yoga Day

'5th International Day of Yoga' was celebrated at ICAR-Central Citrus Research Institute, Nagpur on 21st June, 2019. Yoga experts from Shri. Janardan Swami



International Yoga Day celebration at ICAR-CCRI, Nagpur

Yogabhayasi Mandal, Nagpur elaborated the importance of Yoga and demonstrated Aasanas which could be easily adopted for healthy and peaceful body. Scientists and staff performed the Aasanas. Dr. A.K. Srivastava, I/c Director welcomed the guests.

Training Programmes

Off-Campus

Training under SC Sub-Plan (SCSP)

- Training was organised under SC Sub-Plan on 29th June, 2019 at Taluka Kalmeshwar Dist., Nagpur in which 113 farmers participated. Dr. M.S. Ladaniya, Director, chaired the inaugural session and guided the farmers. Following scientists delivered lectures Dr. A.K. Srivastava, Dr. I.P. Singh, Dr. R.K. Sonkar, Dr. A.K. Das, Dr. Anjitha George, and Sh. B.V. Mahalle, SMS, TMC. Dr. R.K. Sonkar co-ordinated the training programme.

Training under Tribal Sub-Plan (TSP)

- Training was organized under Tribal Sub Plan on Production technology of Citrus on 29th June 2019 at KVK, Dhar, Madhya Pradesh in which 60 farmers from Dhar district attended. Dr. K.S. Kirad, Coordinator, KVK, Dhar, and other State Agriculture & Horticulture dept. officials emphasized the need of citrus cultivation for better livelihood earnings by farmers' in Madhya Pradesh. In Technical Session Dr. A.A. Murkute, Dr. Kiran Kumar Kommu, and Mr. V.N. Dhengre, delivered presentations on various aspects of citrus cultivation and distributed disease-free planting



Participants of Training under TSP at KVK, Dhar, Madhya Pradesh

material. Dr. A.A. Murkute, Nodal Officer (TSP) coordinated the programme.

Meetings organized

- **Institute Research Committee Meeting:** The XXXI Institute Research Committee (IRC) meeting was held under the Chairmanship of Dr. M.S. Ladaniya, Director, during 3-4 May, 2019. Experts Dr. W. S. Dhillon, ADG (HS-I), ICAR and Dr. S.R. Bhat, Rtd. Pr. Scientist, NRCPB, New Delhi were present



31st IRC meeting under the Chairmanship of Dr. M.S. Ladaniya, Director, CCRI

- **Institute Management Committee meeting:** The XXXVI meeting of IMC was held on 25th June, 2019 under the Chairmanship of Dr. M.S. Ladaniya, Director, CCRI. Following members were present: Dr. V.K. Kharche, Director of Research, Dr. PDKV, Akola, Dr. D.K. Ghosh, Pr. Scientist, CCRI, Dr. (Mrs.) P. Golghate, Representative of Director of Horticulture, Pune, Sh. Y. V. Sorte, AF&AO, CCRI; Progressive



IMC meeting at CCRI, Nagpur under the chairmanship of Dr. M.S. Ladaniya, Director, CCRI

Farmers Sh. Kailash Suryawanshi, Jalgaon, Sh. Anand M. Raut and Sh. A. P. Chaitupune, AO, CCRI as Member Secretary.

- The 90th IJSC meeting held on 17th June, 2019 under Chairmanship of Dr.M.S. Ladaniya, Director and various issues concerning staff were discussed / sorted out.

Linkages & collaboration

- VNIT, Nagpur conducting survey under DST-CCP SPLICE funded research project entitled 'Capacity building for Climate change adaptation and mitigation with a special focus on sustainable habitat and risk management' installed temperature data logger at Institute for 2 months from 1st April, 2019 to collect the temperature reading at different locations within Nagpur.
- MOU for Contract Research Project signed for "Studies on agrocel – based Potassium Schoenite (Mahalaabh) in Citrus" with Agrocel Industries Pvt. Ltd., Mumbai on 9th May, 2019 for 3 years.

Publications

Research Papers (In peer Reviewed Journals)

International

- Li-Hui Lu, Srivastava A.K., Youn-Lou Shen and Qiang-Sheng Wu (2019). A Negative feedback regulation of replanted soil micro-organisms on plant growth and soil properties of Peach. *Notulae Botanicae Horti Agrobotanici Cluj-Napoca*. 47(1)255-261
- Kumar P., Kesari P., Kokane Sunil, Ghosh D. K., Kumar P and Sharma A.K. (2019): Crystal Structures of a putative periplasmic cystine binding protein from *Candidatus Liberibacter asiaticus*: Insights into an adapted mechanism of ligand binding. *FEBS Journal* 286 (17): 3450-3472 <https://doi.org/10.1111/febs.14921>.
- Biswas K.K., Palchoudhury S., Ghosh D. K., Debnath P., and Lee R.F. (2019): Codon Usage Bias Analysis of Citrus tristeza Virus: Higher Codon Adaptation to *Citrus reticulata* Host. *Viruses*. 11(4)-331.

- Ghosh D.K., Motghare M., Kokane A., Kokane Sunil., Warghane A., Bhoose S., Surwase D., Ladaniya M.S. (2019): First report of a 'Candidatus Phytoplasma cynodontis'-related strain (group 16SrXIV) associated with Huanglongbing disease on *Citrus grandis* in India. *Aus. Plant Dis. Notes.* 14.9.
- Kumar, K.K. and Babu, P.K. (2019): Diversity of Weed Flora in Citrus at ICAR-Regional Research Centre for Citrus, Biswanath Chariali, Assam, India. *International Journal of Current Microbiology and Applied Sciences* 8(4):2100-2107
- Kumar, K.K. and Das, A.K. (2019): Diversity and community analysis of plant parasitic nematodes associated with citrus at citrus research station, Tinsukia, Assam. *Journal of Entomology and Zoology Studies* 7(3):187-189.
- Thirugnanavel A., Deka B.C., Rakesh Kumar, Rangnamei, L and Meyasae, M. (2019): Genetic diversity, correlation and path coefficient analysis of rajma bean (*Phaseolus vulgaris*) landraces in low altitude of Nagaland. *Indian Journal of Agricultural Science*, 89 (4), 726-33.
- Thirugnanavel A., Bidyut C. Deka and Lily Rengnamei. (2019): Evaluation of *Dendrobium* Hybrids for Growth and Yield under Lower Hills of Nagaland. *Indian Journal of Hill Farming*, Special Issue, Page 33-36.
- Vijayakumari, N. (2019). Shoot tip grafting (STG) in commercial production of disease free quality budgrafts of Citrus in Central India : *International Journal of Recent Scientific Research* 10(1) : 30393-30396

Papers Presented (Oral) in Seminar/ Symposia/ Conferences etc.

- International Conference on Innovative Horticulture and Value Chain Management Shaping Future Horticulture during 28-31 May, 2019 at GBPUA&T, Pantnagar, Uttarakhand.
 - ✓ Kumar Dinesh and Ladaniya M.S. (2019): Nutraceutical from citrus: current status and scope of commercialization :
 - ✓ Srivastava, A.K. (2019): Improving Nutrient and water use efficiency in Citrus

Books / Book chapters:

- Bhattacharyya, S., Jasna, V.K., Sontakki, B.S., Vinayagam, S.S., Shenoy, N.S., Rao, V.K.J., Venkatesan, P. and Rathore, S. (2019): Innovative Approaches in Extension Research Systems. *In: Challenges and Emerging Opportunities in Indian Agriculture.* Ch. Srinivasa Rao, S. Senthil Vinayagam and P.C. Meena (Eds). Published by Director ICAR-NAARM, Rajendranagar, Hyderabad: 500030, Telangana, India. Chapter 15, pp 303-328. ISBN: 978-81-933781-7-5.
- Bhattacharyya, S. and Mukherjee, A. (2019): Importance of Skill Development in Indian Agriculture. *In. ICT and Social Media for Skill Development in Agriculture.* Pp:47-62. Editors and Publisher: Om Prakash, Anirban Mukherjee and Pratibha Joshi Today & Tomorrow's Printers and Publishers, New Delhi.
- Srivastava, A.K., Paithankar, D.H., Venkatramana, K. T., Hazarika Binita. Ladaniya M.S., Rao C.N. and Prakash Patil (2019). INM in citrus: sustaining soil health quality and production. *In : Shaping the Future of Horticulture* (Editors: K.L. Chadha, S.K. Singh, Jai Prakash, V.B. Patel), Kruger Brentt Publisher UK. LTD, Chapter 39, pp-563-594.

Popular Articles

- Thirugnanavel A., Deka. B.C. and Rangnamei Lily (2019): Effect of different growing media on gerbera varieties under low altitude conditions of Nagaland. *Green Farming.* 10(2): 195 : 198.

Review Articles

- Srivastava A.K., Paithankar, D.H. Venkatramana, K.T., Hazarika, Vinita and Prakash Patil (2019). INM in fruit crops: Sustaining quality production and soil health. *Indian Journal of Agricultural Sciences* 83(3):379-395.
- Vijayakumari N. (2019). Scenario of citrus biotechnology – National/International. *Indian Journal of Recent Scientific research.* 10: (03 E), 31452-31459.

Welfare Activity

- The Institute AKMU cell provided the facility of downloading the “CCRI *Citrus*” Mobile App to all visiting farmers.

AICRP (Fruits) : Citrus research

Activities were undertaken during the quarter under the All India Coordinated Research Project (Fruits) at ICAR-CCRI, Nagpur in co-ordination with PC.

Lectures delivered by CCRI scientists in training at other Institute/Organisation

- Dr. Dinesh Kumar, Pr. Scientist (Hort.): 'Citrus Processing and Value Addition'. In Vigyan Sanskar Shibir at NEERI, Nagpur on 24th April, 2019.

Other Extension Activities

Visit to CCRI

During the quarter, farmers, students and trainees/officers visited CCRI, Nagpur as follows:

Farmers

States	District	No. of Farmers
Madhya Pradesh	Neemuch, Janakpur, MP	4
Total		4

Students

Sr. No.	Name of School/ College and place	No. of Students and Staff	Date
1.	Shri Ram College of Agriculture, Rajnandgaon, Chhattisgarh	Students- 35, B.Sc. 3rd year	9th April, 2019
2.	G.H. Rasoni Univ., Saikheda, Dist. Chhindwara, M.P.	Students- 100	18th April, 2019
3.	Anand Niketan College of Agriculture, Warora	Students- 100, B.Sc. (Agri.)	29th April, 2019
4.	College of Agriculture, Nagpur	Students -215, B.Sc. (Hons.)	15th May, 2019
5.	College of Agriculture, Dr. PDKV, Nagpur	Students - 160, B.Sc. (Hons.)	30th May, 2019
6.	College of Agriculture, Darwha, Yavatmal	Students -92, 2nd year	14th June, 2019

Trainees/Officers

Sr. No.	Organization	Number of Officials / Trainees	Date
1.	Officials from NGO, DMDIC and industrialist of Jhalawar, Rajasthan alongwith Professor and Dean College of Horticulture and forestry, Jhalawar	4 Officers	3rd May, 2019
2.	Trainees undergoing 45 days training at RAMETI, Nagpur	40 Trainees	3rd June, 2019

Capacity Building of Institute Staf

- Ms. Sangeeta Bhattacharya, Scientist (Agri. Extn.) : Orientation training (for fresh ARS Scientist) at ICAR-CCRI, Nagpur from 15th April, 2019 to 16th May, 2019.
- Ms. Sangeeta Bhattacharya, Scientist (Agri. Extn.): Professional Attachment Training (PAT) Impact assessment of ICAR-CIFRI Technologies and Training on Livelihood of Fishermen and Fish Farmers at ICAR-CIFRI, Barrackpore, Kolkata during 21st May, to 19 August, 2019.
- Sh. S.L. Shirkhedkar, Sr. Tech. Officer : 'Motivation and Positive Thinking' for Technical Officers at IISWC, Dehradun during 2-7 May, 2019
- Dr. Dinesh Kumar, Pr. Sci. (Hort.): 'Management Development Programme on Leadership Development (a pre-RMP programme)' at ICAR-NAARM, Hyderabad during 11-22 June, 2019.

Regional Research Centre for Citrus, Biswanath Chariali, Assam

- The QRT of ICAR-CCRI visited RRCC, Biswanath Chariali experiment farm to appraise itself of various research activities on 24th April, 2019. In the afternoon, QRT along with officials of CCRI had interactive meeting with BNCA college staff, KVK Coordinators of Sonitpur, Lakhimpur and Dhemaji districts and State Agriculture department officials on citrus cultivation in Assam and other north eastern states of India and measures to improve the production and productivity of citrus in NER.



Visit of QRT officials to RRCC experimental farm



Meeting of QRT officials with BNCA, KVK & State Deptt. Staff

Survey/Field day/Visit to citrus growers' orchard

- Dr. A.D. Huchche, Pr. Scientist (Hort.) undertook survey in Mosambi, sweet orange orchard in the drought affected Gevrai tehsil in Beed district, Ambad and Badnapur tehsils in Jalna district and Adul revenue circle in Paithan tehsil in Aurangabad district of the Marathwada region, in collaboration with officials from Vasantnao Naik Marathwada Krishi Vidyapeeth, Parbhani and Maharashtra State Dept. of Agriculture, Aurangabad during 15-16 May, 2019. The team suggested several measures to save



Dr. A.D. Huchche of CCRI participated in survey of drought affected Mosambi orchards in Marathwada region.

Mosambi orchards during acute water shortage and drought like situation.

Celebration

- 129th Birth Anniversary of Dr. Bhimrao Ambedkar on 14th April, 2019. A programme was organized at 15th April, 2019 and Anti-Terrorism Day on 21st May, 2019.

Distribution of disease-free planting material under CCRI

A total of 36,870 disease free planting material of citrus rootstocks, fruits and seed distributed and revenue of Rs.17,31,799/- generated.

Award, Honours and Recognition

- ICAR-CCRI, Nagpur was awarded ISO 9001:2015 by RIR Certification Private Limited for quality research, extension and other relevant services on citrus for 3 years w.e.f. from 29th May, 2019.
- Dr. Kiran Kumar Kommu was awarded Certificate of excellence in reviewing in recognition of an outstanding contribution to the quality of the Journal- 'Journal of Agriculture and Ecology Research International'.
- Dr. P.S. Shirgure, Pr. Scientist (SWCE) received the Fellowship of the Society for Horticultural Research and Development (SHRD) Ghaziabad for the year 2019.

Distinguished Visitors

National

- Dr. S. K. Chaudhary, ADG (NRM), ICAR and Dr. S.K.Singh, Director, ICAR-NBSS&LUP, Nagpur visited the Institute laboratory, nurseries and farm on 27th April, 2019.

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

Technology Mission on Citrus was started in the year 2007 at Vidarbha, further extended to Marathwada region in 2009 and Chhindwara region of Madhya Pradesh in 2011 by the National Horticulture Mission (now Mission for Integrated Development of Horticulture MIDH) Ministry of Agriculture, Govt. of

India, New Delhi. During the quarter following activities were undertaken:

Distribution of disease free planting material under TMC

Vidarbha: A total of 72,977 disease-free planting material of citrus was distributed and revenue of Rs.29,99,433/- generated.

Personnel

Appointment

Permanent Staff

- Ms. Sangeeta Bhattacharya, Scientist (Agri. Extn.) joined on 15.04.2019 after completion of 109th FOCARS Training at ICAR-NAARM, Hyderabad from 4th January to 3rd April 2019.

Contractual Staff

- Sh. Sunil B. Kokane, YP-II w.e.f. 13th May, 2019 under the Institute Project
- Sh. Anup V. Tatewar, YP-II w.e.f. 19th June, 2019 under "Dynamics of Flowering and Fruiting in Citrus".

Promotion

- Sh. A.B. Gadge, Sr. T.A. to Technical Officer w.e.f. 5th April, 2019
- Sh. K.K. Ghaiwat, T.A. to Sr. Tech. Asstt. w.e.f. 5th April, 2019

Retirement

- Sh. D.H. Raut, Skilled Supporting Staff, superannuated on 31st May, 2019.
- Sh. A.P. Chaitupune, Administrative Officer, superannuated on 30th June, 2019.
- Sh. Khusal P. Gedekar, TSL superannuated on 30th June, 2019.

Education

- Ms. Sangeeta Bhattacharyya, Scientist (Agril

Extension) : Enrolled from March 2019 and underwent one year correspondence course on Post Graduate Diploma in Educational Technology Management (PGDETM) from ICAR-NAARM in collaboration with University of Hyderabad. Passed first semester examination with Distinction marks and appeared second/final semester examination.

FEEDBACK

Iodine Kit for rapid diagnosis of citrus greening disease (HLB)

Citrus greening disease also known as Huanglongbing, HLB is a devastating disease of citrus worldwide, caused by the phloem-limited bacteria, '*Candidatus Liberibacter asiaticus* (CLas)' and transmitted by vegetative propagation and by the insect vector citrus psylla (*Diaphorina citri*). Unfortunately, there is no effective and long-lasting cure for this disease has been found till date. Citrus greening symptoms on leaves are confused with mineral deficiency (especially Zn and Fe), root rot or other stress - related leaf symptoms. A simple iodine solution starch test kit has been developed to detect CLas infection in the field itself. Citrus leaves generally store very low levels of starch and detectable amounts (five-fold increase) are only seen as a result of CLas infection in sweet orange and mandarin. This high starch due to CLas infection can be detected by iodine-starch reaction. This simple, reliable, rapid, and cost effective, iodine-based starch test as visual field tests for HLB presence can be very useful to citrus growers. These tests are based on the ability of iodine to bind starch, resulting in a purple/black-coloured solution and could be used as a simple on-site diagnostic system aimed at quick HLB detection.

At ICAR-CCRI, iodine test results are 75-80% in agreement with conventional and real time (RT) PCR based molecular tests & efforts are continuing to refine it.

Edited by : Dr. M. S. Ladaniya, Director, Dr. A. K. Das, Pr. Scientist (Pl. Patho.), Dr. A. A. Murkute, Pr. Scientist (Hort.)
Dr. J. P. Tej Kumar, Scientist (Biotech.) and Dr. Ashok Kumar, ACTO (Pl. Patho)

Compiled by : Miss Lily Varghese, Asstt. Chief Technical Officer

Published by : Dr. M. S. Ladaniya, Director, CCRI, Nagpur, Maharashtra

Citrus Newsletter is an official document of the Central Citrus Research Institute

Postal Address : P. B. No. 464, Shankar Nagar, P.O., Amravati Road, Nagpur – 440010 (Maharashtra)

Phone No. : 0712-2500249, 2500615, 2500813 **Fax :** 0712-2500813

Website : www.ccringp.org.in **E-mail :** director.ccri @icar.gov.in

Printed at : Eskay's Scanna Graphics, Gujarwadi, Nagpur.