



# ICAR-NRCP



## Newsletter - संवादपत्र

July - December 2022

### From the Director's Desk - निदेशक की कलम से



Dear Readers

It gives me immense pleasure to inform you that our institute bestowed with one of the most prestigious ICAR award, "**Vasantrao Naik Award for Outstanding Research and Application in Dry Land Farming System 2022**". Our institute celebrated its 18<sup>th</sup> Foundation day on 25<sup>th</sup> September 2022. During this program, whole genome sequencing of pomegranate cv. Bhagawa was released by Dr. A. K. Singh, DDG (Hort.). A training programme on "Good Management Practices in Pomegranate" was also organized for the pomegranate farmers in collaboration with MAGNET, Govt. of Maharashtra. A model pomegranate orchard has been established at the centre to showcase the developed technologies. Two patents were granted to our institute for pomegranate seed oil extraction and bio-formulation work.

On research front, a team have identified candidate miRNA-SSR markers (5) putatively linked to pomegranate seed hardness trait. A linkage map in pomegranate through mapping population was also developed. A quantification of fruit cracking linked enzymes was carried out to ascertain the cause of fruit cracking. Pomegranate juice blended with muskmelon squash was developed in order to improve its nutritional and sensorial properties.

During this period, some of the institutional activities like QRT, IMC and IRC, *Hindi Pakhwada* were conducted. Training programs for SCSP and TSP beneficiaries were organised. To speed up the spread of technologies, five MoU's were signed with different stakeholders. I congratulate all the staff for their sincere efforts and achievements.

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## ICAR-NRCP bagged "Vasantrao Naik Award" for Outstanding Research and Application in Dry Land Farming System 2022

The ICAR-NRCP team consisting of **Dr. R. A. Marathe**, Director, **Dr. Jyotsana Sharma**, Principal Scientist, **Dr. K. Dhinesh Babu**, Principal Scientist, **Dr. Ashis Maity**, Senior Scientist, **Dr. Nilesh N. Gaikwad**, Senior Scientist and **Dr. N.V. Singh**, Senior Scientist received a prestigious ICAR **Vasantrao Naik Award** under National Award for Excellence in Agricultural Research in Dry Land Farming System from the auspicious hands of Hon'ble **Shri. Narendra Singh**

**Tomar**, Ministry of Agriculture & Farmers Welfare, Govt. of India on Foundation day of ICAR (16<sup>th</sup> July 2022) at NASC Complex, New Delhi. Shri. Kailash Choudhary, Hon'ble MoS for Agri. & FW, Shri. Parshottam Rupala, Hon'ble Union Minister of Fisheries, AH & Dairying, Prof. Ramesh Chand, Member NITI Aayog and Dr. T. Mohapatra, Secretary (DARE) & DG (ICAR) New Delhi were present on the occasion.



*Dr. R. A. Marathe, Director, NRCP received the ICAR award from Shri Narendra Singh Tomar, Hon'ble Union Minister of Agriculture & Farmers Welfare during the Foundation Day ceremony of ICAR at New Delhi*



*NRCP Team proudly showing the coveted "Vasantrao Naik Award for Excellence in Agricultural Research" on 16<sup>th</sup> July 2022. (Left to Right: Dr. Ashis Maity, Dr. N. N. Gaikwad, Dr. K. Dhinesh Babu, Dr. R. A. Marathe, Dr. Jyotsana Sharma and Dr. N. V. Singh)*





## NRCP Foundation Day cum Farmers training Program on "Good Management Practices in Pomegranate"

NRCP celebrated its 18<sup>th</sup> Foundation Day on 25<sup>th</sup> September, 2022. One-day training programme on "Good Management Practices in Pomegranate" was organized on different aspects of pomegranate production in collaboration with MAGNET, Govt. of Maharashtra, Pune. About 250 farmers and other pomegranate stakeholders participated in the training programme. Dr. K.V. Prasad, Director, ICAR-DFR Pune, presided over the function while Shri. Deepak Shinde, Project Coordinator, MAGNET and Shri. Balasaheb Shinde, DSAO, Solapur was Chief Guest of the function. Shri. Prabhakar Chandane, Shri. Shahaji Jachak, Shri. Bhausaheb Kate from Pomegranate Growers Association of Maharashtra graced this function. On this occasion of NRCP's foundation day, technical bulletins on different aspects of pomegranate production viz. **Genomics, DUS testing, Management of Short Hole Borer and Success Stories of Stem Solarization** were released by the dignitaries. Different institute awards were given to the progressive farmers includes **Shri. Aaba Jadhav** (Satana-Nashik) for quality pomegranate production using new bio-fortified variety Solapur Lal; **Shri. Ranjit Shahajirao Jachak** (Jachakwadi-Indapur) and **Shri. Rahul Rasal** (Nighoj-Parner, Ahmednagar) for export quality pomegranate production; **Shri. Praveen Dilip Mane** (Bairagwadi, Solapur) for quality pomegranate production; **Shri. Tanaji Vishnu Navadkar** (Fondshiras), **Shri. Vijay**

**Vishwanath Narute** (Tamshidwadi) and **Shri. Bira Bandu Waghmode** (Tamshidwadi) from Malshiras tehsil were felicitated for successful management of pomegranate bacterial blight disease using ICAR-NRCP developed stem solarisation technology.

Moreover, awards also given to NRCP staff includes **Dr. Nripendra V. Singh** (Best Scientist Award 2021-22), **Dr. P. Roopa Sowjanya** (Best Research Paper Award 2021-22), **Shri. D.T. Chaudhari** (Best Technical Staff Award 2021-22) and **Shri. V. A. Shinde** (Best Administrative Staff Award 2021-22). The Chromosome Scale Genome Assembly of Indian pomegranate cv. Bhagawa was also released by the Director and other dignitaries on the occasion of Foundation day.

The series of technical lectures were also conducted in the training programme for the farmers which includes "Production of quality planting materials in pomegranate" by Dr. N.V. Singh; "Disease management in pomegranate" by Dr. Jyotsana Sharma; "Nematode management in pomegranate" by Dr. Somnath Pokhare; "Insect-pest management in pomegranate" by Dr. Mallikarjun H. and "Post-harvest management & Value addition in pomegranate" by Dr. Nilesh Gaikwad. The technical session was concluded by scientist-farmers interaction meetings wherein all the scientist of the centre participated and addressed the farmer's problem.



*Inauguration of Foundation Day by Dr. R. A. Marathe, Dr. K.V. Prasad, Shri Deepak Shinde, Shri Balasaheb Shinde, Shri Prabhakar Chandane, Shri Shahaji jachak and Shri Bhausaheb Kate*



*Farmer and other pomegranate stakeholders during One Day training program*







*Best Scientist Award received by  
Dr. N. V. Singh*



*Best Research Paper Award received by  
Dr. P. Roopa Sowjanya*



*Best Administrative Staff Award received by  
Shri V. A. Shinde*



*Best Technical staff Award received by  
Shri D. T. Chaudhary*



*Release of Chromosome Scale Genome Assembly of  
Indian pomegranate cv. Bhagawa and other publications*



*Release of Publications on Management of  
Shot hole borer*







*Felicitation of Progressive Pomegranate Farmers*

## Inauguration of Demonstration block of NRCP technologies

Demonstration block was established to showcase the technologies developed by NRCP, Solapur to the stakeholders. The demonstration block comprises of air layered and tissue cultured planting materials of Solapur Lal and Bhagawa, grafting of Solapur Lal and Bhagawa into four different rootstocks (ACC-2; IC-318707; IC-318712 and IC- 798838). The inauguration of the demonstration block of NRCP technologies was

done on the eve of 18<sup>th</sup> Foundation day. The dignitaries Shri Shahaji Jachak, Ex-President Maharashtra Pomegranate Growers Association; Dr. R.A. Marathe, Director, NRCP; Shri. Deepak Shinde, Project Director, MAGNET; Shri. Prabhakar Chandane, President, All India Pomegranate Growers Association and Dr K.V. Prasad, Director, ICAR-DFR, Pune were present for the event.



*Inauguration of Pomegranate Demonstration block of NRCP technologies  
by Dr. R.A. Marathe, Shri Deepak Shinde, Dr. K.V. Prasad and Shri P. Chandane*

## Release of the Pomegranate Genome cv. Bhagawa

In a path-breaking development for genome research and horticultural science in India, a team of NRCP scientists has completed the genome sequencing and chromosome level assembly of pomegranate cv. Bhagawa. The ICAR-NRCP has released the Chromosome Scale Genome Assembly of Indian pomegranate cv. Bhagawa for press and media on 24<sup>th</sup> September under the Chairmanship of the Dr. A.K. Singh, DDG (HS) and the same has been released at a public event on 25<sup>th</sup> September, on the occasion of 18<sup>th</sup> Foundation

day of NRCP. The team involved in this landmark research comprised **Dr. N.V. Singh, Dr. P. Roopa Sowjanya, Dr. Shilpa Parashuram, Dr. P.G. Patil and Dr. R.A. Marathe.** The chromosome scale genome assembly of the 'Bhagawa' developed by ICAR-NRCP under aegis of Indian Council of Agricultural Research, New Delhi is a huge reservoir of publicly accessible genomic resources for pomegranate researchers across the globe and will provide a great impetus to the pomegranate improvement programme in India.







*Release of Pomegranate Genome by the DDG (HS) & Director, ICAR-NRCP, Solapur*

## Patents received by ICAR-NRCP

ICAR-NRCP granted with two patents, one on "A Process of Extraction of Virgin Pomegranate Seed Oil with retention of bioactive compounds (Patent No. 404341)" by Dr. Nilesh Gaikwad and team and 2<sup>nd</sup> for "Bio-formulation for potassium

fertilizer supplement in pomegranate and process of preparation thereof (Patent No.403302)" by Dr. Ashis Maity and team of ICAR-NRCP.





## PM Kisan Samman Sammelan, Agri Startup Conclave and Exhibition

A special programme of PM Kisan Samman Sammelan, Agri Startup Conclave and Exhibition was arranged on 17.10.2022 by NRCP under the Chairmanship of Dr. R. A Marathe, Director, NRCP. All the staff of NRCP, farmers (80) and Agri startups (03) were attained the programme. Hon. Member of Parliament Dr. Jaisiddeshwar Mahaswami graced the programme as a Chief guest.



Hon. Member of Parliament Dr. Jaisiddeshwar Mahaswami ji graced the programme as Chief guest



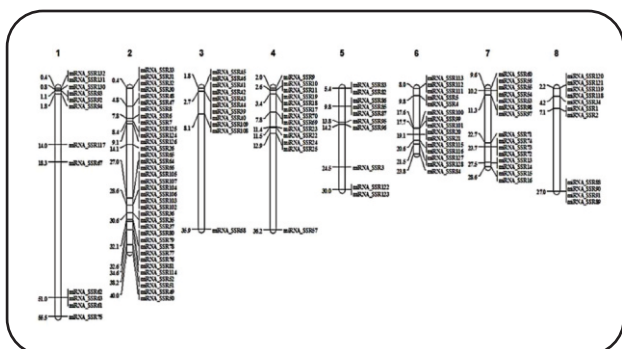
Director NRCP, showing the various pomegranate processed products to Chief Guest

## Research achievements/ Highlights/ Technology developed

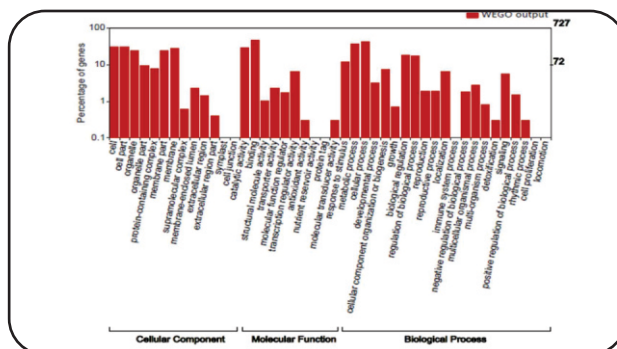
### Identification of Five candidate miRNA-SSR Markers Putatively Linked to Seed Hardness Trait

Through this experiment novel miRNA-SSRs for seed type trait from 761 potential precursor miRNA sequences of pomegranate were identified. SSR mining and BLASTx of the unique sequences identified 69 non-coding pre-miRNA sequences, which were then searched for BLASTn homology against Dabenzi genome. Sixty-three true pri-miRNA contigs encoding 213 pre-miRNAs were predicted. Analysis of the resulting sequences enabled discovery of SSRs within pri-miRNA (227) and pre-miRNA sequences (79). A total of 132 miRNA-SSRs were developed for seed type trait from 63 true pri-miRNAs, of which 46 were specific to pre-miRNAs. Through ePCR, 123 primers were validated and mapped on eight Tunisia chromosomes. Further, 80 SSRs

producing specific amplicons were ePCR-confirmed on multiple genomes *i.e.* Dabenzi, Taishanhong, AG2017 and Tunisia, yielding a set of 63 polymorphic SSRs (polymorphism information content  $\geq 0.5$ ). Of these, 32 miRNA-SSRs revealed higher polymorphism level (89.29%) when assayed on six pomegranate genotypes. Furthermore, target prediction and network analysis suggested a possible association of miRNA-SSRs *i.e.* miRNA\_SH\_SSR69, miRNA\_SH\_SSR36, miRNA\_SH\_SSR103, miRNA\_SH\_SSR35 and miRNA\_SH\_SSR53 with seed type trait. These miRNA-SSRs would serve as important genomic resource for rapid and targeted improvement of seed type trait of pomegranate.



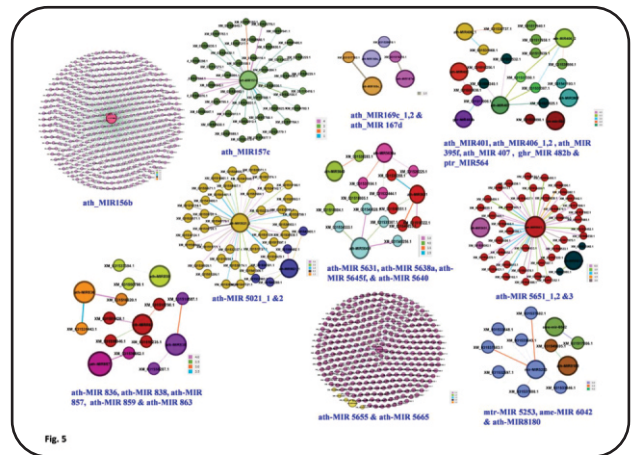
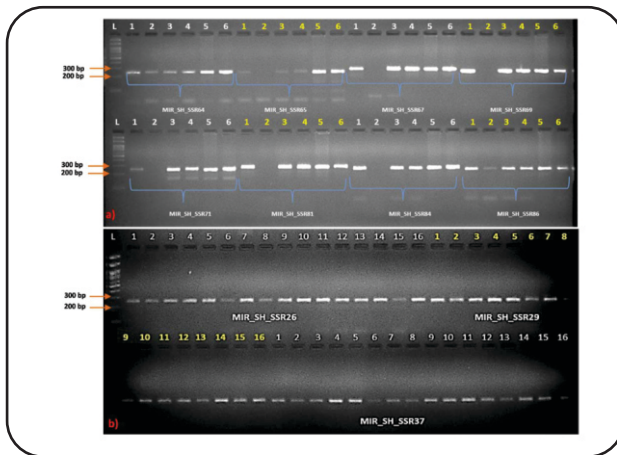
Chromosome specific localization of miRNA-SSR markers on Tunisia genome



Distribution of GO terms







(Prakash G. Patil, N. V. Singh, Manjunatha N., Dhinesh Babu K., Jyotsana Sharma & R. A. Marathe)

To develop linkage map, one should have mapping population. On the mapping population, the polymorphic marker screening will be carried and subjected for the linkage map development. The prior step is developing mapping population followed by parental screening for polymorphic markers and screening on F<sub>1</sub> population and subjected for statistical analysis completed screening of parental lines i.e., Bhagawa and 1196 and identified 25 polymorphic markers. The Polymorphic markers will be screened on F<sub>1</sub> population derived from Bhagawa 1196. The Screening of F<sub>1</sub> Population is in Progress and also generated 16 New Hybrid populations for developing the mapping populations for different horticulturally important traits.





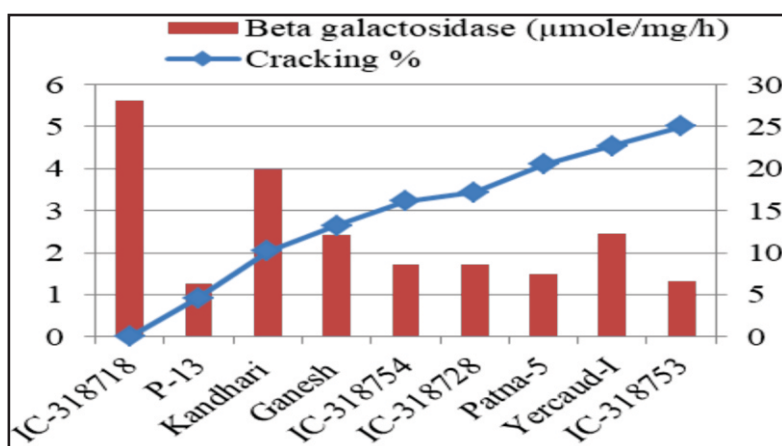


*F<sub>1</sub>/Hybrid fruits of newly generated crosses*

*(Roopa Sowjanya)*

## Quantification of Fruit Cracking Linked Enzymes

Certain enzymes such as Polygalacturonase and  $\beta$ -Galactosidase are directly linked to tissue softness. Concentration of these enzymes was evaluated in the peel of contrasting germplasm of pomegranate for fruit cracking. Polygalacturonase activity ranged between 16 to 120  $\mu\text{mol/g/min}$ . The activity was least in the germplasm that recorded least cracking i.e 0% and was the maximum in germplasm with maximum cracking i.e 25%. Activity of  $\beta$ -galactosidase ranged from 1.27 to 5.62  $\mu\text{mole/mg/h}$ . Its activity showed reverse trend to polygalacturonase. Maximum activity of  $\beta$ -galactosidase was recorded in germplasm (IC-318718) with least fruit cracking i.e 0% and vice versa. Results showed significant positive correlation between fruit cracking per cent and polygalacturonase activity ( $r = 0.667$ ) whereas significant negative correlation between fruit cracking per cent and  $\beta$ -galactosidase activity ( $r = -0.635$ ). Higher levels of polygalacturonase whereas lower levels of  $\beta$ -galactosidase are responsible for fruit cracking.



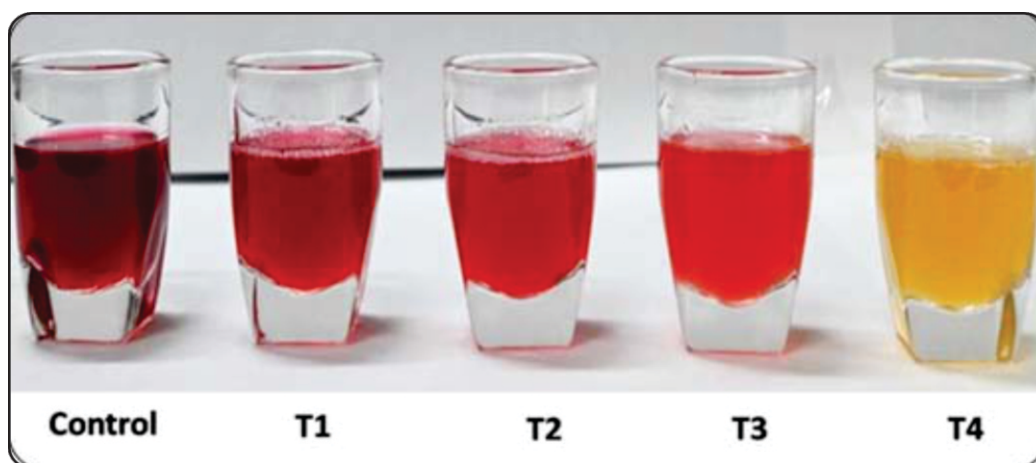
*(Pinky Raigond, Amarja More, Shilpa Parashuram & R. A. Marathe)*



## Development of pomegranate squash blended with muskmelon

Pomegranate squash with enhanced nutritional and sensorial properties was developed by blending it with muskmelon juice. The formulation for the preparation of pomegranate squash blended with muskmelon was control (100% pomegranate juice), T1 (75% pomegranate juice: 25% Muskmelon juice), T2 (50% pomegranate juice: 50% Muskmelon juice), T3 (25% pomegranate juice: 75% Muskmelon juice) and T4 (100% muskmelon juice). The significant decrease in anthocyanin and total phenols content were found from 13.47 to 3.90 mg cyanidin/100ml

and 504.4 to 84.4 mg GAE/L respectively when increase in the per cent of muskmelon in blend. Moreover, the ascorbic acid content was recorded significantly higher in squash containing increase in the level of muskmelon juice. The organoleptic parameters were considered as colour & appearance, taste, mouth feel, aroma, aftertaste and overall acceptability. Based on the total sensory score received, the sample prepared with 75% pomegranate juice and 25% muskmelon juice was found overall acceptable.



(Namarata A. Giri, Nilesh N. Gaikwad & R. A. Marathe)

## Institutional Activities

### Quinquennial Review Team (QRT-III) Meeting

Meeting of the Third Quinquennial Review Team (QRT-III) for the ICAR-NRCP, Solapur under the Chairmanship of Dr. Himanshu Pathak, Secretary, DARE & DG, ICAR, New Delhi, was held at New Delhi on September 6, 2022 to review the 3<sup>rd</sup> QRT report submitted by the duly constituted QRT. Dr. A. K. Singh, DDG (HS), Dr. Vikramaditya Pandey, (ADG) ICAR, New Delhi, Dr. R. A. Marathe, Director, and Dr. Jyotsana Sharma, Pr. Sci. from ICAR-NRCP Solapur (MS) were also present in the meeting while all QRT members joined online. Dr. A. K. Singh, DDG (HS) highlighted the need for research to develop low cost technologies with quality produce, breeding dwarf varieties and desirable selections for protected cultivation along with modifications in field technologies to meet the challenges of changing environmental scenario with

more rains or longer dry spells of high temperature. Dr. Himanshu Pathak, Hon'ble DG appreciated the technologies developed and promoted by ICAR-NRCP and QRT efforts for reviewing the work of ICAR-NRCP, Solapur and guidance for future research work. He urged the institute to focus on low cost technologies and avoid general research being carried out by other institutions. He suggested to priorities and focus 2 - 3 most promising technologies for the benefit of stakeholders. Dr. R.A. Marathe, Director, ICAR-NRCP, agreed to implement all the recommendations of QRT and suggestions given by DDG (HS) and DG, ICAR. The meeting ended with vote of thanks by Dr. Vikramaditya Pandey, ADG, Div. of HS, New Delhi.





## Institute Management Committee (IMC)

Institute Management Committee meeting was held at NRCP, Solapur on 07.11.2022 through physical and online mode under the chairmanship of Dr. R. A. Marathe, Director, NRCP, Solapur. The committee has revived the on-going institutional activities and recommended to procure essential research requirements viz., utility vehicle, equipment besides suggested the enhanced budget for the research activities. The IMC members from other institute were Dr. P.G Patil, Vice-

Chancellor MPKV, Rahuri; Dr. K.P Mote, Director, Horticulture, Maharashtra; Dr. Rohita Lenka, Director, Horticulture, Odisha; Dr. V.K Pandey, ADG (I/c), (Horticulture-I), ICAR, New Delhi; Dr. Ashutosh Murkute, Principal Scientist, ICAR-CCRI, Nagpur; Dr. Anuradha Upadhyay, Principal Scientist, ICAR-NRCG, Pune; Dr. D.V Sudhakar Rao, Principal Scientist, ICAR-IIHR, Bengaluru and Sh. Srinivas Rao, Finance & Account Officer, ICAR-IIRR, Hyderabad.



*Director, NRCP welcomes IMC member Shri Srinivas Rao, FAO, IIRR, Hyderabad and meeting in progress*

## Institute Research Council (IRC) Meeting

The meeting of 17<sup>th</sup> Institute Research Council (IRC) of ICAR- National Research Centre on Pomegranate was held on September 1<sup>st</sup> 2022, at ICAR-NRCP, Solapur under the Chairmanship of Dr. R. A. Marathe, Director, ICAR-NRCP, Solapur. Dr. K. Dhinesh Babu, Pr. Scientist, Member Secretary IRC extended a warm welcome to Hon'ble Chairman Dr. R.A Marathe, Director, ICAR-NRCP, Solapur and all the members. Then presentations on salient achievements of 15 ongoing research projects besides 2 new research project proposal and future line of work were made by each scientist.



*Dr. K. Dhinesh Babu, Pr. Scientist, Member Secretary IRC welcome to Chairman Dr. R.A Marathe, Director, and presentation in progress*

## Independence Day celebration

ICAR-NRCP celebrated 76<sup>th</sup> Independence day with religious fervour. Director, ICAR-NRCP, Dr. R. A. Marathe, hoisted the national flag with singing the national anthem along with all the NRCP staff. On this





occasion the blood donation camp was organised in the NRCP premises. Electrical batteries and gum boots were distributed to farm staff of NRCP. Director congratulated the staff for their accomplishments.



*Celebration of 76<sup>th</sup> Independence Day at ICAR-NRCP, Solapur*



*Blood donation camp on Independence day*





## Events attended by the NRCP staff

Title of the event	Date	Venue	Participants
7 <sup>th</sup> International Conference On Opportunities and Challenges in Agriculture, Environmental & Biosciences for Global Development (OCAEBGD-2022)"	29.10.2022 to 31.10.2022	College of Horticulture and Forestry, Central Agricultural University, Arunachal Pradesh and Don Bosco College of Agriculture, Goa	Dr. N. A. Giri and Dr. P. Roopa Sowjanya
National Press Conference on the Eve of Foundation Day of ICAR –NRCP, Solapur	24.09.2022	Online, ICAR- NRCP	Dr. A.K. Singh, Dr. R.A. Marathe, Dr. Jyotsana Sharma, Dr. N.V. Singh, Dr. P.G. Patil, Dr. Shilpa P., Dr. Roopa Sowjanya Dr. S.S. Pokhare
International conference on Advances in Agriculture and Food System towards Sustainable Development Goals (AAFS-2022)	22.08.2022 to 24.08.2022	University of Agricultural Sciences, Bangalore	Dr.N. A. Giri, Dr. N. N. Gaikwad, Dr. Ashis Maity
1 <sup>st</sup> National Conference on Plant Genetic Resources Management (NCPGRM 2022)	22.11.2022	New Delhi	Dr. Shilpa P.
International Conference on Harnessing Indian Agriculture for Indigenous and Global Prosperity	22.07.2022 to 23.07.2022	NAS Complex, ICAR, New Delhi	Dr. Mallikarjun H.
4th International Conference Global Agriculture, Forestry, Environment and Food Security	17.09.2022 to 19.09.2022	Institute of Forestry, Pokhara Campus Pokhara, Nepal (Online)	Dr. Mallikarjun H.
National Conference on Tribal Horticulture	17.10.2022 to 18.10.2022	Dr. YSR Horticulture University Andhra Pradesh- Online	Dr. Mallikarjun H.
National Dialogue on Soil Use: Problems and Solutions;	19.08.2022	National Environmental Engineering Research Institute (NEERI), Nagpur	Dr. R.A. Marathe, Dr. Mallikarjun H. Mr. Rahul Damale
Clean Plant Nursery Certification Workshop Jointly organized by Department of Horticulture, Government of Himachal Pradesh, & Asian Development Bank	06.07.2022 to 07.07.2022	Hotel Claridges, New Delhi	Dr. N.V. Singh
Agri-Drone Projects for Orientation Session at AAU Anand	07.07.2022	Anand Agricultural University, Anand	Dr. N.V. Singh



## Trainings/ FLDs/ OFTs organized for the farmers/ students/ entrepreneurs etc. by NRCP

Title	Date	Co-ordinator	Participants and Venue
Scope for pomegranate cultivation in Kalaburagi District of Karnataka	29.11.2022	Dr. Pinky Raigond, Dr. Shilpa P., Dr. Mallikarjun H. & Dr. C. Awachare	(94) KVK, Kalaburagi
Field Day for pomegranate organized by ICAR- NRCP, Solapur	15.07.2022	Dr. Dhinesh Babu	(50) Wakil Vasti, Surwad, Indapur, Pune (TC, Solapur Lal)
Fertis India Pvt. Ltd. Sponsored training programme on Good Agriculture Practices for Quality Pomegranate Production and value addition"	10.08.2022 to 12.08.2022	Dr. Mallikarjun H. & Dr. Manjunatha N.	(25) ICAR- NRCP, Solapur
Training program on "Production of export quality Pomegranate Production" by NRCP in collaboration with APEDA, ATMA Solapur, Maharashtra Pomegranate Growers Association, Pune	02.09.2022	Dr. Somnath Pokhare	(110) ICAR-NRCP, Solapur
One day farmers training program on "Good Agricultural Practices in Pomegranate"	25.09.2022	Dr. Nilesh Gaikwad & Dr. Somnath Pokhare	(120) ICAR- NRCP, Solapur



*Inauguration of training program by Dr. R.A. Marathe, Director, NRCP, Solapur sponsored by Fertis India Pvt. Ltd.*



*Training programme on "Production of Export Quality Pomegranate" at NRCP on 07.06.2022*



*On-field farmers training program at Sangavi-Nighoj, Ahmednagar on 21.12.2022*







*Training program on "Production of export quality Pomegranate Production" at NRCP on 02.09.2022*



*NRCP staff attending online program on "Rashtriya Kisan Diwas" on 23.12.2022*

## Meeting organised at NRCP



*Shri Dashrath Tambhale, Director ATMA & SMART, Govt. of Maharashtra held meeting with beneficiaries of SMART project from Solapur District on 11.11.2022*



*A online programme on PM Kisan Sanman Nidhi attended by the staff on 17.10.2022*



*PM meeting with the Secretary General of the United Nations, Mr. Antonio Guterres at the launch of the Mission LiFE at Statue of Unity in Ekta on 20.10.2022*

## Farmers corner

ICAR-NRCP, Solapur played key role in registration of a farmer's Pomegranate variety under PPVFRA act of Govt. of India. Team of scientist involved in DUS centre of NRCP along with the duly appointed team visited a pomegranate orchard of Shri. Vittal Bhosale, Pomegranate grower from Tupewadi, Aurangabad, Maharashtra on 14.07.2022 in order take regular DUS observations and sample collection for evaluation of different fruit characteristics.







*Duly appointed DUS team for on-site testing of the farmers variety at Tupewadi, Aurangabad, M.S.*

## Training attended by NRCP staff

Title of the training	Date	Organizers	Participants
DBT-sponsored training on "Biosecurity and Biosafety: Policies, Diagnostics, Phytosanitary Treatments and Issues"	02.08.2022 to 11.08.2022	ICAR- NBPGR- Online	Dr. Mallikarjun H.
IP Awareness/Training program under National Intellectual Property Awareness Mission organized by Intellectual Property Rights Office, India	05.08.2022	Online Mode	Dr. N. N. Gaikwad
National Dialogue on Soil Use – Problems and Solutions	19.08.2022	NEERI, Nagpur	Dr. R. A. Marathe
Executive Development Programme on Leadership Development	04.07.2022 to 09.07.2022	ICAR- NAARM	Dr. R. A. Marathe



*Dr. R. A. Marathe, Director, NRCP undergone Executive Development Programme on Leadership Development at ICAR-NAARM, Hyderabad during July 4-9, 2022*

## Agricultural Exhibitions/ Farmers fair attended/ Technology displayed/ Demonstrated

- ICAR-NRCP participated in Kisan Agri Show, Pune during 14<sup>th</sup>-18<sup>th</sup> December 2022.
- ICAR-NRCP participated in Siddheshwar Krushi Exhibition during 29<sup>th</sup> December 2022 to 2<sup>nd</sup> January 2023.
- ICAR-NRCP participated in the programme and exhibition on Expansion of Value Chain in India Potential and Opportunities organized by NHB and showcased ICAR - NRCP technologies (especially pomegranate processing and value addition) to the visitors on 1<sup>st</sup> November, 2022 at VAMNICOM, Pune.







*Director, NRCP showcasing of ICAR- NRCP technologies to the Honorable Shri Narendra Singh Tomar, Minister of Agriculture and Farmers' Welfare, on 1 November, 2022 during exhibition at VAMNICOM, Pune*



*ICAR-NRCP participated in Kisan Agri Show, Pune during 14<sup>th</sup> to 18<sup>th</sup> December, 2022*

## Events organized under SCSP

- Conducted one-day "Educational Awareness cum Training Program on Agriculture" at NRCP on 12.8.2022. Beneficiaries were guided on importance of agriculture for livelihood. Later inputs were distributed to beneficiaries.



*Training programme and input distribution to SC students of Solapur, Maharashtra under SCSP scheme*

- Conducted one-day "Awareness cum Training Program on Pomegranate cultivation" at NRCP on 19.09.2022. Beneficiaries were guided on importance of agriculture for livelihood. Later inputs were distributed to beneficiaries.







*Training program and agri-input distribution to SC farmers of Kalaburagi, Karnataka under SCSP scheme*

- Conducted one-day on-farm awareness-cum-training programme on 'Scope for pomegranate cultivation' for SC farmers of Kalaburagi on 29.11.2022 at Kalaburagi. Farmers were guided on different aspects of pomegranate cultivation. Total 94 SC farmers participated in the training programme. Awareness was created among farmers to adopt pomegranate cultivation.



*Training programme for SC farmers of Kalaburagi, Karnataka under SCSP scheme*

## Events organized under STC (TSP)

Training details	Team	Input distributed
One-day workshop on "Awareness and Dissemination of Agriculture Technologies" tribal sub-plan of Gadchiroli district on 18.08.2022 in collaboration with KVK, Gadchiroli (under PDKV, Akola) (farmers beneficiaries: 74)	Course Director: Dr. R.A. Marathe Coordinator Dr. Mallikarjun M.H. Co-Coordinators Dr. Shilpa Parashuram Mr. Rahul D. Damale	Biofertilizer-Phosphate solubilizing bacteria (PSB), Biopesticide- <i>Trichoderma viridae</i> , Micronutrient: (PDKV-Grdae-2), Literature: Crop reference Book (POP) Krushi Sawadini-2022 and Equipment/Tools: Battery-operated Knapsack sprayer and Secateurs







*Distribution of Agriculture inputs and equipments to beneficiaries at KVK Sonapur, Gadchiroli*

## हिंदी पखवाडा

राष्ट्रीय अनार अनुसंधान केंद्र, सोलापुर में १४ से २७ सितंबर २०२२ के दौरान हिंदी पखवाडा मनाया गया। इस पखवाड़े के दौरान विभिन्न प्रतियोगिताएं जैसे कि आशुभाषण, वाद-विवाद, निबंध, हिंदी टिप्पण व् प्रारूप लेखन/पत्र लेखन, प्रश्न मंच, हिंदी काव्य पाठ, कंप्यूटर पर यूनिकोड में हिंदी टाइपिंग व कहानी लेखन का आयोजन कराया गया। हिंदी पखवाड़े में केंद्र के सभी कर्मचारियों ने बढ़-चढ़कर हिस्सा लिया। हिंदी पखवाड़े का समापन प्रतियोगिता के विजेताओं को मुख्य अतिथि, डॉ. आर.ए. मराठे निदेशक महोदय द्वारा सर्टिफिकेट्स देने से हुआ। हिंदी पखवाड़े का आयोजन श्री आर.बी.राय, प्रशासकिय अधिकारी इन्होंने किया था।



*निदेशक महोदय संबोधित करते हुए*



*मुख्य अतिथि निदेशक महोदय के करकमलों द्वारा सर्टिफिकेट्स लेते हुए केंद्र के कर्मचारी*

## 17<sup>th</sup> Parthenium Awareness Week



Parthenium awareness week, held annually from 16-22<sup>th</sup> August, is a program organized by ICAR-DWR Jabalpur, Madhya Pradesh. The 17<sup>th</sup> Parthenium awareness week has been conducted at ICAR- NRC on Pomegranate by uprooting and making of compost from parthenium and other weeds, waste stubbles. The program was inaugurated by Dr. R. A. Marathe Director, NRCP, Solapur. All staff participated by uprooting the parthenium grass at Crop Cafeteria, Kegaon & Hiraj field of NRCP. The parthenium awareness week program was attended by 35 to 40 participants. The awareness was created among participants.



## Swachhata Pakhwada

The Swachhata Pakhwada was celebrated at the institute from 16 to 31<sup>st</sup> December, 2022 by taking swachhata pledge. Coconut, Mangos plantations were conducted at Hiraj research field of ICAR-NRCP. Building premises, laboratories, library, guest house and research field were cleaned with the active involvement of ICAR-NRCP staff. The public places were cleaned with awareness among the people and dustbins also given to the public places. On the occasion of *Kisan Diwas* swachhata activity was conducted at Jaloli Ta. Pandharpur Dist. Solapur with the compost making demonstration to the farmers adopted under MGMG scheme. The debate competition and drawing competitions were conducted at Shree Sharadchandra Patil School, Solapur.



Cleanliness drive at school



Kisan Diwas Celebration and Swachhata Abhiyan at Jaloli



Plantation at Hiraj Farm of Institute



Distribution of cleaning materials

## Publications

### Research papers

1. Patil PG, Singh NV, Bohra A, Jamma S, Manjunatha N, Venkatesh SC, Dhinesh Babu K, Jyotsana S and Marathe RA (2022). Novel miRNA-SSRs for improving seed hardness trait of pomegranate (*Punica granatum* L.). *Frontiers in Genetics*. 13:866504. doi:10.3389/fgene. 2022.866504. (NAAS Score: 10.77).
2. Manjunatha N, Sharma J, Pokhare SS, Agarrwal R, Patil PG, Sirsat JD, Chakranarayan MG, Bicchal A, Ukale AS, Marathe RA (2022). Characterization of *Alternaria* and *Colletotrichum* Species Associated with Pomegranate (*Punica granatum* L.) in Maharashtra State of India. *Journal of Fungi*. 8, 1040. <https://doi.org/10.3390/jof8101040>. (NAAS Score: 11.82).





3. Patil PG, Jyotsana S, Manjunatha N, Singh NV, Bohra A, Gunnaiah R, Jamma SM, Vinayaka J, Sangnure VR and Marathe RA (2022). Identification and validation of SSR Markers for *Xanthomonas axonopodis* pv. *punicae* an incitant of bacterial blight of pomegranate. 3 Biotech 12:153. doi: 10.1007/s13205-022-03209-z. (NAAS Score: 8.89).
4. Maity A, Marathe RA, Sarkar A, Basak BB. (2022). Phosphorus and potassium supplementing bio-mineral fertilizer augments soil fertility and improves fruit yield and quality of pomegranate. Scientia Horticulturae, <https://doi.org/10.1016/j.scienta.2022.111234>, (NAAS rating: 9.46).
5. Maity A, Sharma J, Sarkar A, Basak BB. (2022). Zinc nutrition improves fruit yield, quality and reduces bacterial blight disease severity in pomegranate (*Punica granatum* L.). Journal of Plant Nutrition, <https://doi.org/10.1080/01904167.2022.2118610> (NAAS rating: 7.71).
6. Singh NV, Salunkhe O, Awachare C, Salutgi U, Sharma B, Parashuram S, Marathe, RA. (2022). Healthy Saplings – Key to Sustainable Pomegranate Production. Biological Forum – An International Journal 14(4): 1188-1194. (NAAS rating: 5.11)
7. Tonde AB, Bhoite AA, Gaikwad NN. (2022). Studies on microencapsulation of *Lactobacillus acidophilus* NCIM 5306 and evaluation of matrix material efficiency in pomegranate juice. Food Research 6(2): 255-264.

### Patent

1. Gaikwad Nilesh N. and Pal Ram Krishna (2022) "A Process of Extraction of Virgin Pomegranate Seed Oil with retention of bioactive compounds" Patent Filed Application No. 201611011366 E-2/528/2017/DEL.
2. Ashis Maity, R.K.Pal, J.Sharma (2022) Bio-formulation for potassium fertilizer supplement in pomegranate and process of preparation there of Patent No.403302. Date of grant-August 10,2022.
3. Tanbir Ahmad, Nilesh N. Gaikwad and Yogesh Kumar. (2022). An innovative poultry processing table. CBR No. 9785 APP. No. 3172/DEL/2012.

### Book Chapters

1. Babu N, Kashyap P, Prusty AK, Samant D, Maity A. (2022). Role of horticulture for sustainable food production under climate change scenario. In: Natural Resource Management in Horticultural Crops (Eds. Roy, S.S., Kashyap, P., and Adak, T.). Today & Tomorrow's Printers and Publishers, New Delhi-110002 pp. 293-313.
2. Patil PG, Singh NV, Shilpa P, Roopa Sowjanya P, Sharma J, Marathe RA. (2022). Recent advances in pomegranate genomics: Status and prospects: In Omics in Horticultural Crops,. Pages 193-203, ISBN 9780323899055 10.1016/B978-0-323-89905-5.00023-9
3. Gaikwad NN, Giri NA, Marathe RA. (2022) Pomegranate beverage, Pomegranate juice, pomegranate lime ginger beverage, pomegranate wine, minimally processed arils and pomegranate juice powder. In Innovative foods @icar, Indian Council of Agril. Research 110.

### Pomegranate Advisories/E-Publications/Other publications

1. Pinky Raigond (2022) Physiological disorders in pomegranate: impact of use of plant growth-promoting hormones for quality pomegranate production. E-training manual on 'Recent advanced practices for export quality pomegranate production and value addition' from June 6-10, 2022'. ICAR-NRCP, Solapur. Pp 33-36



2. Singh NV, Sharma J, Patil PG, Babu KD, Shilpa P, Sharma A and Marathe RA (2022). Pomegranate cultivation in dry land regions of India - a success story. *Krishi Science*. 4(2): 44-48.
3. Sharma, J., Maity, A., Singh, N.V., Mallikarjun, M.H., Manjunatha, N., Pokhare, S. and Chaudhari, D. (2022). Bimonthly Pomegranate Advisory for Bearing Orchards (October-November 2022) <https://nrcpomegranate.icar.gov.in/files/Advisory/123.pdf>
4. Sharma, J., Maity, A., Singh, N.V., Mallikarjun, M.H., Manjunatha, N., Pokhare, S. and Chaudhari, D. (2022). Bimonthly Pomegranate Advisory for Bearing Orchards (August-September 2022). <https://nrcpomegranate.icar.gov.in/files/Advisory/119.pdf>
5. Singh, N.V., Babu, K.D. and Maity, A. (2022). Adverse effects of high temperature on pomegranate. Available on Dalimbmitra Platform <https://dalimbmitra.com/wpcontent/uploads/2022/04/Effects-of-rising-temperature-on-pomegranate-sent-o-Dalim-mitra-on-12.04.2022.pdf>.
6. Awachare, C., Singh, N.V., Babu, K.D. and Marathe, R.A. (2022). Canopy management in pomegranate for improved fruit quality and yield. *Biotica Research Today* 4(1): 011-013.
7. Rahul Devidas Damale, Marathe R A, Gajanan Fuke, Dinkar Chaudhari, Dinesh K Babu (6 July 2022), Pomegranate phytochemicals and importance in human health & diet. *Krushi Sahkar* newspaper.
8. Rahul Devidas Damale, Marathe R A, Gajanan Fuke, Dinkar Chaudhari, Dinesh K Babu (7 July 2022), Pomegranate fruit and its importance in Ayurveda. *Krushi Sahkar* newspaper.
9. Rahul Devidas Damale, R A Marathe, Gajanan Fuke, (August 2022) Importance of healthy pomegranate, *Agrowan* newspaper.
10. Mallikarjun, M. H., Marathe, R. A., Manjunatha, N., Somnath, S. P., 2022. Shot Hole Borer: An Emerging Pest of Pomegranate Its Diagnosis and Management. 4<sup>th</sup> International Conference on "Global Efforts on Agriculture, Forestry, Environment and Food Security (Theme: Climate Change and Its Impact) (GAFEF-2022)" organized by Agricultural and Environmental Technology Development Society (AETDS) U.S. Nagar Uttarakhand, India from September 17-19, 2022 Souvenir book Gafef Vol-2, Page No. 519. ISBN: 978-93-5659-453-1.
11. Mallikarjun, M. H., Shilpa, P., Rahul Damale, Singh, N.V., Somnath, S. P., Marathe, R. A. 2022. A sub-plan approach for tribal development at Gadchiroli, Maharashtra. National Conference on Tribal Horticulture (hybrid mode) October 17-18, 2022, (THS1007). Organized by Dr. YSR Horticultural University Venkataramannagudem, West Godavari District, Andhra Pradesh. Souvenir cum abstract book. PNo.136.

### Technical / extension bulletins

1. Shilpa P, Roopa Sowjanya P, Babu KD, Singh NV, Gaikwad NN, Sharma J, Mallikarjun MH, Patil PG, Chandra R and Marathe RA (2022). DUS catalogue of pomegranate cultivars (Part-I). Technical Bulletin No. NRCP/2022/2, ICAR-National Research Centre on Pomegranate, Solapur, p.55.
2. Patil PG, Singh NV, Sowjanya R, Parashuram S, Babu KD and Marathe RA (2022). Genomics Enabled Pomegranate Improvement, Technical Bulletin No. NRCP/2022/1, ICAR-National Research Centre on Pomegranate, Solapur.
3. Singh NV, Shilpa, Roopa Sowjanya, P., Sharma, J., Mallikarjun, MH, Maity, A., Gaikwad, NN, Babu, KD, Pokhare, S., Manjunatha, N., and Marathe, RA. (2022). Promotion of ICAR-NRCP, technologies under SCSP programme. Technical Bulletin No. NRCP/2021/1, ICAR-National Research Centre on Pomegranate, Solapur.





4. Sharma, J., Manjunatha, N., Pokhare, S. S. and Marathe. R. A. (2022). Stem Solarization to Control Bacterial Blight Disease (Eco-friendly, Economical and Effective Technology) Extension Bulletin No.4/NRCP/2022 ICAR – National Research Centre on Pomegranate, Solapur, (MS), India, 12 p.

### Extension folders

1. Pinky Raigond, Nripendra V. Singh, Shilpa Parashuram, Chandrakant Awachare, Roopa Sowjanya, Rajiv A. Marathe (2022) Physiological disorders in pomegranate and their management. ICAR-National Research Centre on Pomegranate.
2. पिकी रायगोंड, नृपेन्द्र वी. सिंह, शिल्पा परशुराम, चंद्रकांत अवचारे, रूपा सौजन्या, राजीव अ. मराठे (2022) अनार में अजैविक विकार व प्रबंधन. आई.सी.ए.आर.-राष्ट्रीय अनार अनुसन्धान केंद्र, सोलापुर, महाराष्ट्र.
3. Pokhare, S. S., Sharma, J., Manjunatha, N., and Marathe. R. A. (2022). Nematode management in Pomegranate. ICAR-NRCP/EXTN/2022/2.
4. डॉ. सोमनाथ पोखरे, डॉ. ज्योत्सना शर्मा, डॉ. मंजुनाथ एन., आणि डॉ. राजीव मराठे (२०२२). डाळिंबातील सूत्रकृमीचे एकात्मिक व्यवस्थापन. विस्तार पत्रिका २०२२/२

### Training manual

- Mallikarjun M. H., 'E-Training manual on "Good Agriculture Practices for Quality Pomegranate Production and value addition from August 10-12, 2022" at ICAR-National Research Centre on Pomegranate, Solapur, Maharashtra, India. Technical E-Training Manual No. NRCP/2022-1. Page 119.

### Video film

- NV Singh, Shilpa P, Roopa Sowjanya P, Yuvraj Shinde, Mahadev Gogoan, Jyotsana Sharma and RA Marathe, (2022), NRCP SCSP Tikamgarh interventions in Pomegranate production: <https://youtu.be/s5RltT2YQ7I>

### New Projects sanctioned

- Genome wide association mapping in Pomegranate to identify novel genes funded by DST - SERB, GOI of total budget Rs.49,97,419 for the period of August 2022 to August 2025 (PI: Dr. P. Roopa Sowjanya).

### Peer recognitions/ Awards/ Honours received by the NRCP staff

- **Dr. R.A. Marathe** received "**Eminent Scientist Award-2022**" in 4<sup>th</sup> International Conference, GAFEF-2022 during September 17-19 at Tribhuvan University, Nepal.
- **Dr. N.V. Singh** awarded as Fellowship of the Indian Academy of Horticultural Sciences-2022 by Indian Academy of Horticultural Sciences, New Delhi.
- **Namrata Ankush Giri\***, Nilesh N. Gaikwad, Ashis Maity, Manjunatha N. and R. A. Marathe. 1<sup>st</sup> position in **Best oral presentation award** for presentation on "Utilization of pomegranate by-product for oxidative and microbial stability of muffins" in "International conference on Advances in Agriculture and Food System towards Sustainable Development Goals (AAFS-2022)" at during 22-24 August, 2022 at UAS, Bangalore.
- **Namrata Ankush Giri\***, Nilesh N. Gaikwad, Prasad Gaikwad and R. A. Marathe. 1<sup>st</sup> position in **Best oral presentation award** for presentation on "Physico-Chemical Properties of Pomegranate Peel Powder and Its Utilization as Natural Preservative in Muffins" in "7<sup>th</sup> International Conference on



Opportunities and Challenges in Agriculture, Environmental & Biosciences for Global Development (OCAEBGD-2022)" during 29-31 October, 2022 at Don Bosco College of Agriculture, Goa.

- **P. Roopa Sowjanya** received Best oral presentation award in "7<sup>th</sup> International Conference on Opportunities and Challenges in Agriculture, Environmental & Biosciences for Global Development (OCAEBGD-2022)" during 29-31 October, 2022 at Don Bosco College of Agriculture, Goa.

## MoU/ Linkages/ Commercialization of Technologies

- NRCP, Solapur Signed MoU with ICAR-NAARM, Hyderabad as a-IDEA Technology, Business Incubator with the support of DST, DBT & NABARD Govt. of India on July 9, 2022.
- NRCP recognized as Centre of Excellence for Pomegranate by the MAGNET, An Asian Development Bank Funded project of Govt. of Maharashtra on 20 July 2022.
- MoU signed between NRCP, Solapur and M/s. Bharti Green Tech for transfer of technology on "A novel bio-formulation for potassium fertilizer supplement in pomegranate and process of preparation thereof" on 20 August, 2022.
- Dr. R. A. Marathe, Director handed over Technology Licensing MoU of Bio-hardening Protocol to Mr. Anil Patil Vice President, Jain Irrigation Systems Ltd. on 28 July, 2022.
- MoU was signed between NRCP, Solapur and M/s. Sheel Biotech for transfer of technology on "A novel bio-formulation for potassium fertilizer supplement in pomegranate and process of preparation thereof" on 28.07.2022.



*NRCP, Solapur Signed MoU with ICAR-NAARM, Hyderabad on July 9, 2022*



*NRCP recognized as Centre of Excellence for Pomegranate by the MAGNET, Govt. of Maharashtra on 20 July 2022*



*MoU signed between NRCP, Solapur and M/s. Bharti Green Tech on 20 August, 2022*



*Technology Licensing with Jain Irrigation Systems Ltd. on 28 July, 2022*







*MoU signed between NRCP, Solapur and M/s. Sheel Biotech New Delhi on 28.07.2022*

## Distinguished Visitors to ICAR-NRCP, Solapur



*Hon. Member of Parliament Dr. Jaisiddeshwar Mahaswami ji at ICAR-NRCP, Solapur on 17.10.2022*



*Visit of Dr. Praveen Kumar, Director, ICAR – CCARI, Goa, Dr. Rajeev Srivastava, Ex-Head, NBSS & LUP, Nagpur; Dr. S.K.Dubey, Ex. Head, ICAR-IISWC, Dr. Ajit Kumar Deshpande, MPKV, Rahuri on 20.10.2022*

## Students & Farmers Visit

S.N.	Date	Organization/Place	Category Farmers	No. of Beneficiaries
1	02.09.2022	ATMA Solapur, Scientist-Farmer Interaction	Farmers	100
2	08.08.2022	Sadguru College of Agriculture, Mirajgaon	Student	120
3	29.08.2022	College of Agriculture, Akulj	Student	31
4	19.09.2022	College of Agriculture, Osmanabad	Student	69
5	24.09.2022	College of Agriculture, Parbhani	Student	115
6	26.09.2022	College of Biotechnology, Latur	Student	106
7	27.09.2022	College of Agriculture, Parbhani	Student	123



8	17.10.2022	College of Biotechnology, Latur	Student	40
9	19.10.2022	College of Agriculture, Pathari	Student	68
10	15.11.2022	Vidya Pratishthan College, Baramati	Student	98
11	18.11.2022	Brahmadev Mane Junior college, Belati Solapur	Student	75
12	22.12.2022	DBF dayanand college of Arts and science, Solapur	Student	50
13	27.12.2022	Lokmangal college of Agriculture, Wadala	Student	22
14	27.12.2022	College of Agriculture, Umerkhed, Yavaatmal	Student	75
15	29.12.2022	Walchand College, Solapur	Student	65

### T.V. Programme / Radio talk

Dr. Nilesh Gaikwad has participated as subject specialist in the Hello Kisan–Phone in programme entitled "Pomegranate processing and entrepreneurship development" through DD Kisan on 21 December, 2022.

### Infrastructure Created

Two laboratories for carrying research work related to genomics and genetics & plant breeding were created at NRCP. These laboratories are equipped with sophisticated instruments like PCR machine, RT-PCR, Fragment analyzer, Gel documentation system, Nano drop Spectrophotometer, high throughput liquid handling system, tissue lyser, and other minor equipment's related to genomics work.



*Genomics Laboratory*



*Genetics and Plant Breeding Laboratory*

### Transfer and Promotion

Dr. Ashish Maity, Sr. Scientist, Soil Science, relieved on 20 August, 2022 after transfer from ICAR-NRCP, Solapur to ICAR-IIWM, Bhubaneswar, Odisha.

Shri R. B. Rai promoted to Administrative Officer with effect from 03 August, 2022 at ICAR-NRCP, Solapur.









