



# Newsletter

## ICAR-NRC on Pomegranate



NRCP Newsletter, Jan-June, 2025

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<p><i>Produced &amp; Published by:</i></p> <p><b>Dr. R. A. Marathe, Director</b>            ICAR-National Research Centre on            Pomegranate, Kegaon, Solapur,            Maharashtra            Ph: 0217-2354330            Email : nrcpomegranate@gmail.com</p>	<p><i>Compiled &amp; Edited by:</i></p> <p>Dr. Pinky Raigond, Sr. Scientist (Plant Physiology)            Dr. Somnath S. Pokhare, Sr. Scientist (Nematology)            Dr. Namrata A. Giri, Scientist (Food Technology)            Website : <a href="https://nrcpomegranate.in">https://nrcpomegranate.in</a></p>



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## Stakeholders Meet on High Value Horticultural Crops

Stakeholders Meet on ‘Production, Value Addition, and Export of High-Value Horticultural Crops’ was successfully organized by ICAR-National Research Centre on Pomegranate (NRCP), Solapur in collaboration with the Mahatma Gandhi Institute for Rural Industrialization (MGIRI), Wardha, Maharashtra. The event held at the National Agriculture Science Complex in New Delhi, witnessed the participation of around 50 industry stakeholders, including planting material suppliers, agri-input dealers, value addition experts, marketing professionals, and exporters.

The meeting was graced by Dr. S. K. Singh, DDG (HS), ICAR, New Delhi, as the Chief Guest, alongside Dr. S. N. Jha, DDG (Agril. Engg.), ICAR, New Delhi, as the Guest of Honor. The inaugural session commenced with a welcome address and opening remarks by Dr. R. A. Marathe, Director, NRCP, Solapur, followed by an insightful address on entrepreneurship development by Dr. A. A. Murkute, Director, MGIRI, Wardha. As part of the event, NRCP, Solapur, felicitated two progressive farmers, Shri. Bhagwat Uttam Pawar and Shri. Nanaso Dada Gadade from Solapur, with the prestigious ICAR-NRCP “Anar Gaurav Puraskar” for their dedicated efforts in producing sustainable, residue-free, export-quality pomegranates and guiding other pomegranate fellow farmers. ULink AgriTech Pvt. Ltd. (INI Farms) was also honored on this occasion for their contribution in successfully exporting Indian pomegranates to the United States of America (USA).

The event continued with insightful technical sessions where industry experts shared their knowledge and discussed challenges faced in horticultural exports. Technical Session-I was chaired by Dr. V. B. Patel, ADG, ICAR, New Delhi, and Dr. Sachin Suroshe, Project Coordinator (PC), AICRP Honey Bees and Pollinators, New Delhi. The presentations were made by Dr. Sunil Pareek, Professor and Dean, NIFTEM-K, Haryana; Mr. Sukhdev Singh, Founder & Group CEO Food Freshly, Germany; Mr. Atul Wable, ULink AgriTech, Pvt. Ltd. (INI Farms); Mr. Prashant Indalkar, SamAgri, Hyderabad and Mr. Karan Sinha, Director of Agriculture and Climate action, Mann Deshi Foundation, Satara.

Technical Session II was chaired by Dr. Sudhakar Pandey, ADG (Flower/Veg./Spices/Med. Plants) and Dr. K. Narsaiah, ADG (PE), ICAR, New Delhi. Key discussions focused on challenges in exports, availability of commodities, and extending the shelf life of pomegranate arils for the export market. The presenters were Dr. Kaushik Banerjee, Director, ICAR-NRCG, Pune; Dr. Nilesh N. Gaikwad, ICAR-NRCP, Solapur; Dr. Aparjita Vardhan, Principal Scientific Officer, MGIRI, Wardha; Er. Vinay Pol, Bharti Green Tech Pvt. Ltd., Dahiwadi, Satara, and Mrs. Swapna Jarag, Grow India Import Export, Pune.

The stakeholder meet facilitated crucial discussions among farmers, scientists, industry leaders, and exporters, paving the way for future collaborations in high-value horticulture exports. The stakeholder meet was successfully organized by the team led by Dr. R. A. Marathe (Convener) and Dr. A. A. Murkute (Co-convener), with Dr. Nilesh Gaikwad and Dr. Namrata Giri serving as Organizing Secretaries, and Dr. Somnath Pokhare and Dr. Nripendra Singh as Co-organizing Secretaries.





*Dignitaries on dias during inauguration programme of stakeholders meet*



*Participants during the inaugural program of stakeholders meet*



*Dr. S. K. Singh, DDG (HS), ICAR, New Delhi felicitating “Anar Gaurav Puraskar” to Shri. Bhagwat Uttam Pawar*



*Dr. S. N. Jha, DDG (Agril. Engg.), ICAR, New Delhi Felicitating “Anar Gaurav Puraskar” to Shri. Nanaso Dada Gadade*



*Technical session's co-ordinators during Stakeholders Meet*



*Organizing team of Stakeholders Meet with Participants*



## National Conference on Innovative Technologies for Rural Development and their Commercialization

NRC on Pomegranate, Solapur in collaboration with Punyashlok Ahilyadevi Holkar (PAH) Solapur University, Solapur and Sinhgad Institute, Solapur organized National Conference on “Innovative Technologies for Rural Development and their Commercialization” during 3-5 March 2025.

Padmashree Dr. Shivam Bhoje, Former Director, Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam (Tamil Nadu), graced the inauguration of the national conference as the Chief Guest. Hon’ble Prof. Dr. P. A. Mahanawar, Vice Chancellor (PAH Solapur University, Solapur); Dr. Rajiv A. Marathe, Director (NRCP, Solapur); and Hon’ble Shri Sanjay Navale, Campus Director Sinhgad Institutes Solapur, were also present on the occasion. All the scientists, research scholars, Young professionals participated in the conference and participated in poster and oral presentations. NRCP also participated in the exhibition of institute technologies during the event. Many students, farmers, faculties visited the exhibition stall. Dr. R.A. Marathe, Director, ICAR-NRC on Pomegranate, Solapur acted as convener, Dr. Nilesh N. Gaikwad, as Co-convener, Dr. Namrata A. Giri and Dr. Somnath S. Pokhare as organizing committee members for the national conference



*Dignitaries on dias during inauguration of National Conference*



*Visit of Prof. P. A. Mahanawar, Vice Chancellor, PAH Solapur University and Director, NRCP at exhibition stall*



## Workshop on Agricultural Entrepreneurship for Empowering Farmers through Value Addition and Skill Development

One-day workshop on “Agricultural Entrepreneurship for Empowering Farmers through Value Addition and Skill Development” was organized by NRCP, Solapur on 4<sup>th</sup> March 2025 at Sinhgad Institute, Solapur. Dr. S. H. Pawar, Research Director, CRTD, Sinhgad Institute, Solapur, and Dr. R. A. Marathe, Director, NRCP, Solapur, graced the occasion and addressed the gathering on the significance of entrepreneurship and skill development in agriculture and processing. Dr. S. D. Navale, Professor, N.B.N. Sinhgad College of Engineering, Solapur, delivered an insightful talk on “Entrepreneurship Development through Agricultural Skill Development.” More than 100 farmers & students participated in the workshop.

During the event, a MoU was signed between NRCP and Sinamai Karjat Agro Farmers Producer Company Limited, Mirajgaon, Ahilyanagar, Maharashtra for providing technical support to produce high-quality and export-grade pomegranates. Two technical sessions were organized on the themes: “Value Addition and Skill Development in Pomegranate & Banana” and “Value Addition and Skill Development in Millets, Flowers & Sericulture.” Nine experts working on several crops like Pomegranate, Banana, Millets and Floriculture delivered insightful lectures for these sessions.



*Inauguration of Workshop by Director, NRCP*



*MoU between NRCP and Sinamai Karjat Agro FPC Ltd., Mirajgaon, Maharashtra*

First technical session was conducted by Dr. K. Dhinesh Babu and Dr. Ranjan Kumar Singh. Dr. Nilesh N. Gaikwad and Dr. Somnath Pokhare, Dr. Suresh P. from the ICAR-NRC on Banana, and Dr. Kiran Jadhav from KVK, Jalgaon shared their insightful thoughts. The second technical session was conducted by Dr. Sangram Dhumal and Dr. Baswaraj Raigond. This session covered expert lectures by Dr. Dinesh Kshirsagar from KVK Mohol, Dr. Parashuram Patroli from the Centre on Rabi Sorghum, and Dr. Rahul Yadav and Dr. Ganesh Kadam from the ICAR-Directorate of Floriculture Research.

For the successful organization of the workshop, Dr. R. A. Marathe, Director, NRC on Pomegranate, Solapur, served as the Convener; Dr. Nilesh N. Gaikwad and Dr. Namrata A. Giri served as the Organizing Secretaries and Dr. Somnath S. Pokhare served as the Co-Organizing Secretary.



## Viksit Krishi Sankalp Abhiyan

NRCP scientists actively participated in the Viksit Krishi Sankalp Abhiyan (VKSA) 2025, a nationwide Pre-Kharif campaign organized from May 29 to June 12, 2025 throughout the country. This abhiyan was launched by the Ministry of Agriculture and Farmers Welfare and the ICAR with an aim to promote modern agricultural technologies among farmers across India. All the scientist of NRCP contributed in this technology outreach event by joining hands with five KVKs of Maharashtra. Teams visited and interacted with the farmers of different villages under the jurisdictions of KVKs located at Solapur-I (Shabari Pratishtan KVK), Solapur- II (KVK, Mohol), Dharashiv (Tuljapur KVK), KVK Latur and KVK Nanded.

The teams created awareness among farmers on advanced technologies developed for crops / animal husbandry by different research institutes of ICAR in general and NRCP in particular. Experts from institutes and KVKs guided farmers on diseases, insect-pests identification and their management practices. Awareness created on using disease free planting material from certified nurseries to improve crop health and yield. Scientists distributed NRCP's publications and guidelines to enhance accessibility of scientific knowledge on pomegranate cultivation.



*Director NRCP, Solapur attended the VKSA meeting at KVK, Narayangaon, Pune*





## Pomegranate Buyer-Seller Meet in Rajasthan

Team of scientists (Dr. Sangram S. Dhumal, Dr. Ranjan Kumar Singh, Dr. Somnath S. Pokhare and Dr. Namrata A. Giri) participated in the two days pomegranate buyer-seller meet on “Pomegranate from farm to international market: Pomegranate production, processing, export and market management for Rajasthan state”. This programme was organized by APEDA, New Delhi in collaboration with DOA, NRCP, AEFC, State Agriculture University during 6-7 January, 2025 at Balotra district, Rajasthan. About 50 farmers and 30 exporters participated in the meet. Dr. Somnath Pokhare delivered a lecture on Export Quality Pomegranate Production at the meet. The program was followed by the field visit to nearby pomegranate orchards and on farm interaction with farmers.



### *Inauguration of buyer-sellers meet*



## *Address to stakeholders by Dr. Sangram Dhumal*



*Lecture on 'Export Quality Pomegranate Production' by  
Dr. Somnath Pokhare*



## *Display of NRCP Technologies and interaction with visitors*

## **Technical Advice for the establishment of ‘Centre of Excellence for Pomegranate’ in Gujarat**

On the basis of invitation received from the Gujarat State Agriculture Department requesting inputs and technical advice for the establishment of Centre of Excellence (CoE) for the Pomegranate near Morbi in Gujarat, a team of scientists consisting of Dr. Sangram S. Dhumal, Dr. Ranjan Kumar Singh, Dr. Somnath S. Pokhare and Dr. Namrata A. Giri along with the officials from the Gujarat State Agriculture Department visited the proposed site of CoE as well as pomegranate orchards at Surendranagar, Dhrangadhra and Morbi area on January 8-9, 2025. Team also had an interaction with about 80 pomegranate farmers at



Govt's Surendranagar nursery farm where Dr. Somnath Pokhare delivered a lecture on 'Package of Practices for Quality Pomegranate Production'. Team had a meeting with the Director of Horticulture, Gujarat and other officials from the department on 10.01.2025 at Gandhinagar.



*Visit of NRCP team at pomegranate market and farmer's field in Gujarat*



*Lecture by NRCP team to pomegranate farmers*



*Pomegranate planting material inspection at farmer's field*



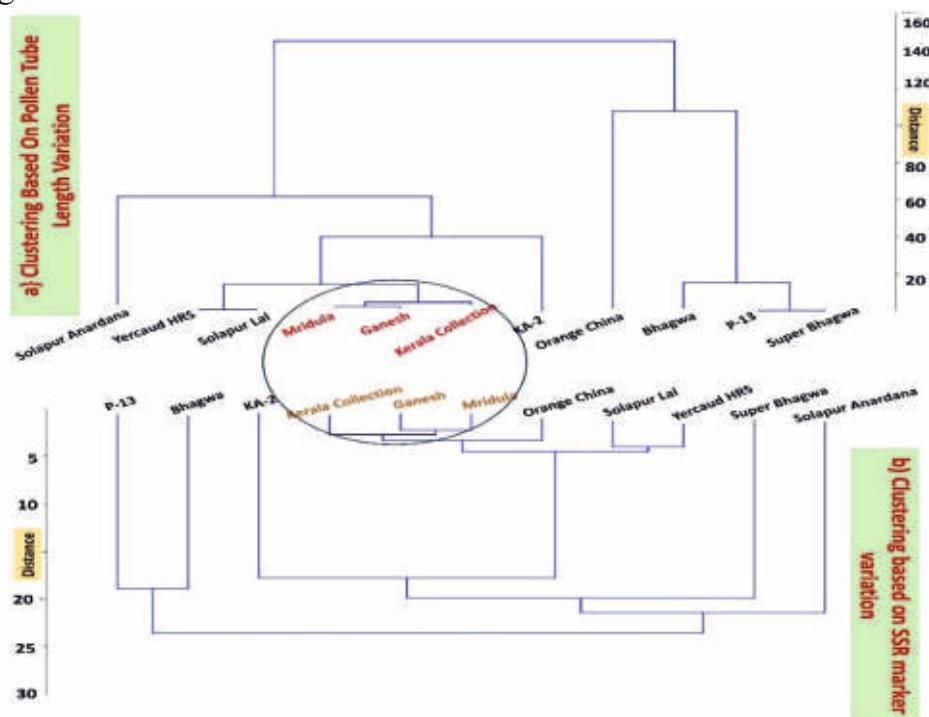
*Meeting of NRCP scientists with Director of Horticulture, Gujarat*



## Research achievements / Highlights / Technology developed

### Evaluation of pollen characteristics and SSR genotyping to identify superior pollen donors in pomegranate

This study evaluated pollen characteristics and genetic diversity among 11 pomegranate genotypes using phenotypic and SSR molecular marker assay. Pollen germination, viability, tube length, and morphology were assessed under *in vitro* conditions. Pollen germination significantly varied from 66.23% (Solapur Anardana) to 92% (Solapur Lal), while pollen tube length varied between 303.95  $\mu\text{m}$  (Solapur Anardana) and 583.71  $\mu\text{m}$  (Orange China). Pollen viability tests revealed values from 66.94% (Mridula) to 94.23% (P-13). Pollen morphology analysis indicated predominance of oval-shaped pollen in most genotypes, with Ganesh exhibiting the highest proportion (53.17%). The superior pollen performance observed in some germplasm may indicate these as promising pollen donors for hybridization and orchard pollination management.



**Dendrogram showing genetic distance between the pollen tube length of pomegranate varieties by NTSYS-pc software**

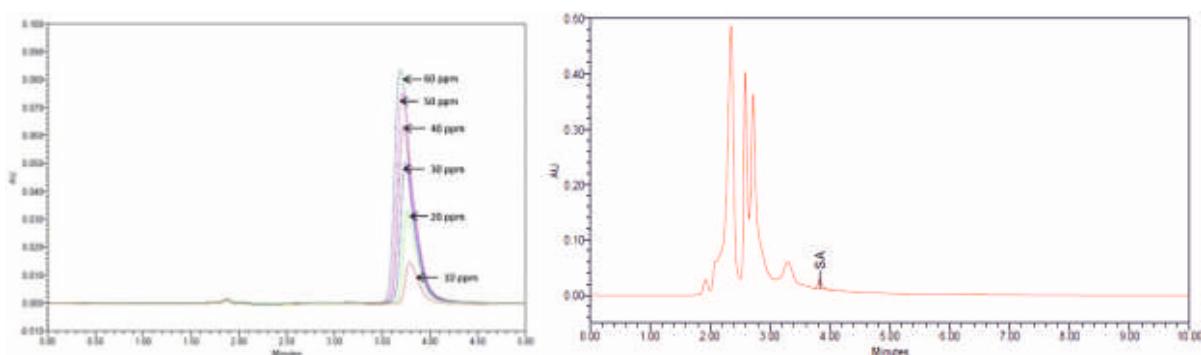
Molecular characterization of these genotypes using 19 SSR primers revealed high polymorphism (89% of primers were 100% polymorphic), enabling clear genotypic differentiation. Cluster analysis based on SSR data and pollen traits showed close genetic similarity between genotypes such as Kerala Collection, Mridula, Ganesh and high divergence between Solapur Anardana and P-13. The integration of pollen phenotypic data with molecular markers provided insights into the genetic basis of pollen performance, supporting the use of SSR markers in breeding programs for selecting superior pollen donors to enhance fruit set and hybridization efficiency in pomegranate.

*(P. Roopasowjanya, A. R. Kadam, A. Madave, K. D. Babu, R. A. Marathe)*



## HPLC method for evaluation of Salicylic acid in pomegranate plant parts

A protocol for estimation of Salicylic acid has been optimized on HPLC using isocratic system. Ratio of organic solvents in mobile phase and pH of solvent for preparing standards were major modifications along with other minor changes made for method optimization. After HPLC protocol optimization, sample extraction procedure was optimized using pomegranate leaf and fruit rind for estimation of free and free+bound form of salicylic acid. More peak area was obtained with liquid nitrogen extraction than direct solvent extraction and after pH adjustment of the sample. The retention time of salicylic acid was 3.8 minute. The limit of detection and limit of quantification with the optimized method were 0.16 mg/kg and 0.48 mg/kg, respectively. The linear range was 10-100 ppm with  $R^2$  0.999.



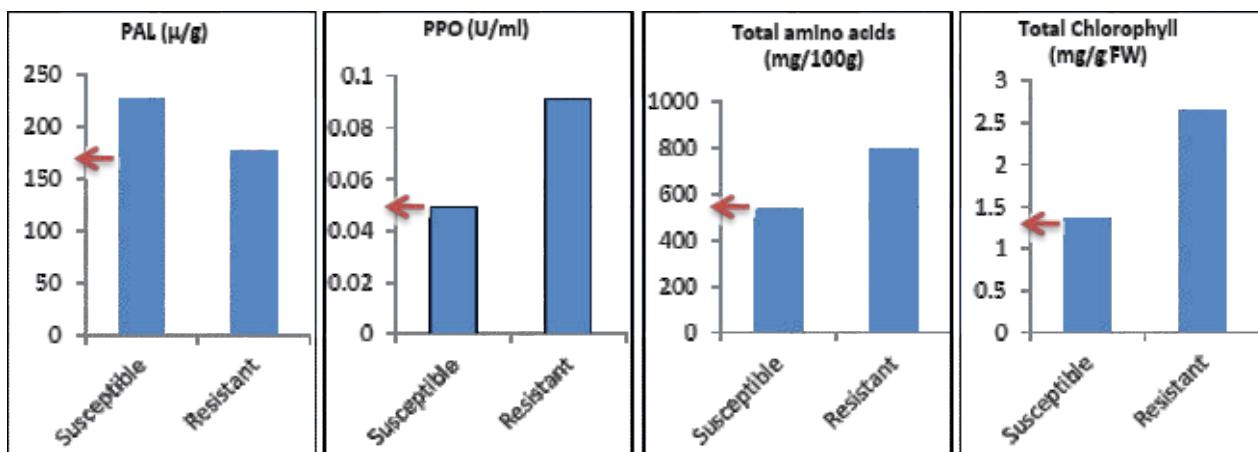
Overlay HPLC chromatogram of Salicylic acid standards (left), free form of salicylic acid in leaf (right)

(P. Raigond & R. A. Marathe)

## Identification of leaf-based biochemical markers for aril browning

To screen germplasm/ hybrid lines for resistance or susceptibility to aril browning at early stage, four leaf-based key biochemical parameters with significant correlation to aril browning were identified. For this, six contrasting pomegranate germplasm for aril browning (three resistant *viz.* Jodhpur collection, IC318754, Bedana thin skin, & three susceptible *viz.* Ganesh, 1205, G137) were selected for identification of leaf based biochemical markers linked to aril browning. The results showed that the leaf biochemical composition varies significantly between resistant and susceptible germplasm indicating the role of certain leaf biochemical parameters in imparting resistance to aril browning. Amongst all the tested parameters, phenylalanine ammonia lyase, polyphenol oxidase, total free amino acids and total chlorophyll showed clear cut difference between contrasting germplasm. Phenylalanine ammonia lyase activity was 22% lower, polyphenol oxidase activity was 86% higher, total free amino acids were 49% higher and total chlorophyll content was 96% higher in leaves of aril browning resistant germplasm. Total soluble sugars, starch, membrane thermal stability, total anthocyanins and peroxidase was non-significantly high in leaves of resistant germplasm than susceptible ones. These markers along with few molecular markers will be a useful tool to screen large number of germplasm/ hybrid lines.



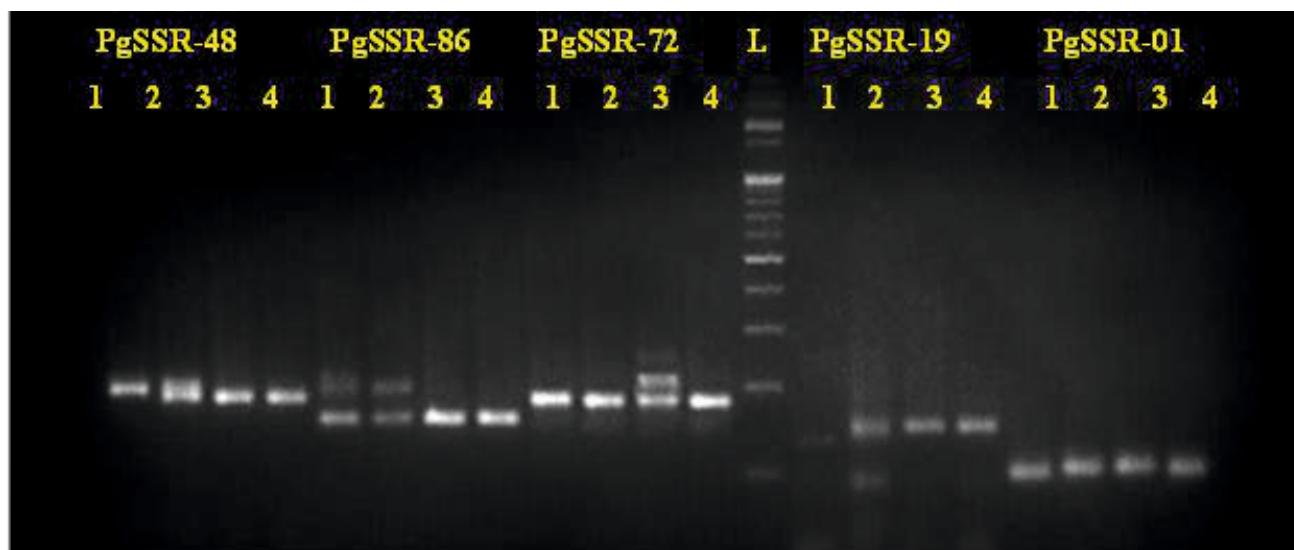


*Leaf based biochemical parameters with significant correlation to aril browning in contrasting germplasm*

(P. Raigond & S. Parashuram & R. A. Marathe)

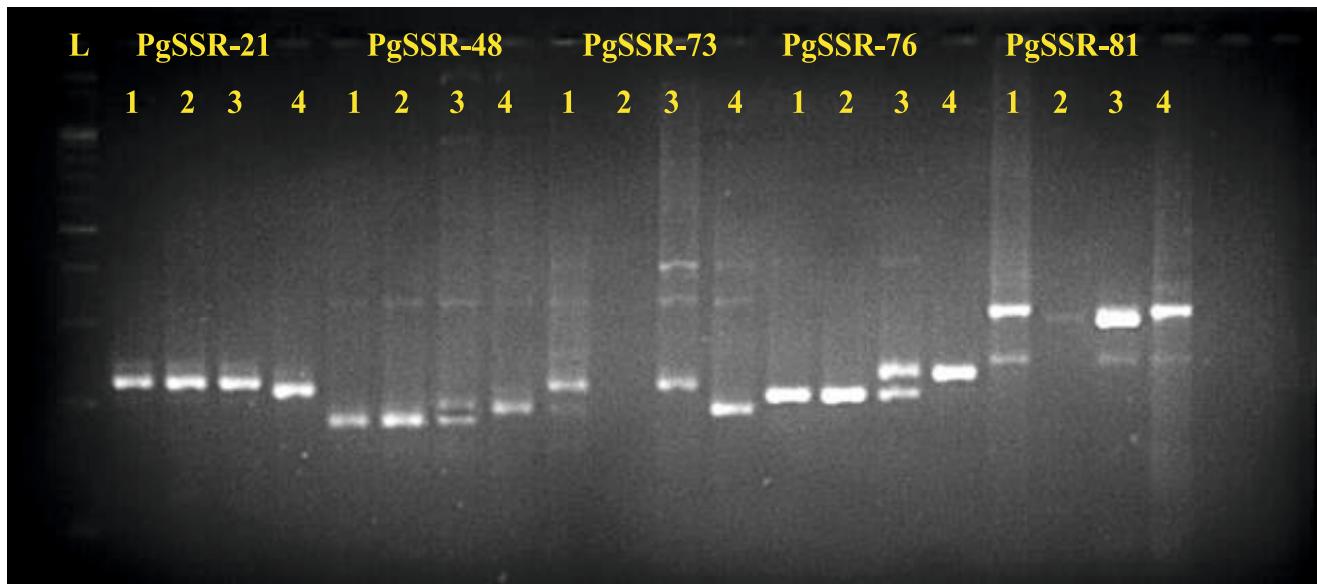
### Identification of polymorphic SSR markers for fruit cracking and aril browning in pomegranate

This study aimed to identify polymorphic SSR primers to distinguish fruit cracking and aril browning contrasting pomegranate germplasm for further utilization in linkage mapping. For fruit cracking, four lines (two resistant: IC-318718, 1201 & two susceptible: Yercaud HRS, Kabul Yellow) were genotyped with 64 SSR primers where 16 were found polymorphic (PIC: 0.25–0.63, avg. 0.49). Markers PgSSR4 and PgSSR86 effectively distinguished resistant germplasm from susceptible types. For aril browning, four lines (less aril browning: IC-318779, Kabul Yellow & high aril browning: Crenado-de-elcho, P-16) were tested with 60 SSR primers, where 15 were polymorphic (PIC: 0.12–0.68, avg. 0.45). PgSSR48 and PgSSR76 showed strong differentiation. Notably, PgSSR48 was able to distinguish the contrasting germplasm for fruit cracking and aril browning highlighting its potential for utilizing in developing linkage maps for both the traits.



*Amplification of pomegranate genotypes using polymorphic primers PgSSR48, PgSSR86, PgSSR72, PgSSR19, PgSSR1 (L: 100bp Ladder; 1: 1201; 2: IC-318718; 3: Yercaud HRS; 4: Kabul Yellow)*





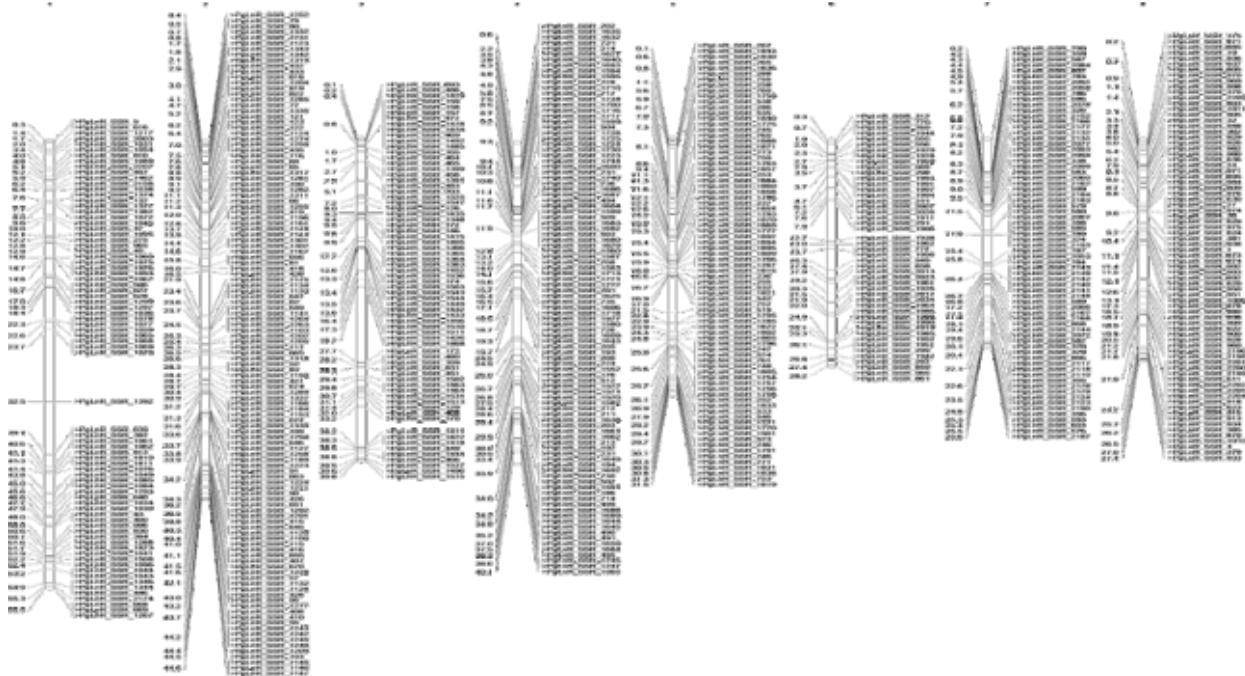
*Amplification of pomegranate genotypes using polymorphic primers PgSSR 21, PgSSR 48, PgSSR 73, PgSSR 76, PgSSR 81 (L- 100bp Ladder, 1- Kabul yellow, 2- IC-318779, 3- Crenedeo-de-elcho, 4- P-16)*

*(S. Parashuram, P. Raigond & R. A. Marathe)*

### **Development of novel long non-coding RNA and their target gene based SSR markers for trait mapping in pomegranate**

Total 2,520 LncRNAs expressed during fruit development stress in pomegranate were in silico analyzed. Identified 5,397 SSR motifs in these sequences and designed 2,212 LncRNA-SSR primers. Through ePCR validation, 2,127 primers got validated on Tunisia chromosomes. Subsequently, ePCR across four genomes resulted in identification of 634 single allele producing LncRNA primers. These 634 informative markers were physically located on Tunisia chromosomes. Further, in order to assign functional roles to these novel markers. The target analysis was performed for LncRNA sequences against 93 unique genes that are reported to be expressed during fruit cracking in pomegranate. This analysis helped to identify 19 candidate genes that are multiply targeted by 530 unique LncRNA coding sequences. Out of 19 target genes, 13 genes were found to be related to fruit development functional role. These results are confirmed through network analysis showing LncRNA and their target gene interactions. We also deployed 93 unique genes for designing of 38 EST-SSR markers. Finally, 103 primers were selected for wet lab validations, out of which 65 primers are LncR-SSRs and 38 are EST-SSRs from target genes. These markers will be useful in mapping fruit cracking tolerance in pomegranate.





**Physical locations of 634 LncRNA-SSR markers on Tunisia chromosomes**

(P. G. Patil, P. Raigond, S. Parashuram, C. Awachare, K. D. Babu & R. A. Marathe)

### Non-dairy based pomegranate peel extract fortified yoghurt for lactose intolerance

Lactose intolerance, a common digestive disorder affecting a significant portion of the global population, necessitates the development of alternative, non-dairy fermented food products. Plant-based yoghurts, such as those derived from soy milk, are gaining increasing attention due to their nutritional value, hypoallergenic nature, and suitability for vegan and lactose-intolerant individuals.

Pomegranate peels extract fortified soy yoghurt was developed. Yoghurt made with soymilk having 13°Bx TSS, 1% *Lactobacillus bulgaricus* and 10% pomegranate peel extract was most acceptable. It provides 127 mg GAE/100g total phenols (38 mg GAE/100g in control), 50% antioxidant activity (29% in control) and 5.2% protein (5.4% in control). During storage of yoghurt for 21 days at refrigerated temperature, the minimum viable count of *Lactobacillus bulgaricus* was maintained and considered as safe for consumption up to 21 days. The developed soy milk yoghurt fortified with pomegranate peel extract is ideal for lactose-intolerant individuals, rich in antioxidants and protein and being probiotic, support gut health similarly to dairy yoghurt.

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



## Events attended by the NRCP staff (Seminar/ Webinar/ Symposia/ Conferences)

- National Conference on “Digital Technologies for Transforming the Horticulture Sector” organized by Indian Academy of Horticultural Sciences (IAHS) and ICAR, during 28-30 January 2025 at Division of Agricultural Engineering, IARI, New Delhi (Dr. Mallikarjun M.H.)
- National Conference on “Innovative Technologies for Rural Developments and Their Commercialization” during 03-05 March, 2025 was co-organized by NRCP, Solapur, PAH University & N. B. Navale Sinhgad College of Engineering, Solapur at Sinhgad College of Engineering Solapur (All Scientists).
- 2<sup>nd</sup> International conference on Innovations in Biotechnology for sustainability during 10-11 March, 2025 organized by Dept. of Biotechnology, V.G. Shivdare College of Arts, Commerce and Science, Solapur (Dr. P. Roopa Sowjanya).
- World Intellectual Property Day-2025 organized by NRCP, Solapur on May 1, 2025 at NRCP, Solapur (All Scientists).

## Trainings/ FLDs/ OFTs organized for the farmers/ students/ entrepreneurs etc. by NRCP (on campus/ off campus)

### Field day

Visit and interaction of NRCP scientist's to pomegranate orchard of progressive farmers at Goudwadi, Sangola on 5 January 2025.



### Workshops

1. Farmer Scientist workshop for advance technologies in farming on 22<sup>nd</sup> May 2025, sponsored by Science and Engineering Board (SERB). Participants 62. (Dr. P Roopa Sowjanya).
2. One day workshop cum farmer scientist interaction meeting on “Quality Pomegranate Production” organized in collaboration with Mann Deshi Foundation on 17<sup>th</sup> January 2025 at Mardi, Mhaswad. Participants: 120 farmers (Coordinators: Dr. Somnath Pokhare, Dr. Manjunatha N., Dr. Mallikarjun M.H., Dr. Chandrakant Awachare).



## Trainings

1. Three days training programme on 'Export Quality Pomegranate Production through Nutrition, Abiotic and Biotic Stress Management' during 30<sup>th</sup> January- 1<sup>st</sup> February, 2025 sponsored by Valagro Biosciences Pvt. Ltd. Participants: 36 (Coordinators: Dr. Somnath Pokhare, Co-coordinators: Dr. Nilesh Gaikwad & Dr. Chandrakant Awachare).
2. Farmers' interaction-cum-training program on 'Management of Insect Pests and Diseases of Pomegranate' in collaboration with Casper Agro Science and IFFCO on March 8-9, 2025 at Hagaribommanahalli. Participants: 400 farmers (Resource persons: Dr. Mallikarjun M.H. and Dr. Manjunatha N.).
3. Training programme on 'Quality production, post-harvest management, Value addition, Processing, Packaging, Marketing and Export of Pomegranate' during 24-25<sup>th</sup> February 2025 at IIPM, Bengaluru sponsored by IIPM, Bengaluru and KAPPEC, Govt. of Karnataka in collaboration with NRCP, Solapur (Coordinators: Dr. Nilesh N Gaikwad, Dr. Namrata Giri and Dr. Somnath Pokhare).
4. Training programme on 'From Plantation to Postharvest: Key Practices for Successful Pomegranate Cultivation' during 10-12<sup>th</sup> March 2025 sponsored by Plantbiotix Bio-agri division of Zytex Biotech Pvt. Ltd. Participants: 15 (Coordinators: Dr. Pinky Raigond, Co-coordinators: Dr. Namrata A. Giri and Dr. Shilpa P.).
5. Training programme on 'Pomegranate Pest, Disease and Nematode management' on 18<sup>th</sup> June 2025 organized by Corteva Agriscience Pvt. Ltd. at Pachegaon, Khurd Sangola (Resource persons: Dr. Somnath S. Pokhare, Dr. Mallikarjun M.H. & Dr. Manjunatha N.).
6. One-day training program on 'Quality Pomegranate production in Rain-Shadow and Drought Prone Areas of Maharashtra' on 20<sup>th</sup> June, 2025 organized by ICAR - NRCP, Solapur in collaboration with Mann Deshi Foundation, Mhaswad, Satara (Team: Dr. Chandrakant Awachare, Dr. Somnath Pokhare, Dr. Manjunatha N., Dr. Mallikarjun M.H., Dr. Basana Gowda G.).
7. Two Farmer Interaction meetings on 'Good Horticultural Practices for Quality Pomegranate Production' organized in collaboration with Mann Deshi Foundation on 27<sup>th</sup> June, 2025 at Bidal, Mhaswad, Dist-Satara and Nirnimgaon, Malshiras Dist-Solapur. Participants: 210. (Team: Dr. Somnath Pokhare, Dr. Chandrakant Awachare, Dr. Manjunatha N., Dr. Basana Gowda G.).
8. Student Training under SERB Social Scientific Responsibility (SSR) conducted during December 2024 to March 2025 sponsored by SERB, DST (GOI). Participant: 01 (Dr. P Roopa Sowjanya).





**Training programme on “Export Quality Pomegranate Production through Nutrition, Abiotic and Biotic Stress Management” sponsored by Valagro Biosciences Pvt. Ltd. at NRCP, Solapur**



**Training program in collaboration with Mann Deshi Foundation, Mhaswad, Satara at NRCP, Solapur**



**Training programme in collaboration with IIPM, Bengaluru and KAPPEC, GoK. at IIPM, Bengaluru**



**Training cum farmer scientist interaction meeting in collaboration with Mann Deshi Foundation at Mardi, Mhaswad**





*Training programme sponsored by Plantbiotix - Bioagridivision of Zytex Biotech Pvt. Ltd.*

### **Other Programs**

1. Dr. R. A. Marathe, Dr. Somnath S. Pokhare and Dr. Chandrakant Awachare attended 'Farmers Conference' under Mann Deshi Mahotsav, on 7<sup>th</sup> February 2025 in Nerul, Mumbai.
2. Dr. Ranjan Kumar Singh participated in 'XVII Agriculture Science Congress' organized by National Academy of Agricultural Sciences (NAAS) during 20-22 February 2025 at G.B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand.
3. Dr. Nilesh Gaikwad and Dr. Somnath S. Pokhare participated in 'Pomegranate Stakeholders Meet' with World Bank Officials on 21<sup>st</sup> February 2025 at NRCP, Solapur.
4. Dr. Nilesh Gaikwad participated in BOS subcommittee meeting of Cosmetic Technology, PAHSU, Solapur for finalization of syllabus as per NEP on 6<sup>th</sup> March 2025.
5. Staff of NRCP participated in ICAR-South Zone Sports Tournament 2024 during 08-11 April, 2025 at ICAR-Sugarcane Breeding Station, Coimbatore.
6. Dr. Somnath S. Pokhare acted as coordinator in the Vikasit Krishi Sankalp Abhiyaan (VKSA) Kharif 2025 from 29<sup>th</sup> May-12<sup>th</sup> June 2025.
7. Dr. Basana Gowda, G. attended NAAS General Body Meeting and Foundation Day Programme on 5<sup>th</sup> June 2025 at NASC, New Delhi.
8. Dr. Nilesh Gaikwad visited cold Chain project (M/s. Vaishnavi Grape & Pomegranate Processing Private Limited, Solapur, Maharashtra) under PMSKY, MoFPI as member of Joint Inspection Team on 22<sup>nd</sup> June 2025.





*Sports Contingent with Director, NRCP*



*Dr. R. A. Marathe, Director NRCP at Mann Deshi Mahotsav, on 7<sup>th</sup> February 2025 in Nerul, Mumbai.*

### **Training attended by NRCP staff**

- Training on ‘AI in Agriculture’ organized by Division of Computer Application, ICAR-Indian Agricultural Statistics Research Institute during January 06-10, 2025 (Online) (Dr. Ranjan Kumar Singh).
- ‘MOOC Artificial Intelligence in Agriculture’, organized by MANAGE, Hyderabad during 1-28 February 2025 (Online) (Dr. Ranjan Kumar Singh).
- ‘Implementation of ISO/IEC 17025:2017 and internal auditing’ during 17<sup>th</sup> to 18<sup>th</sup> February 2025 (online) and 5-7 March 2025 (physical mode) at ICAR-NRCP,



Solapur. (Dr. Nilesh Gaikwad, Dr. Pinky Raigond, Dr. Manjunatha N., Dr. Mallikarjun M.H. and Dr. Namrata Giri).

- ‘Global GAP IFA V6 training programme’ during 21-25 April, 2025 organized by Project Unit, MIDH Division, Department of Agriculture & Farmers Welfare, Krishi Bhawan, New Delhi at Pune (Dr. Mallikarjun M.H.)
- ‘Plant water relations: Introduction to principles and measurements with Sap flow meter and Psychrometer’ organized by ICT International Pvt. Ltd. on 27 March, 2025 (Online) (Dr. Pinky Raigond).
- All staff attended different training programmes offered on iGOT portal through online mode.



*Training programme on “Implementation of ISO/IEC 17025:2017 and internal auditing”*

## Agricultural Exhibitions/ Farmers fair attended/ Technology displayed

- NRCP participated and exhibited stall in ‘XVII Agriculture Science Congress’ organized by National Academy of Agricultural Sciences (NAAS) during 20-22<sup>nd</sup> Feb 2025 at G.B. Pant University of Agriculture and Technology, Pantnagar (Dr. Ranjan Kumar Singh).
- NRCP participated and exhibited stall in Pusa Kisan Mela organized by IARI Campus, New Delhi during 22-24<sup>th</sup> Feb 2025 (Dr. Ranjan Kumar Singh).
- National Horticulture Fair-2025 during 27 February – 01 March 2025 organized by IIHR, Bengaluru, Karnataka (Dr. Shilpa Parashuram, Dr. Manjunath N.).





*Exhibition of NRCP stall at Pusa Kisan Mela*



*Exhibition of NRCP stall at XVII Agriculture Science Congress, Pantnagar*



*NRCP team at NHF Exhibition at IIHR, Bengaluru*

### **Peer recognitions/ Awards/ Honors received by the NRCP staff**

- **Dr. Somnath S. Pokhare** received recognition as Cluster Head of the Centre of Excellence for the Pomegranate under Indo-Israel Agriculture Project (IIAP), jointly implemented by MIDH, Ministry of Agriculture & Farmers Welfare, Govt. of India and MASHAV, Embassy of Israel on 3<sup>rd</sup> June 2025.
- **Dr. Basana Gowda G.** selected as NAAS Associate (Plant protection) of the prestigious National Academy of Agricultural Sciences, New Delhi on 05<sup>th</sup> June, 2025.



- **Mr. Rahul Devidas Damale** received Netaji Subash ICAR International Fellow 2023-24 on 14<sup>th</sup> January 2025 by Agricultural Education Division, ICAR, New Delhi.
- **Dr. Pinky Raigond** awarded **Chandra Prabha Singh Young Scientist Award** by Indian Potato Association. She also bagged ‘**IPA medal for Best paper Award**’ for publication ‘Utilization of potato waste for production of bioethanol: A novel technology’, and ‘**IPA medal for Best Paper Award**’ for the paper ‘Analysis Of Carotenoids Metabolism Genes Landscape In Potato And Cloning Of Zeaxanthin Epoxidase Gene’, conferred by Indian Potato Association during National Symposium on ‘Harnessing potato innovations, diversity for food and nutritional security’ held during 27-29 January 2025.
- **Dr. Dhinesh Babu** elected as Councillor – West Zone to the Society for Promotion of Horticulture, ICAR-IIHR, Bengaluru for the period of two years wef. June-July 2025.
- **Deepali Kulkarni, Patil PG and Marathe RA** received Best oral presentation award for the paper entitled ‘SSR and gene based marker analysis for identifying unique and rare alleles in Pomegranate Cultivars’ during International Conference on ‘Innovations in Biotechnology for Sustainability (IBS2K25)’ held on 10-11<sup>th</sup> March 2025, organized by Department of Biotechnology at V. G. Shivedare College of Arts, Commerce and Science, Solapur, Maharashtra.



*Dr. Basana Gowda G. receiving NAAS Associate (Plant protection) award*

**Technology Developed / Certified / Commercialization / Linkages / Collaborations / MoU signed**





*Two technologies on “Trichoderma consortia technology for growth promotion & root promotion against soil borne pathogens” and “A Novel Bioformulation for potassium fertilizer supplement in pomegranate and process of preparation thereof” transferred to Kusani Green Agri Pvt. Ltd., Pusad, Dist-Yavatmal on 16.06.2025*



*Technology on “In vitro propagation of pomegranate cv. Bhagwa” transferred to Krishi Bounty (KB) Pvt. Ltd., Chennai, Tamil Nadu on 08.04.2025*





*Technology on “Two Stage hard wood cutting protocol of pomegranate including bio hardening” transferred to Mr. Pravin Mane, Pravin Dalimb Hi tech Nursery, Bairagwadi, Ta-Madha Dist Solapur on 29.04.2025*

### MoU with Academic Institutes

For facilitating students for Training and Research internships at NRCP, Solapur, the following MoU were signed with the academic institutions.

S. No.	Beneficiary Institution	Date of MoU
1.	Centre for Research & Technology Development, Sinhgad College of Engineering, Solapur	04.03.2025
2.	D.B.F. Dayanand College of Arts & Science, Solapur, Maharashtra	23.04.2025
3.	Walchand Institute of Technology, Solapur, Maharashtra	07.05.2025
4.	MIT Vishwapravayag University, Solapur, Maharashtra	08.05.2025

### Publications

#### Research papers

1. Raigond, P., Roopa Sowjanya, P., More, A., Zodage, S., Gawade, N., Parashuram, S., Giri, N., Patil P., Babu, D., Marathe. R. (2025). Morpho-nutritional diversity for biofortification traits to enhance fruit quality in pomegranate (*Punica granatum* L.). *Journal of Food Composition and Analysis*.141. **(NAAS rating: 10.00)**.
2. Awachare, C., Patel, J., Solomon, S. S., Raigond, P., Babu, K. D., Shilpa P., Sarkar, S., Kumar, M., Manjunath Prasad C.T., Marathe R.A. and Singh N.V. (2025).



Deciphering salt stress response of pomegranate genotypes (*Punica granatum* L.)- a comprehensive evaluation. *Plant Physiology Reports*, 30, 246–256 (NAAS rating: 7.5).

3. Babu, K. D., Marathe, R.A., Ganeshamurthy, A.N., Rane, J., Naikwadi, B.V., Raigond, P., Roopa Sowjanya, P., and Shilpa. P. (2025). Integrated Soil Fertility Management through Conservation Horticulture in Pomegranate Orchards. *Indian Journal of Fertilizers*. 21 (4): 370-379 (NAAS : 5.29).

## Book chapters

- K. Dhinesh Babu, R. A. Marathe and M. Sankaran. (2025). Role and Mode of Action of Calcium, Anti-oxidants and Enzymes. In : Post-harvest Management of Fruits and Plantation Crops. (Volume 1: Basic Concepts), NIPA, New Delhi. Pp.67-88.

## Popular articles

- Pinky Raigond, Nilesh N. Gaikwad, Namrata A. Giri, Rajiv A. Marathe (2025) Pomegranate for nutritional and livelihood security. Kerala Karshakan (English journal), volume 13, issue 1, page 21-32.
- Amar Kadam, Roopa Sowjanya P, Vipul Sangnure, Ajinkya Mandave, Rajiv A Marathe (2025). Powering Fruit Crop Genomics: Key Bioinformatic Tools for Mapping Studies. Krishi Science. 6:36-41.

## Training Manuals

- सोमनाथ पोखरे, नम्रता गिरी, पिंकी रायगोड, शिल्पा परशुराम आणि राजीव मराठे. (२०२५). प्रशिक्षण पुस्तिका “गुणवत्तापूर्ण डालिंब उत्पादनासाठी योग्य पद्धती: लागवड ते मूल्यवर्धन”. १०-१२ मार्च, २०२५. पान: १-४७.

## Videos

- Production and editing of the video “ICAR-National Research Centre on Pomegranate (ICAR-NRCP): An Introduction” (Hindi) by Dr. Ranjan Kumar Singh and Dr. Somnath S. Pokhare.

## Republic Day Celebration

ICAR-NRCP, Solapur celebrated 76<sup>th</sup> Republic Day on 26<sup>th</sup> January, 2025 by unfurling of the Indian National flag by Dr. R. A. Marathe, Director, NRCP in presence of all the scientific, technical, administrative, contractual staff of the centre. The gathering was addressed by the speech of the Director.





*Unfurling of the Indian National flag by Dr. R. A. Marathe, Director with staff*

## **RAC (Research Advisory Committee) Meeting**

The 18<sup>th</sup> Research Advisory Committee Meeting of NRCP was held on May 19, 2025 at NRCP, Solapur under the Chairmanship of Dr. C. D. Mayee, Former ASRB Chairman, New Delhi. Dr. K. Dhinesh Babu, Member Secretary extended a warm welcome to the Hon'ble Chairman and esteemed RAC members. Dr. R.A. Marathe, Director, extended welcome and felicitated RAC team. Presentations on ATR and major achievements in the purview of Production, Crop improvement, Protection, Post-harvest Technology were made. In the afternoon, committee also visited the labs and experimental blocks. At last, Chairman Dr. C. D. Mayee appreciated the research achievements of the institute and the efforts taken by NRCP for outreach and capacity building activities.

On the same day the new facilities such as Polyhouse, Green house dryer and Natural Farming Unit was inaugurated by the RAC committee Dr. C. D. Mayee, Ex-Chairman, ASRB & Chairman RAC; Dr. PC Tripathi, PS, SMD (HS), ICAR, New Delhi; Dr. K.K. Pandey, PS, ICAR-IIVR, Varanasi; Dr. S.H. Jalikop, EX-PS, ICAR-IIHR, Bengaluru; Dr. Sunil Pareek, Dean (PGS), NIFTEM, Sonipat; Dr. AN Ganeshamurthy, Ex- Head (Soil Sc.), ICAR-IIHR, Bengaluru & Ex-Dean, CoHF, CAU, Imphal; Dr. BP Singh, Ex-Head, ICAR-CISH, Lucknow

Mr. Ramdas Patil, Pomegranate grower, Nashik; Mr. Shankar Waghmare, Pomegranate grower, Mohol, Dr. R. A. Marathe, Director, NRCP and staff.



*RAC meeting under the Chairmanship of Dr. C. D. Mayee, Former ASRB Chairman, New Delhi*

### **Institute Research Council (IRC) Meeting**

The meeting of the 19<sup>th</sup> Institute Research Council (IRC) of National Research Centre on Pomegranate was held on June 23, 2025 under the chairmanship of Dr. R. A. Marathe, Director, NRCP and Subject Expert Dr. D. P. Waskar, Former Director of Research, VNMKV, Parbhani. Scientific staff of the institute presented their research achievements since last IRC meeting. The Expert and Director NRCP reviewed the ongoing research work and gave the suggestions regarding new research work needs to be initiated on the aspects of protected cultivation, organic and natural farming and bio-intensive pomegranate protection.



*Dr. R. A. Marathe, Director welcoming subject expert Dr. D. P. Waskar, Former Director of Research, VNMKV and staff of NRCP during IRC meeting*



## International Yoga Day

NRCP celebrated the 11<sup>th</sup> International Day of Yoga (IDY) on 21<sup>st</sup> June 2025, embracing this year's theme - "Yoga for One Earth, One Health." Mrs. Snehal S. Pendse, a renowned Yoga teacher from Solapur delivered an insightful lecture on "Importance of Yoga for Health in Modern Life", highlighting yoga's role in managing mental stress and fostering a healthy lifestyle. A mass demonstration of various Yoga Asanas was conducted by Mrs. Pendse. The event was coordinated by Dr. Shilpa P.



*NRCP staff during International Yoga Day celebration*

## World Intellectual Property Day

NRCP, Solapur celebrated 'World IP Day' and organized a seminar entitled "IPR issues in India" on 1<sup>st</sup> May 2025. The programme was chaired by Dr. R.A. Marathe, Director, NRCP. The introduction about the seminar was given by Dr. K. Dhinesh Babu. Guest lectures (virtual mode) were delivered by Dr. Kunal Anil Gaikwad, Senior Research Fellow, PPV& FRA, Pune and Dr J. Stanley, Principal Scientist (Entomology) and ITMU/ZTMU, Co-Nodal officer, ICAR-IIMR, Hyderabad. The speakers have enlightened the participants on the topic of 'Role of PPV and FRA and IP issues in Indian Agriculture'.



*Welcome of Dr. R. A. Marathe, Director, NRCP, Solapur and presentation by Dr. J. Stanley, Co-Nodal officer, ITMU/ZTMU, ICAR-IIMR, Hyderabad through virtual mode*



## New Year Celebration - 2025

Recreation Club of NRCP celebrated New Year 2025 with enthusiastic participation from all staff members in the esteemed presence of the Director. The programme commenced with a New Year address by Dr. R. A. Marathe, Director. Staff members who made significant achievements during the previous year were felicitated by the Director in recognition of their contributions. On this occasion, the Director encouraged all employees to strive for excellence in research and to work towards the betterment of pomegranate farmers.



## Outreach activities

### SCSP Project

Team of SCSP project consisting of Dr. Sangram Dhumal, Pr. Scientst, Dr. Namrata Giri, Dr. Roopa Sowjanya, Mr. Mahadev Gogaon conducted different training programmes and activities for the pomegranate farmers under SCSP scheme. It includes the distributions of planting materials, fertilizers, pesticides and other agricultural inputs. The training about the quality pomegranate production in dry land area were also conducted under the scheme.

Sr. No.	Title	Place	No. of beneficiaries	Agri-Inputs Distributed
1.	Input Distribution Program on 22.01.2025	Karamba, North Solapur	150 farmers	Knapsack sprayer, Tadapatri
2.	Input Distribution Program on 13.03.2025	Solapur District	49 farmers	Brush cutter
3.	Input Distribution Program 17.03.2025	Bhalwani, Mangalwedha Taluka, Solapur	150 farmers	Tadapatri, Fertilizer, Knapsack sprayer, Pesticides





*SCSP agricultural inputs distribution program to the beneficial farmers*

### **“7<sup>th</sup> Poshan Pakhwada”**

NRCP, Solapur actively participated in the celebration of the 7<sup>th</sup> Poshan Pakhwada from 8<sup>th</sup> to 22<sup>nd</sup> April 2025 by organizing various awareness activities aimed at promoting nutritional well-being. As a part of the initiative, an awareness programme on “Malnutrition and Importance of a Balanced Diet” was organized for the students of S.M. Shankarrao Mohite Patil Vidyalaya, Kegaon, Solapur. The programme witnessed enthusiastic participation of 80 students, along with the Director and staff members of the institute. The session focused on the significance of consuming a balanced diet and the importance of incorporating locally grown fresh fruits, vegetables, and millets into daily meals. As a part of the outreach, healthy food packets were distributed among the students to encourage better eating practices and reinforce the message of nutrition through action. The programme was coordinated by Dr. Namrata Giri, NRCP, Solapur.





*Celebration of Poshan Pakhwada and distribution of healthy food packets to students*

### **Farmers and Students Visit**

- A group of six farmers from Anantapur, Andhra Pradesh visited the NRCP, Solapur on 18<sup>th</sup> June 2025.
- 06 B. Sc (Agri) (VIII semester) Students from Lokmangal College of Agriculture, Wadala visited NRCP as attachment to research station under RAWE & AIA programme from 03-07, February 2025.
- 77 students from Lokmangal College of Agriculture visited NRCP on 21.02.2025.



*Technology information and field visit at demonstration block of NRCP*

### **Infrastructure / Facilities developed**

- For promoting natural farming of pomegranate, *Jeevamrit* unit with capacity of 8000 litres per week, Natural Farming unit with production of all types of Plant protection natural extract, Vermicompost production unit and Slurry unit has been established at Hiraj Farm.
- Developed naturally ventilated polyhouse for protected pomegranate cultivation.
- Developed low cost and economically feasible greenhouse dryer for production of dried arils, and *anardana* preparation etc.





*Inauguration of 'Natural Farming and slurry unit' by RAC Chairman and members*



*Inauguration of 'Vermicompost production unit and polyhouse' by RAC Chairman and members*



*Inauguration of 'Green house dryer' by RAC Chairman and members*

## Distinguished Visitors





*Exposure visit cum meeting of District Development Managers of NABARD (48 members) to NRCP, Solapur on 07 February 2025*



*Interaction with Dr. N. G. Shah, Member Secretary RGSTC, Mumbai & Prof. A.V. Sapre, RGSTC Advisor, at NRCP on 29<sup>th</sup> January 2025*

## Joining

- Dr. Basana Gowda G., joined as Senior Scientist-DR (Agricultural Entomology) on 15<sup>th</sup> April 2025. Earlier he was working at ICAR-Central Rice Research Institute, Cuttack, Odisha.
- Dr. Ramniwas joined as Senior Scientist-DR (Fruit Science) on 28<sup>th</sup> April 2025. Earlier he was working at ICAR-CAZRI, KVK Bhuj, Kutch, Gujarat.
- Dr. Chandrakant Awachare joined as Senior Scientist-DR (Fruit Science) on 23<sup>rd</sup> April 2025.
- Dr. Shilpa P. joined as Senior Scientist-DR (Genetics & Plant Breeding) on 13<sup>th</sup> May 2025.



## Electronic and Print Media coverage



## विज्ञान, तंत्रज्ञानाच्या वापराने शेतीत प्रगती करा

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सोलापूरच्या ग्रामीण विकासावरील राष्ट्रीय परिषदेचा समारोप



## सारोळेतील डाळींब बागेस कवी शास्त्रज्ञांची घेट

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## विकसित कृषी संकल्प अभियान ८० गावांपर्यंत पोहोचले

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मौलाना : कौनी अधिकारानुसारी कौनी विद्यालय विद्यालय

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ਗੁੰਬੜੇ ਭੁਲੀ ਸਾਡੀ ਹੀਜਾਂ









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<https://nrcpomegranate.in>  
Phone: 0217-2354330 Fax: 0217-2353533

