



# ICAR-NRCP

## Newsletter - संवादपत्र



July - December 2021

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



Dear Readers,

It gives me immense pleasure to release the newsletter of ICAR-NRCP, Solapur for the period of July-December, 2021. This period witnessed several mega events and brought laurels in the history of NRCP. It was a proud moment for NRCP as special **Postal Cover** was released by the Indian Post on the occasion of 17<sup>th</sup> foundation day of the institute on 25<sup>th</sup> September 2021. This special postal cover depicts the pomegranate technologies developed by the centre

and importance of pomegranate in 3 languages. A mega scientific event in the form of an "**International Webinar**" was successfully organised by NRCP on "Pomegranate: Ancient Fruit in Modern Horticulture" in collaboration with SARP, Solapur and ICAR-CIAH, Bikaner during August 25-27, 2021. More than 200 delegates from 9 countries participated in this 3 days' webinar.

In order to create more variation in pomegranate genome by inducing mutagenesis, doses of EMS were standardized and fixed the LD50 values for Bhagawa cultivar. One "Bhagawa" variant from the farmer field with early maturity trait (137-147 days) has been identified and collected. The technology on production of pomegranate juice powder using foam mat drying technique was developed for its utilization in the preparatory foods like ice cream, confectionary and reconstitution in to drinks.

During this period, NRCP has organised eight workshops / farmers interaction programmes for creating awareness for pest and disease management and also organised six special webinars under "Azadi ka Amrit Mahotsav" covering different aspects of pomegranate. Other important events like "**75<sup>th</sup> Independence Day**"; "**International Millet Year**"; "**Mahila Kisan Divas**" were celebrated with great enthusiasm.

AMoU for the commercialization of technology of minimal processing of pomegranate arils has been signed during this period. Many scientists of the institute also received fellowship and awards. I congratulate all the awardees for their sincere efforts and achievements.

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## Special Events

### Release of “Special Postal Cover” on eve of 17<sup>th</sup> Foundation day of ICAR-NRCP

Department of Post, Govt. of India, released the special postal cover to commemorate 17<sup>th</sup> foundation day of ICAR-NRCP on 25<sup>th</sup> September 2021. Shri H.C. Agrawal, Chief Postmaster General, Mumbai Circle and Dr. R. A. Marathe, Director, NRCP released this postal cover. This postal cover's front side depicts the pomegranate technologies (Bio-fortified variety- Solapur Lal, Bio-hardened tissue culture planting material and processed products) developed by the center and the geographical coverage of pomegranate cultivation in India. The backside of the special postal cover displays importance of pomegranate in 3 languages.

The programme was graced by Dr. Lakhan Singh, Director, ICAR-ATARI, Pune, Dr. R.G. Somkuwar, Director (Acting), ICAR-NRC for Grapes, Pune and Shri. Pratap Kate, Vice President, All Maharashtra Pomegranate Growers and Research Organization, Pune and progressive pomegranate growers of the region.

Progressive pomegranate growers, Shri. Shashidhar Hatture (Akkalkot); Shri. Aabasaheb Taware (Baramati); Shri. Sanjay Chopade (Madha); Shri Prakash Suryavanshi (Atpadi) producing excellent quality pomegranate production and exporter Shri Amarjeet Jagtap (Pandharpur) were felicitated by the dignitaries on the dais. The best performing staff of NRCP Dr. Nilesh Gaikwad (Scientist category); Dr. P. G. Patil (Best Research Paper); Shri Mahadev Gogaon (Technical staff category); Shri Kiran Khatmode (Administrative staff category) were also felicitated during this occasion. The book on "Good Management Practices in Pomegranate" was also released by the dignitaries present on this occasion. In the afternoon, a session chaired by Director, was organized on online interaction meet with the pomegranate growers to answer the queries of the pomegranate growers from all over India.



Shri. Pratap Kate, Dr. R. G. Somkuwar, Dr. Lakhan Singh, Shri. H. C. Agrawal and Dr. R. A. Marathe releasing the special postal cover to commemorate 17<sup>th</sup> foundation day of ICAR-NRCP



Dr. Nilesh N. Gaikwad received Best Scientist award from Dr. Lakhan Singh, Director, ATARI, Pune



Felicitations of Mr. Amarjeet Jagtap, Progressive Farmer & Pomegranate Exporter, Pandharpur by Director NRCP





*Release of book on "Good Management Practices in Pomegranate"*



*Dr. K. Dhinesh Babu felicitated  
Dr. R. A. Marathe, Director on foundation day*

## International Webinar on "Pomegranate: Ancient Fruit in Modern Horticulture"

NRCP has organized an International Webinar on "Pomegranate: Ancient Fruit in Modern Horticulture" during August 25-27, 2021 in collaboration with Society for Advancement of Research on Pomegranate, Solapur and ICAR-CIAH, Bikaner. A total of 47 Invited Speakers including 7 international speakers and 200 delegates from 9 countries namely, Israel, Iran, Spain, USA, Turkey, Italy, South Africa, Germany, Pakistan and India have participated in this mega scientific event. In this webinar representatives of many MNCs like UPL, ICL, Jain Irrigations, Sam AgriTech, Coromandel, Bayer, Corteva, etc., also participated. The Padma Shri awardee pomegranate farmer Sh. Genabhai Dargabhai Patel has also shared his experiences to inspire the

other pomegranate growers.

The Inaugural program of the International Webinar was chaired by Dr. C.D. Mayee, Former Chairman, ASRB and Dr. A.K. Singh, DDG, Horticulture Science. The webinar also witnessed the august presence of Dr. N.K. Krishna Kumar, Former DDG Horticulture Science; Dr. P.L. Saroj, Director, ICAR-CIAH, Bikaner; Dr. T. Jankiram, VC, Dr. YSR Horticultural University (AP); Dr. A.S. Dhawan VC, VNMKV, Prabhani; Dr. P.G. Patil VC, MPKV, Rahuri; Dr. B.K. Pandey, ADG (HS-II), ICAR, New Delhi; Dr. R.T. Patil, Former Director, ICAR-CIPHET; Dr. V.I. Benagi, Ex-VC, UAS Dharwad and other dignitaries. The International Webinar was convened by Dr. R.A. Marathe and coordinated by Dr. N.V. Singh.



*Welcome of dignitaries by  
Dr. R. A. Marathe, Director, NRCP*

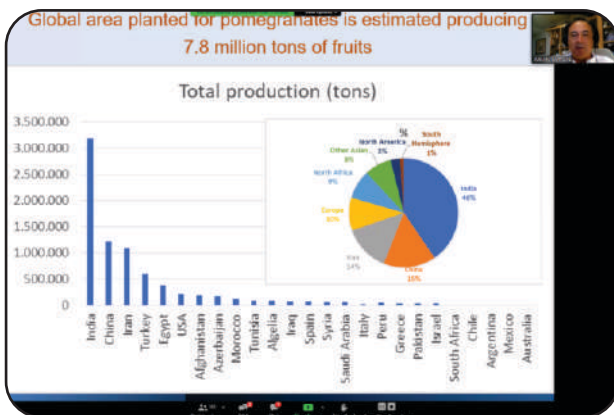


*Inauguration of International Webinar by  
Dr. C.D. Mayee & Dr. A.K. Singh in virtual mode*





*Co-ordination team of International Webinar on "Pomegranate: Ancient Fruit in Modern Horticulture" held during August 25-27, 2021 at ICAR-NRCP, Solapur*



*Presentation by Dr. Julian Bartual Martos, Agricultural Expt. Station, Spain*



*Presentation by Dr. Ali Sarhosh, Asst. Professor and Extension Specialist, University of Florida, USA*

## International Millet Year celebration

As a part of the Curtain Raiser of "International Year of Millets 2023" a programme was organized by NRCP on 17<sup>th</sup> September 2021. The inaugural session of the programme resumed with ICAR invocation song followed by the welcome address by Dr. Namrata A. Giri, Co-coordinator of the programme. Dr. R.A. Marathe, Director, NRC on Pomegranate delivered a keynote address and emphasized on the importance and health benefits of the millets. Chief guest for the programme was Shri Upparaya Chincholi, Vice President of Grampanchayat, Suntoor, Karnataka. The live telecast of the programme which was inaugurated by Shri Narendra Singh Tomar, Honorable Union Minister of Agriculture & Farmers' Welfare was

attended by all the participants. Farmers from Karnataka and different districts of Maharashtra, girls/kanya (71) from Sahakar Maharshi Shankarrao Mohite Patil Vidyalaya, Kegaon, staff/SRF/YP/JRF/ research scholars of NRCP attended the programme. Kit of millet based food products and planting materials (1000) of custard apple, jamun, coconut, sapota, mango, jackfruit and pomegranate were distributed to kanya and farmers. The tree plantations (300) were done in the field of NRC on Pomegranate by farmers, kanya and staff of the Centre. The programme was concluded with a vote of thanks by Dr. Nilesh Gaikwad, Senior Scientist, NRCP.





*Distribution of Millet based food product kit to school girls*



*Tree plantation by farmers and NRCP Staff*

## Celebration of Mahila Kisan Diwas

NRCP has organised Mahila Kisan Diwas on 16<sup>th</sup> October 2021 through both virtual and offline mode. During the inaugural address, Dr. R. A. Marathe, Director, NRCP, highlighted the role and importance of women in agriculture in general and pomegranate in particular. During this programme, a lady farmer cum entrepreneur Mrs. Vaishali Fulchand Aware from Sasure village of Barshi tehsil, Solapur was felicitated. She is one of the beneficiaries of Maharashtra State Rural Livelihood Mission (UMED Abhiyan) and working as Master Krushi Sakhi to train and disseminate knowledge for rural farmers and farm women. She is also a founder of Vardayini Farmer

Producer Company. Mrs. Aware also shared her experience and struggle during *sangoshthi*. She has shared the transformation amongst family and society from in general apathy to appreciation during her independent entry in this endeavour to help the fellow farmers and women. A lecture on Role of women in agriculture and research was delivered by Dr. Jyotsana Sharma, Principal Scientist (Plant Pathology), NRCP. About 115 participants attended this program including farmers, farm women, entrepreneurs and college students. The programme was coordinated by Dr. Namrata Giri and vote of thanks was given by Dr. Somnath Pokhare.



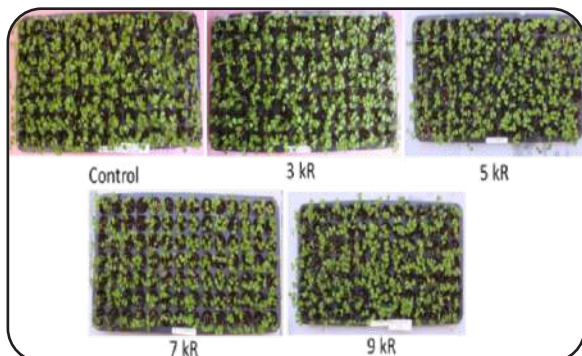
*Felicitation of Mrs. Vaishali Aware, lady farmer cum entrepreneur, on the occasion of Mahila Kisan Diwas at ICAR-NRCP, Solapur*



## Research achievements/ Highlights/ Technology developed

### Breeding for bacterial blight resistance in Pomegranate (*Punica granatum* L.)

- In total 307 pomegranate accessions maintained in field gene banks at Kegaon and Hiraj research farms of NRCP, Solapur during 2021-22. It includes 140 Indigenous (Uttarakhand, Jammu & Kashmir, Himachal Pradesh, Maharashtra, Karnataka, Rajasthan, Tamil Nadu, Gujarat) and 167 Exotic (USA, Turkmenistan, Russia, Iran, Italy, Japan, Afghanistan, France) collections.
- 98 germplasm accessions including 70 exotic accessions and 28 indigenous accessions were evaluated for their genetic reaction to bacterial blight disease under challenge inoculation to XAP-90, 118 culture (108 pfu/ml; OD: 0.154). Out of 98 accessions, one germplasm found moderately resistant with BBD with severity grade of 2 and 9 accessions as moderately susceptible with severity grade of 3 in comparison to check variety Bhagawa (SG: 5).
- New advanced F2 and BC1F1 generation of 'Solapur Lal' × 'Bhagawa'; 'Solapur Lal' × (GxNx D), 'Solapur Anardana' × (GxNx D) have been developed to evaluate for BBD resistance.
- Standardized and fixed the LD50 value for EMS treatment of cv. "Bhagawa" seeds for both with (1.4% for 4hrs) and without pre-soaking (1% for 6hrs) treatment with water.
- *In vitro* mutagenesis study for developing solid mutants has been carried using EMS and Sodium Azide chemicals by treating the nodal segments of Super Bhagawa variety with EMS @ 0.25, 0.5, 0.75% for 1, 2, 3 and 4 hrs and Sodium Azide @ 1, 2 & 4 mM @ 1, 3 and 6 hrs. Based on their effect on bud sprouting (%), the LD50 was found to be EMS 0.5% 4 hr (36.67%) and Sodium Azide 2mM 3hrs.
- Gamma irradiation of seeds of cv. 'Bhagawa' was carried out for 4 different doses (3 kR, 5 kR, 7 kR, and 9 kR and studied their effect on seed germination (%) and seedling survival (%).
- Identified and collected one "Bhagawa" variant from the farmer field at Solapur which matures in about 137-147 days.



*Mutagenic population of pomegranate developed through physical mutagenesis (Gamma rays)*



*Early maturing variant identified from farmer field*

*(Shilpa P., Jyotsana Sharma, Babu, K. D., Roopa Sowjanya P., Singh N. V., Patil P. G.)*

### Structural and functional annotation, Resistance genes and Transcription Factor identification of Bhagawa genome sequence

Proteins from OrthoDBv10 using the Viridiplantae lineage were downloaded. Redundancy in the downloaded dataset were removed to create a Non-Redundant pool. This was done using mmseqs2 by requiring a 90% identity and a 90% sequence match for clustering the proteins and finally extracting proteins that had a minimum length of 10AA. This unique protein set was aligned to the genome using GenomeThreader and BRAKERv2.1.0 was used to create Augustus profiles using multiple optimization rounds. Augustus predicted 38263 genes. The final curation and integration led to the validated presence of 33003 genes with 41682 mRNAs. The geneic space in the genome is about 32.7% with the coding space being 18.8%.

*(Roopa Sowjanya P.)*



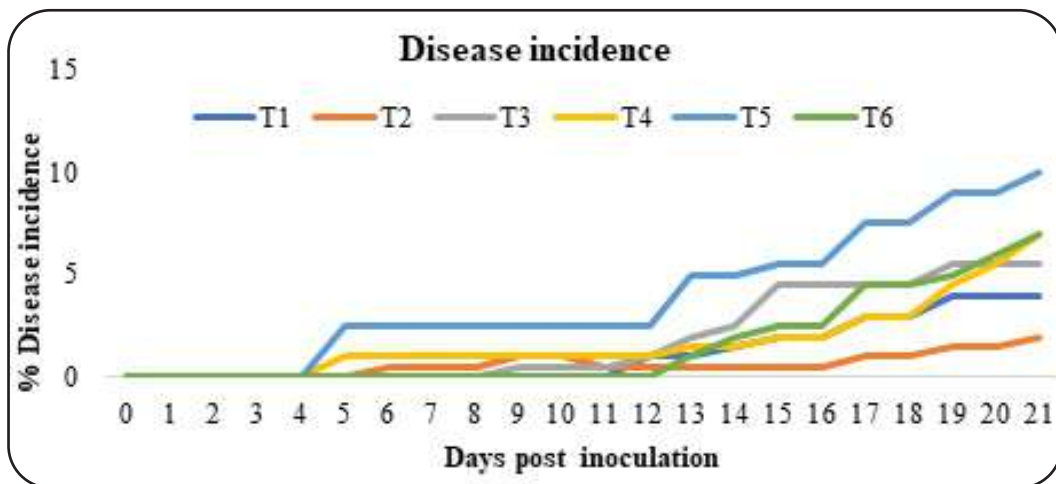
## Effect of anti-transpirants on bacterial blight incidence or correlation between stomatal opening and bacterial blight incidence

To study the correlation between stomatal opening and bacterial blight incidence, chemicals that act as anti-transparent (such as atrazine: T1 and Kaoline: T2) were sprayed onto leaves of 6-month pomegranate plants (var Bhagawa) in polyhouse. Other treatments included salicylic acid (T3; recommended in IDPM schedule), water spray but without cover T4. In treatment T5, plants were treated as per standard procedure and control (T6) where no spray was performed on plants. All the plants were challenge inoculated with *X. axonopodis* pv. *punicae* as per standard protocol.

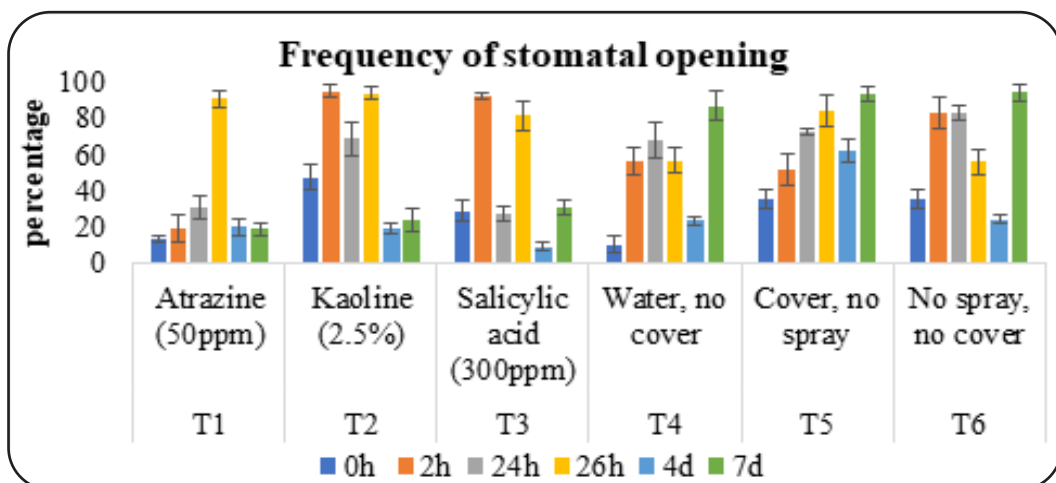
Leaf samples were collected at different time intervals (immediately after anti-transpirants spray (0h); after 2h; after pathogen spray (24h); 2h after pathogen spray (26h); 4 and 7 days after anti

transparent spray. Leaves were stained with safranin to visualise stomata under the microscope. Total number of stomata and number of open stomata were counted and frequency of open stomata was calculated in percent. Disease incidence and severity was recorded for the plants.

Minimum disease incidence and/or severity were observed in plants treated with Kaoline followed by atrazine and salicylic acid. Plants in T5 showed the maximum disease incidence as per expectation. The frequency of open stomata showed variation at different time points, however, a correlation was found between stomatal opening at 7 d and disease incidence on the plants. More detailed studies with even more chemical treatments are under way.



Effect of anti-transparent on bacterial blight incidence on pomegranate



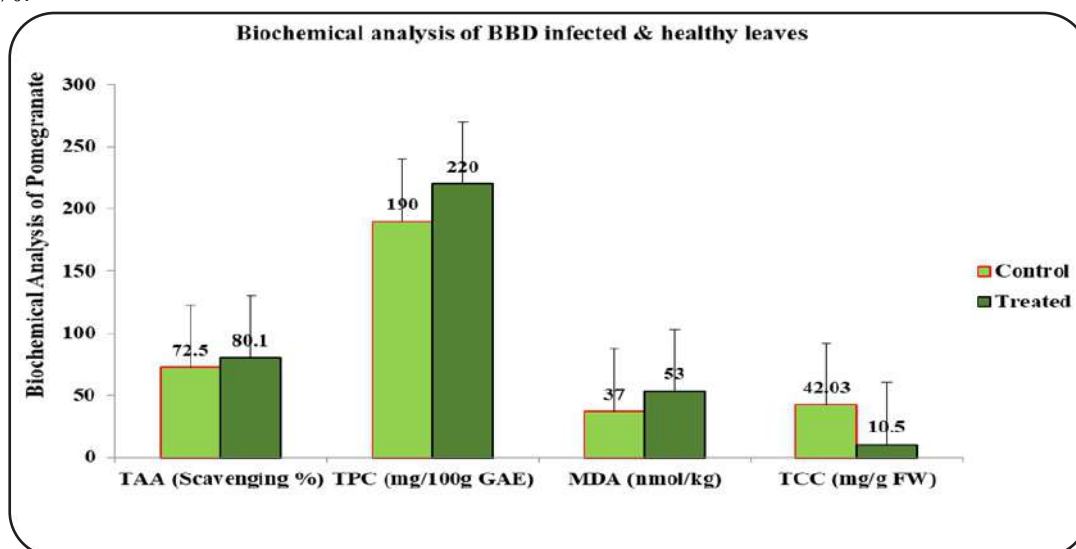
Effect of anti-transparent on stomatal opening on pomegranate leaves

(Manjunatha N., Somnath Pokhare & Jyotsana Sharma)



## Bacterial blight stress induced biochemical changes in pomegranate leaf samples

The DPPH scavenging, total phenolic content, lipid peroxidation (MDA content) and total chlorophyll content were analysed from healthy and bacterial blight disease (BBD) stress imposed leaf samples. Results showed 10.48% increase in total antioxidant activity in BBD stressed leaves, while total phenolic content and MDA showed 15.78% and 43.24% increase, respectively. Total chlorophyll content decreased by 75.01%.



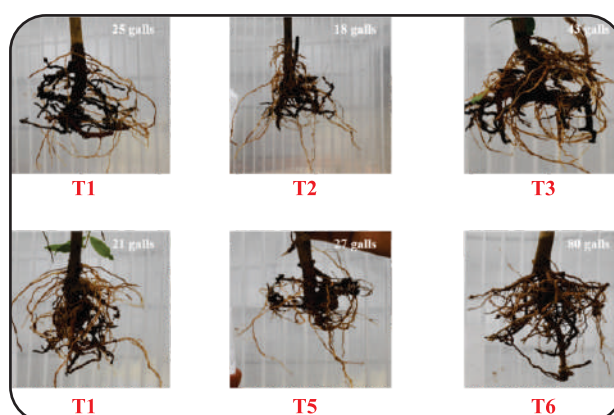
Biochemical profile of BBD Infected Leaf Samples

(Rahul D. Damale, Shilpa P., Manjunath N, P. Raigond, Mallikarjun H., Dhinesh Babu & R. A. Marathe)

## Evaluation of newer nematicides under poly-house conditions

Primary trial for the evaluation of newer nematicidal chemicals T1 (Fluensulfone 2% GR), T2 (Fluazaindolizine 500 SC), T3 (Metham sodium), T4 (Fluopyrum 34.48% SC), and T5 (vegetable oil based nematicide) against Root-Knot Nematode (RKN) on new roots under pot condition for the period of 5 months was carried out. About 20 selected plants for trial were already heavily infested by RKN (>100 galls/plant, highest galling index scale). Four plants per treatment were randomly assigned, out of which 2 were root pruned and roots were mixed in the same pot soil. Treatments with nematicides were given as recommended with and without root pruning of the pomegranate plants. Lowest number of galls were observed in the T2 (0.5 liter/plant) followed by T4 (0.5 liter/plant) and T1 @ 10 g/plant. In the case of root pruned plants, no galls were observed in T1 and T4 in the above-mentioned concentrations.

Treatment	Rec. dose	Dose taken per pot	Galls on New white roots	
			Plants with un-pruned roots	Plants with pruned roots
T1	10g/dripper (Max 40 gm/Plant)	10 g/ plant	25 galls	No galls
T2	2ml/2L	0.5 liter/plant	18 galls	Plant dead
T3	4 ml/2L	0.5 liter/plant	43 galls	10 galls
T4	2ml/2L	0.5 liter/plant	21 galls	No galls
T5	200 µl/2L	0.5 liter/plant	27 galls	Plant dead
T6	0.5 liter/plant	0.5 liter/plant	80 galls	15 galls



(Somnath Pokhare, Manjunatha N. & Jyotsana Sharma)





## Foam mat drying of pomegranate juice

Pomegranate juice is well known for health benefits owing to presence of various bioactive compounds. However, the seasonality of the fruits, susceptibility of the pomegranate juice for microbial contamination, costly transportation due to higher volume curtails its accessibility to masses. These factors curtail the marketing of pomegranate juice in distant markets. The Foam mat drying is an innovative approach for the drying of the juices especially with higher sugars.

It is a process of drying liquid - solid foods by being mixed with foaming agent and or stabilizing agent to produce stable foam, which undergoes air drying. Thus experiment was planned to study the effect of different



percentages of the whey protein isolate (WPI) (5, 7.5, and 10%) as foaming agent and carboxy methyl cellulose (CMC) (0, 0.25, 0.5 and 0.75 %) as stabilizing agent were observed on foam expansion, foam density and foam drainage volume. The 10 % whey protein isolate and 0.25 % of CMC has shown the best results in terms of foam expansion, foam density and foam drainage volume of 455.28 %, 0.2030 g/cc and 20.10 ml, respectively. The pomegranate juice foam produced at optimum conditions (10% WPI and 0.25% CMC) used for foam mat drying experiments. The drying experiments were conducted up to the moisture content of 4 % (db) at 50, 60 and 70 °C, and foam thickness of 3 and 6 mm. Based on the drying time required and bioactive compound retention the 60°C temperature and 3 mm drying thickness was selected for the drying. At this selected temperature and thickness, the drying time of 180 minutes with optimum retention of the bioactive compounds in the reconstituted juice viz. total phenol 2678.87 g/L GAE, antioxidant capacity 41.19 mg/100ml AAE, anthocyanin 24.60 mg/100ml, and ascorbic acid 14.17 mg/100 ml was observed. The pomegranate juice powder can be utilized as the preparatory food in ice cream, confectionary, and reconstitution in to drinks etc.

(N. N. Gaikwad, N. A. Giri, Anuja Kadam & Rajiv A. Marathe)

## Events organized by the NRCP staff

Title of the event	No. of participant	Date	Course Director/ Co-coordinators/ Team
Workshop on Insect pest disease management of Pomegranate, at Sangewadi, Sangola	78	27.07.21	Dr. Jyotsana Sharma, Dr. Somnath Pokhare
Workshop on Insect pest disease management of Pomegranate, at Kadaldas, Sangola	60	04.08.21	Dr. Jyotsana Sharma, Dr. Somnath Pokhare Dr. Mallikrjun, H.
Farmer Scientist interaction about pomegranate cultivation and pest and disease management at Dhumalwadi, Dist-Satara	200	08.09.21	Dr. Jyotsana Sharma, Dr. Somnath Pokhare

## Programs under Azadi Ka Amrit Mahotsav

(Coordinators: Dr. Nilesh N. Gaikwad, Co-coordinators: Dr. Somnath S. Pokhare & Dr. Namrata A. Giri)

Title of the webinar	Date	Speaker
Pomegranate production in dry land region: An alternative for higher income	16.07.21	Dr. N.V. Singh
Pomegranate Nutrition and its Therapeutic Utility	08.09.21	Dr. Namrata A. Giri
Solapur Lal and Solapur Anardana: NRCP Contribution in Biofortified Food	16.09.21	Dr. K. Dhinesh Babu
Pomegranate miracle health fruit for livelihood and nutrition for women	16.10.21	Dr. Jyotsana Sharma
"Pomegranate Value addition: NRCP contribution in technologies and entrepreneurship development" on the occasion of world food day	16.10.21	Dr. Nilesh N. Gaikwad



"Entrepreneurship Opportunities for small land holding pomegranate farmers"		28.12.21	Dr. N.V. Singh & Dr. Nilesh N. Gaikwad
<b>Events attended by the NRCP staff</b>			
<b>Title of the event</b>	<b>Date</b>	<b>Organizers</b>	<b>Participants</b>
Online Training Programme on "DUS Testing" conducted by PPV&FRA, New Delhi	01.07.21	On-line PPVFRA, New Delhi	Dr. Shilpa Parashuram
Meeting on Gap assessment in infrastructure & processing facilities for development of potential value chains for perishable products under Operation Greens Scheme of MoFPI, GOI	14.07.21	Ministry of Food Processing Industries GOI	Dr. Nilesh Gaikwad
Plant Genetic Resources Management and Utilization	19.07.21-01.08.21	NRCP, Solapur (Virtual)	Dr. Shilpa Parashuram
International e-Conference on Postharvest disease management and value addition of horticultural crops	18.08.21-20.08.21	IARI, New Delhi (Virtual)	Dr. Namrata Ankush Giri
National conference on "Oil Palm- A right choice towards self-sufficiency in edible oil production"	06.09.21	IOPR, Pedavegi, A.P. (Virtual)	Dr. Namrata Ankush Giri
Delivered lecture on "cultivation and value addition of pomegranate for improvement in export"	09.10.21	APEDA, Ministry of C & I, GOI and Agrovision, Nagpur	Dr. Nilesh Gaikwad
International webinar on "Fighting the hunger using smart technology"	26.10.21	IOPR, Pedavegi, A.P. (Virtual)	Dr. Namrata Ankush Giri
9 <sup>th</sup> Indian Horticulture Congress, organized by IAHS, New Delhi	18.11.21-21.11.21	CSAUA&T, Kanpur	Dr. K. Dhinesh Babu
National Agricultural Scientist Conclave on "Sustainable Agriculture Through Integrated Inputs" at JNKVV, Jabalpur, Madhya Pradesh organized by Bhartiya Agro- Economic Research Centre, New Delhi	09.12.21-12.12.21	JNKVV, Jabalpur, Madhya Pradesh	Dr. Mallikarjun H.
Online National webinar on the use of Nontechnology in Agriculture: Nano fertilizer Jointly organized by ICAR-Research Complex for Eastern Region, Patna, and Indian farmers, fertilizer Cooperative limited Patna, Bihar.	23.09.21	NRCP, Solapur (Virtual)	Dr. Mallikarjun H.
Virtual Webinar on Increasing the Yield, Quality and Income of Pomegranate Farmers organized by Dhanuka Group in partnership with the University of Horticultural Sciences, Bagalkot, Karnataka	24.07.21	UHS, Bagalkot	Dr. N.V. Singh
National Agricultural Scientists Conclave on Sustainable Agriculture through integrated inputs organized by Bhartiya Agro-Economic Research Center in Collaboration with Bhartiya Kisan Sangh. The conclave will be held at JNKVV, Jabalpur	10.12.21-11.12.21	JNKVV, Jabalpur	Dr. N.V. Singh



13 <sup>th</sup> Swadesh Prem Jagriti Sangosthi International Conference on Innovative Approaches for Enhancing Water Productivity in Agriculture including Horticulture, PJTSAU, Rajendranagar, Hyderabad, Telangana, India	16.09.21-19.09.21	PJTSAU, Rajendranagar	Dr. N.V. Singh
International web conference on Innovative & Current Advances in Agri & Allied Sciences	19.07.21-21.07.21	SSDAT, Meerut, India	Mr. Rahul Damale

### Trainings conducted for Farmers/ Students/ Officers/ Entrepreneurs etc.

Title	Date	Team	Participants & Venue
Four days MANAGE, Hyderabad sponsored collaborative online training program on "Modern practices for export quality pomegranate production and value addition" for extension officers of State Agri./Hort.	28.07.21-31.07.21	Dr. N.V. Singh	49 NRCP, Solapur
Farmer-Scientist Interface meet & live webcasting of Hon'ble Prime Minister's programme of Dedication of 35 Crop Varieties and establishment of ICAR – NIBSM, Raipur to the Nation.	28.09.21	Dr. S. S. Pokhare	80 NRCP, Solapur
Field day on 'Management of Bacterial blight and Wilt in Pomegranate' jointly organized by ICAR-NIASM, Baramati and ICAR-NRCP, Solapur	21.10.21	Dr. Jyotsana Sharma Dr. S. S. Pokhare	60 NIASM, Baramati
Field day cum farmer fair on impact of "Stem Solarization – Six Step Technology for the Management of Bacterial Blight Disease in Pomegranate"	13.11.21	Dr. Jyotsana Sharma, Dr. S. S. Pokhare, Dr. Manjunatha N.	150 Village - Tamshewadi, Malshiras, Solapur
Celebration of World Soil Day	05.12.21	Dr. Ashis Maity	92 NRCP, Solapur
Farmers scientists' interaction on 'Climate Resilient varieties, technologies and practices'	28.12.21	Dr. S. S. Pokhare	50 NRCP, Solapur



*Field day cum farmers fair on impact of 'Stem solarization - Six step technology for bacterial blight management'*



*Live webcasting of Hon'ble Prime Ministers' Program on 28<sup>th</sup> September 2021*

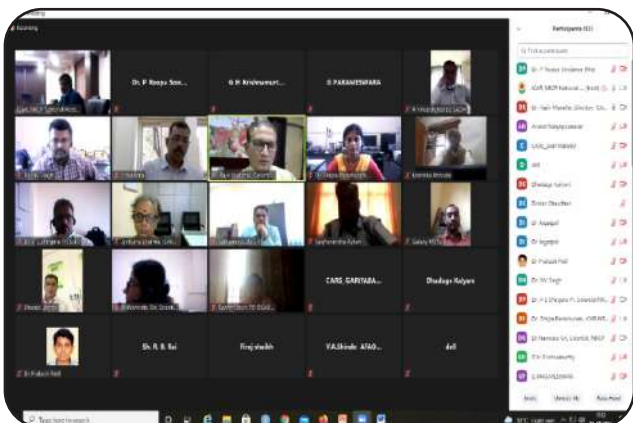




*World soil day celebration at NRCP on 5<sup>th</sup> December 2021*



*Live streaming of Programme on "Natural Farming" on 16<sup>th</sup> December 2021*



*Address by Dr. Rajiv A. Marathe, Director NRCP during the training program*



*Lecture by Dr. Mallikarjun on Insect Pest Management in Pomegranate*

## Institutional activities

### Institute Research Council (IRC) Meeting

The sixteenth IRC meeting of NRCP was held on 24<sup>th</sup> November 2021 at NRCP, Solapur under the Chairmanship of Dr. R. A. Marathe, Director, NRCP, Solapur. Dr. Prakash G. Patil, Sr. Scientist, I/c Member Secretary IRC extended a warm welcome to Hon'ble Chairman Dr. R.A Marathe and all the members. Presentations on salient achievements of 17 ongoing and 2 new research project proposal and future line of work were made by each scientist.



*Welcome of Dr. R. A. Marathe, Director, NRCP by Member Secretary IRC*



*Presentation of research achievements by scientist during the IRC meeting*



## Research Advisory Committee (RAC) Meeting

The fifteenth RAC meeting of NRCP was held during November 29-30, 2021 at NRCP under the Chairmanship of Dr. N. Kumar, Vice Chancellor, TNAU, Coimbatore, Tamil Nadu. Dr. Prakash G. Patil, Sr. Scientist (Plant Biotech) & I/c Member Secretary extended a warm welcome to the Hon'ble chairman and esteemed members of the RAC. Then Director, NRCP briefed all the members about 16 Years Journey of NRCP with success stories at Solapur through a brief presentation. The in-charge member secretary

presented the 'Action Taken Report' on the recommendations of 14<sup>th</sup> RAC meeting held during November 6-7, 2020 (virtual mode). At the end of the opening session, the Chairman addressed the house and appreciated the research efforts made by NRCP scientists. The technical sessions started thereafter with the presentation on detailed work done during 2020-21 by the Principal Investigators of 13 projects. The Chairman and all members of RAC interacted with the scientists on each project.



*Dr. N. Kumar, Chairman along with Dr. D. P. Waskar, Dr. Madan Pal, Dr. R. A. Marathe, Dr. S. K. Panda, Dr. V. V. Sulladmath and Scientist during 15<sup>th</sup> RAC at NRCP*

## Third Quinquennial Review Team

The third Quinquennial Review Team (QRT-III) for the NRCP was chaired by Dr. K.P. Viswanatha, former Vice-Chancellor, MPKV, Rahuri, Maharashtra. Dr. D.P. Waskar, Director of Research, VNMKV, Parbhani, Maharashtra; Dr. S.D. Gorantiwar, Head, Dept. Agril. Engg., MPKV, Rahuri, Ahmednagar, Maharashtra; Dr. Indu S. Sawant, Ex. Director (Acting), ICAR – DOGR, Pune; Dr. C. K. Narayana, Pr. Scientist, Div. of PHT & AE, ICAR-IIHR, Bengaluru, Karnataka; Dr. Rajesh Parbhatrao Kadam, Prof. & Head, Dept. of Extension Education, VNMKV, Parbhani, Maharashtra were the members.

The preliminary meeting of the third QRT was held on October 26, 2021. Director, NRCP briefed about 16 years' journey of NRCP and highlighted the research work done in the institute. Dr. A.K. Singh, DDG (HS), ICAR interacted online with

QRT members and briefed on pomegranate R&D at national and international level and also expressed his suggestions for improvements. The Action Taken Report of previous QRT (QRT-II) recommendations was presented by the Member Secretary, QRT. The meeting was followed by interaction of QRT members with pomegranate growers from Karnataka, Madhya Pradesh, Chattisgarh, Rajasthan and Maharashtra who were present at NRCP, Solapur for attending 7 days training programme on pomegranate cultivation. On this occasion technical bulletin on “Outreach Programme of ICAR-NRCP, Solapur under SCSP and TSP/STC to disseminate pomegranate production technologies” and technical manual on, “Model Propagation and Orchard Management Practices for sustainable Pomegranate Production” were released by the QRT members.





*Dr. K.P. Viswanatha, Dr. D.P. Waskar, Dr. S.D. Gorantiwar, Dr. Indu S. Sawant, Dr. C. K. Narayana, Dr. Rajesh Parbhatrao Kadam, and Dr. R.A. Marathe during 3<sup>rd</sup> QRT at NRCP*

## Other Special Events

### Independence day Celebration

The Institute celebrated the 75<sup>th</sup> Independence Day on 15 August 2021 by hoisting the Indian National flag by Director, NRCP in presence of all the scientific, technical, administrative, contractual staff of the centre. The gathering was addressed by the Director followed by the felicitation of the farm labor and children of the staff who scored highest in academics.



### Parthenium Awareness Week

The 16<sup>th</sup> "Parthenium Awareness Week" has been conducted at NRCP, Solapur Maharashtra during 16<sup>th</sup> August 2021 to 22<sup>nd</sup> August 2021. The various activities have been conducted under this programme such as releasing of Maxican beetle, parthenium uprooting, making compost, spraying of herbicides, student's rally, demonstrations and exhibitions. Director, NRCP has inaugurated "Parthenium Awareness Week" by releasing the maxican beetles (*Zygogramma bicolorata*) and all staff participated in the different programme conducted under "Parthenium Awareness Week". The students and staff from S. M. Shankarrao Mohite Patil, Kegaon, Solapur, Maharashtra also actively participated in the programme.



*Activities under "Parthenium awareness week"*

## ICAR-NRCP Outreach Activities

### Mera Gaon Mera Gaurav (MGMG)

A team of NRCP Scientists visited Khandali village of Mohol, which is adopted under the Government scheme of MGMG, on 28<sup>th</sup> August 2021. Scientist visited pomegranate orchards and guided farmers on shot hole borer management. On 12<sup>th</sup> October 2021, different programmes of Swacchata campaign were



also conducted at Khandali. Awareness was created among farmers about new pomegranate variety 'Solapur Lal'. Farmers were guided on the management practices to control bacterial blight and other diseases. Later soil samples from pomegranate orchards were collected and soil health cards were distributed to the farmers.



*Distribution of Soil Health card to farmers of Adopted village*



*Visit of NRCP team to adopted village under MGGM program*

## Release of Special Postal Covers

A Special Postal Cover (SPC) on 'Solapur Pomegranate, Solapur Terry Towel and Solapur Chaddar was issued by the Department of Posts, Maharashtra Postal Circle on 26.08.2021 in the programme held at NRCP. Solapur is famous for its quality pomegranate, textile industries, mainly due to its manufacturing capacity for producing terry towels, Chaddars etc. and all these products got Geographical Indication (GI) tag. These postal covers will help to promote all these products at national level. The programme was attended by Shri. Milind Shambharkar, District Collector, Solapur and Ms. G. Madhumita Das, IPoS, Dr. Rajiv Marathe, Director, NRCP and many industrialists and progressive pomegranate growers from the Solapur district. A postal stamp of these dignitaries were also released by Dept. of Posts at this occasion.



*Shri. Milind Shambharkar, District Collector, Solapur and Ms. G. Madhumita Das, IPoS, honoured Director, NRCP with a special postal stamp*



## Events organized under Scheduled Caste Sub Plan (SCSP)

A training programme was conducted on “Model propagation and orchard management practices for sustainable pomegranate production for farmers and coordinating agencies” under SCSP scheme during 26<sup>th</sup>-29<sup>th</sup> Oct, 2021. About 30 SC farmers got benefited with the programme.



*Training programme under SCSP scheme at NRCP*

## Farmer visit to ICAR-NRCP, Solapur

Sr. No.	Date	Organization/ Place of beneficiaries	No. of farmers beneficiaries
1.	16.09.21	Farmers exposure visit from Department of Agriculture Badmer, Rajasthan	50
2.	29.09.21	State Agriculture Department, Gadchiroli (MS)	52
3.	17.12.21	KVK, Mohol, Solapur	27
4.	30.12.21	State Agriculture Department, (MS)	25



*Exposure visit of farmers arranged by Department of Agriculture, Badmer, Rajasthan*

## Student Visits to ICAR-NRCP

Sr. No.	Date	Organization/ Place of beneficiaries	No. of farmers beneficiaries
1.	08.09.21	Dnyaan Prabhodini Krushi Tantra Vidhyalay, Harali, Osmanabad, MS	40
2.	29.10.21	AD, college of agriculture, Dapoli, MS	89
3.	25.11.21	PG students of Aahilyabai holkar University Solapur, MS	58
4.	02.12.21	College of Agriculture, Karkere Hasan, Karnataka	60
5.	05.12.21	College of Agriculture, Hassan, Karnataka	59







*Educational Visit of Students of College of Agriculture, Karkere, Hasan, Karnataka*

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

Name of Scientist	Name of award	Awarding organization
Dr. R.A. Marathe	SARP Fellowship – 2020	Society for Advancement of Research on Pomegranate (SARP), Solapur
Dr. K. Dhinesh Babu	Fellow of SARP - 2020	
Dr. Ashis Maity	SARP Associateship- 2020	
Dr. Nilesh Gaikwad	SARP Associateship- 2020	SARP, Solapur
Dr. Mallikarjun M.H	Young Scientist Award-2020	SARP, Solapur
Dr. Shilpa Parashuram	Young Scientist Award-2020	SARP, Solapur
Dr. N.V. Singh	SARP Fellowship -2021	SARP, Solapur
Dr. P. G. Patil	SARP Associateship Award-2021	SARP, Solapur
K. Dhinesh Babu, et al., Gaikwad N.N et al. Manjunatha N., et al., Mallikarjun M.H., et al., Singh, et al., Patil, et al., Sowjanya R, et al., Shilpa P, et al., Pokhare S., et al.	Best Poster Award	SARP, Solapur
K. Dhinesh Babu, et al.	Best Poster Award	IAHS, CSUA&T, Kanpur
Maity, et al., Gaikwad, N.N et al., Singh, N.V et al., Patil, P. G et al., Shilpa, P. et al.	Best oral presentation award	SARP, Solapur
Dr. Ashis Maity	Best oral presentation award	Hi-Tech Horticulture Society and Prerna Foundation, Meerut, UP.
Dr. Namrata Giri	Best oral presentation award	ICAR-IARI, New Delhi.



*Dr. R.A. Marathe, Director, NRCP receiving the 'Fellow of Society for Advancement of Research on Pomegranate – 2020' Award from Dr. Lakhman Singh, Director, ATARI, Pune*



## Technology Commercialization/Linkages/Collaborations/MoU signed



A technology on “Process of minimal processing and shelf life extension of minimally processed arils” licensed to M/S Gnanam Foods, Bhuj-Bhachau Highway, RS NO 426, Opp. Essar pump, Village-Morgar, Tal- Bhachau, District- Kutch, State- Gujarat, 370140 on 20<sup>th</sup> July 2021 and revenue of Rs. 1,18,000/- received.

## Publications

### Research Papers

1. Maity, A. Marathe, R.A., Sarkar, A., Basak, B. (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: 11.75).
2. Kumar, R.A., Rajpurohit, V.S., Gaikwad N. N. (2021). Image dataset of pomegranate fruits (*Punica granatum*) for various machine vision applications. *Data in Brief*. 37:107249 <https://doi.org/10.1016/j.dib.2021.107249> (NAAS rating: 7.70).
3. Singh, N.V., Patil, P.G., Sowjanya, P.R., Shilpa, P., Natarjan, P., Reddy, U.K., Babu, K.D., Pal, R.K. and Sharma J. (2021). Chloroplast Genome Sequencing, Comparative Analysis and Discovery of Unique Cytoplasmic Variants in Pomegranate (*Punica granatum* L.). *Frontiers in Genetics*, doi: 10.3389/fgene.2021.704075 (NAAS rating: 10.60).
4. Babu K.D., Sharma J., Maity A., Singh N.V., Patil P.G., Shilpa P., and Marathe, R.A. (2021). Pomegranate: An ancient fruit for health and nutrition. *Progressive Horticulture*. 53 (1): 3-13 (NAAS rating: 4.49).

### Book chapters

1. Nilesh N. Gaikwad, Namrata Giri and K. Dhinesh Babu. (2021). Processing and Value addition, In Good Management Practices in Pomegranate, Eds. R A Marathe, S. Pokhare, J. Sharma, PG Patil, N. Manjunatha, Mallikarjun, M.H., Technical Manual No.1/NRCP/2021 ICAR-National Research Centre on Pomegranate, Solapur-413255 (Maharashtra), India, 129-132.
2. Namrata Ankush Giri, Sajeev M.S., Bansode V.V., Krishnakumar T. and Pradeepika Chintha. (2021). Sweet potato (*Ipomoea batatas* L.): Nutritional importance and value addition In: Recent Advances in Root and Tuber Crops, Brillion Publishers, New Delhi, 355-376.
3. Sankaran, M, Babu, KD, Jai Prakash, Karale, AR. (2021). Pomegranate. In: Fruits: Tropical & subtropical. Vol.2 (Eds. Parthasarathy VA, Bose TK, Mitra SK, Bhosh B, Chakraborty I, Sanyal D). Daya Publishing House, N.Delhi. pp.165-242.
4. Ferrara, G., Palasciano, M., Sarkhosh, A., Cossio, F., Babu, K.D., Mazzeo, A. (2021). Orchard Establishment and Tree Management. In: The Pomegranate: Botany, Production and Uses (Eds Sarkhosh, A., Yavari, A. and Zamani, Z), CABI Publishing – Wallingford OX10 8DE, United Kingdom. 247-284.
5. Mallikarjun H. (2021). Insect and non-insect pests and their management. Technical Manual No.1/NRCP/2021 on Good Management Practices in Pomegranate, published by ICAR-NRC on Pomegranate, Solapur-413255 (Maharashtra), India, pp170.



6. Singh, N.V., Babu, K.D. and Sharma, J. (2021). Pomegranate. In: Subtropical fruit crops: theory to practical (Ghosh, S.N. and Sharma, R.R. eds.), Jaya Publishing House, New Delhi, Pp. 454-523.
7. Patil, P.G., Singh, N.V., Shilpa, P., Sowjanya, R., Jyotsana, S., Marathe, R.A. (2021). Recent Advances in Pomegranate Genomics: Status and Prospects. In: Gyana Ranjan & K.V. Peter (eds.) Omics in Horticulture crops, Elsevier
8. Bohra A., Jha U., Satheesh Naik S.J., Mehta S., Tiwari A., Maurya A.K., Singh D., Yadav V., Patil P.G., Saxena R.K and Varshney R.K. (2021). Genomics: Shaping Legume Improvement. In book: Genetic Enhancement in Major Food Legumes (Eds. Saxena K.B et al.). DOI: 10.1007/978-3-030-64500-7\_3.
9. Babu, K.D. and Singh, N.V. (2021). Orchard management. In: Good Management Practices in Pomegranate, (Eds: Marathe, R.A., Pokhare, S.S., Manjunatha, N., Sharma, J., Mallikarjun, M.H., and Patil, P.G.) Technical Manual No.1/NRCP/2021 ICAR-NRC on Pomegranate, Solapur-413255 (Maharashtra), India, pp 38-43.
10. Singh, N.V., Chandra, R., Babu, K.D. and Shilpa, P. (2021). Healthy planting material for sustainable production. In: Good Management Practices in Pomegranate, (Eds: Marathe, R.A., Pokhare, S.S., Manjunatha, N., Sharma, J., Mallikarjun, M.H., and Patil, P.G.) Technical Manual No.1/NRCP/2021 ICAR-National Research Centre on Pomegranate, Solapur-413255 (Maharashtra), India, pp 8-11.
11. Singh, N.V., Chandra, R., Marathe, R.A., Babu, K.D. and Patil, P.G. (2021). Establishing new orchard. In: Good Management Practices in Pomegranate, (Eds: Marathe, R.A., Pokhare, S.S., Manjunatha, N., Sharma, J., Mallikarjun, M.H., and Patil, P.G.) Technical Manual No.1/NRCP/2021 ICAR-National Research Centre on Pomegranate, Solapur-413255 (Maharashtra), India, pp 12-16.
12. Singh, N.V., Sharma, J., Shinde, Y., Babu, K.D. and Shilpa, P. (2021). Economics of pomegranate cultivation. In: Good management practices in pomegranate, (Eds: Marathe, R.A., Pokhare, S.S., Manjunatha, N., Sharma, J., Mallikarjun, M.H., and Patil, P.G.) Technical Manual No.1/NRCP/2021 ICAR-NRC on Pomegranate, Solapur-413255 (Maharashtra), India, pp 141-143.
13. Singh, N.V., Sharma, J., Babu, K.D. Patil, P.G. (2021). Supply chain management, marketing and export issues in pomegranate. In: Good Management Practices in Pomegranate, (Eds: Marathe, R.A., Pokhare, S.S., Manjunatha, N., Sharma, J., Mallikarjun, M.H., and Patil, P.G.) Technical Manual No.1/NRCP/2021 ICAR-National Research Centre on Pomegranate, Solapur-413255 (Maharashtra), India, pp 133-140.
14. Rajiv Marathe, Jyotsana Sharma, Rahul Damale and Mallikarjun (2021). Gaajar Gavati Nirmoolan Jagarukta Saptaha. Sakal-Agrowon, 22<sup>nd</sup> August 2021.

### Popular articles

1. Sharma, J., Maity, A., Singh, N.V., Mallikarjun, H., Manjunatha, N., Pokhre, S., Chaudhary, D. (2021) मृग बहार डालिंब बागेचे व्यवस्थापन. Agro One, 5<sup>th</sup> August, 14 pp.
2. Sharma, J., Maity, A., and Mallikarjun, H. (2021) मृग बहार डालिंब बागेसाठी नियोजन. Agro One, 21<sup>st</sup> October, 14 pp.
3. Jyotsana Sharma, Ashis Maity, N.V. Singh, Mallikarjun, Manjunatha, N., Somnath Pokhare and Dinkar Chaudhary, (2021). मृग बहार डालिंब बागेचे व्यवस्थापन. Sakal-Agrowon, 5<sup>th</sup> August 2021.
4. Jyotsana Sharma, Somnath S. Pokhare, Manjunatha, N., Mallikarjun, H. and Vijay Lokhande, (2021). SIX-STEP Management Schedule for Bacterial Blight Disease. Agro India Magazine, pp36-38.
5. Mallikarjun, Rajiv Marathe and Dinkar Chaudhary 2021. डालिंब पिकावरिल खोड कीड व्यवस्थापन. Sakal-Agrowon, 29<sup>th</sup> September 2021.



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

1. Sharma, J., Maity, A., Singh, N.V., Mallikarjun, H., Pokhare, S., and Chaudhari, D. (June-July, 2021). Dalimba phaldharak baghsathi daimashik salla. <https://nrcpomegranate.icar.gov.in/files/Advisory/101.pdf>
2. Sharma, J., Maity, A., Singh, N.V., Pokhare, S., Mallikarjun, H., and Chaudhari, D. (October-November, 2021) Dalimba pikasathi salla. <https://nrcpomegranate.icar.gov.in/files/Advisory/112.pdf>
3. Mallikarjun, Rajiv Marathe and Dinkar Chaudhari (2021). Advisory for pomegranate shot hole borer management (September-2021) <https://nrcpomegranate.icar.gov.in/files/Advisory/107.pdf>
4. Mallikarjun, Rajiv Marathe and Dinkar Chaudhari (2021). Dalimb pikaavaril khod keed (Bhungera) vyavstapan (September-2021). <https://nrcpomegranate.icar.gov.in/files/Advisory/108.pdf>
5. Mallikarjun (2021). Fruit Piercing Moths Management Advisory August 2021. <https://nrcpomegranate.icar.gov.in/files/Advisory/104.pdf>
6. Jyotsana Sharma, Ashis Maithy, N. V. Singh, Mallikarjun, Manjunatha, N., Somanth Pokhare and Dinkar Chaudhari, Bimonthly Pomegranate Advisory for Bearing Orchards (August-September 2021 in English). (<https://nrcpomegranate.icar.gov.in/files/Advisory/102.pdf>).
7. Jyotsana Sharma, Ashis Maithy, N. V. Singh, Mallikarjun, Manjunatha N., Somanth Pokhare and Dinkar Chaudhari, Bimonthly Pomegranate Advisory for Bearing Orchards (October-November 2021 in English). (<https://nrcpomegranate.icar.gov.in/files/Advisory/109.pdf>).

## **Souvenir**

1. Marathe R. A., Singh N. V., Sowjanya R, Gaikwad N. N., Manjunath N. Shilpa P., Damale R. D., Jyotsana Sharma. (2021). International Webinar on Pomegranate: Ancient Fruit in Modern Horticulture, August 25-27, 2021, ICAR-NRCP and SARP, Solapur, Maharashtra, India, 205 p.

## **Technical Bulletin/ Folders/ Manuals/ Books**

1. Mallikarjun H., Jyotsana Sharma, Somnath S. Pokhare, Manjunatha, N. & Rajiv Marathe (2021). Dalimb Pikaavaril khod keed (Bhungera) vyavstapan. ICAR-NRCP/Vistar Patrika/2022/1. Published under CROPSAP.
2. Somnath S. Pokhare, Manjunath N., Jyotsana Sharma, Mallikarjun M.H. and Prakash Patil (2021). Good Management Practices in Pomegranate, Technical Manual No.1/NRCP/2021 ICAR-National Research Centre on Pomegranate, Solapur-413255 (Maharashtra), India, pp170.
3. M. H. Mallikarjun, N. Manjunatha, Jyotsana Sharma, K. Dhinesh Babu, P.S. Shirgure, Ashis Maity, N.V. Singh, N. Gaikwad, S. S. Pokhare, P. Shilpa, Roopa Sowjanya, Gunwant Garad, Govind Hande, K.N. Rao and Shailendra (2021). 'Course Compendium of Lectures for Training Programme on "Modern practices for export quality pomegranate production and value addition" for Extension Officers from July 28<sup>th</sup> -31<sup>st</sup> 2021 at ICAR-National Research Centre on Pomegranate, Solapur, Maharashtra, India.pp89.
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