



FARM COORDINATOR

... कृषि तकनीकी समन्वय पत्र

भाकृअनुप – राष्ट्रीय अजैविक स्ट्रेस प्रबंधन संस्थान

ICAR-NATIONAL INSTITUTE OF ABIOTIC STRESS MANAGEMENT

बारामती, पुणे - 413 115, महाराष्ट्र, भारत

Baramati, Pune – 413 115, Maharashtra, India

Published by

Dr. Himanshu Pathak

Director

ICAR- National Institute of Abiotic Stress Management,
Baramati, Pune- 413115, Maharashtra

Contributors

Dr. Pravin Bhimdeo Taware, Asst. Chief Technical Officer & Farm Manager

Mr. Rushikesh Shivaji Gophane, Technical Officer (Hort)

Mr. Patwaru Ranbhid Chahande, Senior Technical Assistant (Agril)

Mr. Sunil Vishnu Potekar, Senior Technical Assistant (Agro.Met.)

Mr. Aniket Tukaram More, Technical Assistant (Farm)

Mr. Pravin Hari More, Technical Officer (Computer)

Compiled and edited by

Dr. Pravin Bhimdeo Taware, Asst. Chief Technical Officer & Farm Manager

Contact Details

Director

ICAR- National Institute of Abiotic Stress Management,
Baramati, Pune- 413115, Maharashtra

Phone: 02112-254055/57/58, Fax: 02112-254056

Email- director.niasm@icar.gov.in

Website- www.niam.res.in



Page No.

Contents

1

निदेशक की लेखनी से / From the Director's Desk

2

Achievements November 2021

3

Weather Summary

4

Targets December 2021

5

Challenges Ahead

6

Technical Basics

7

Glimpses of the Month

8

प्रगति के पथ पर / Plan for Progress

निदेशक के लेखनी से...

इस वर्ष बहुत ही अनोखी मौसम स्थितियों का प्रदर्शन हो रहा है। मानसून की अवधि समाप्त हो गई है लेकिन फिर भी नवंबर के मध्य में चक्रवात प्रभाव के कारण हुई बारिश का खरीफ फसल पर प्रतिकूल प्रभाव पड़ा और रबी की बुवाई में गड़बड़ी हुई। नवंबर का महीना बीत गया लेकिन सर्दी का अहसास अभी बाकी है। इस दौरान औसत अधिकतम और न्यूनतम तापमान क्रमशः 30.4 और 18.8 रहा। दिसंबर के महीने में चक्रवात प्रभाव के कारण कुछ और बौछारें पड़ने की संभावना है। यह नियासम अनुसंधान फार्म और समग्र रूप से कृषि में सभी कृषि गतिविधियों को प्रभावित करने वाला है। यह अच्छा है कि कृषि तकनीकी कर्मचारियों ने अनुसंधान क्षेत्रों में रबी फसलों की बुवाई और अंगूर, अनार, ड्रैगन फ्रूट आदि जैसे बागों में चंदवा प्रबंधन कार्यों को पूरा कर लिया है। लेकिन उन्हें मौसम की स्थिति से प्रभावित होने वाले बदलते परिदृश्य पर नजर रखनी होगी।

इन सभी गतिविधियों पर नज़र रखना और साथ ही साथ मौसम की स्थिति का दस्तावेज़ीकरण और चुनौतियों का पूर्वानुमान, अनुसंधान फार्म प्रबंधन के लिए बहुत मददगार साबित होगा। क्योंकि कार्य की योजना बहुत पहले से बनाना और योजनाओं का समय पर क्रियान्वयन कृषि प्रबंधन गतिविधियों में महत्वपूर्ण है। 'प्रक्षेत्र समन्वयक' का यह अंक 'आगे की चुनौतियाँ' और 'माह के लिए तकनीकी मूल बातें' जैसी विशेष पंक्तियों के माध्यम से इन विकासों पर ध्यान केंद्रित करता है। यह लक्ष्य तय करने और उन्हें बेहतर तरीके से हासिल करने में अहम भूमिका निभाएगा।

कृषि समन्वयक आगामी माह की उपलब्धियों एवं कार्य योजना की जानकारी प्रदान करते हैं। डॉ. प्रविण तावरे और पूरी टीम को इस महत्वपूर्ण प्रकाशन को समय पर लाने हेतु उनके समर्पण और निरंतरता के लिए मैं धन्यवाद देता हूँ।

From Director's Desk...

This year is exhibiting very unique weather conditions. Monsoon period is over but still the showers due to cyclone effect during mid-November had adverse impact on *Kharif* harvest & disturbance in *Rabi* sowing.

The month of November passed but the colds is yet to be experienced. Average Max. & Min. temperatures were 30.4 and 18.8, respectively during this period. Some more showers due to cyclone effect are expected in the month of December. This is going to influence all the farm activities at NIASM research farm and agriculture as a whole. It's good that farm staff has completed most of the *rabi* crops' sowing in research fields and canopy management operations in orchards like grape, pomegranate, dragon fruit, etc. But they have to keep eye on changing scenario as influenced by weather conditions.

Keeping track of all these activities and simultaneously documentation of weather conditions and prediction of challenges is going to be very helpful for research farm management. Because planning of work much earlier and timely execution of the plans is important in day to day farm management activities. This issue of 'Farm Coordinator' keeps focus on these developments through special lines on 'Challenges Ahead' and 'Technical Basics for Month'. This will play key role in fixing targets and achieve them in better way.

Farm Coordinator provides information on achievements and action plan for the next month. I thank Dr. Pravin Taware and the whole team for their dedication and sincerity in bringing out this important publication.



Himanshu

Field preparation and sowing of *rabi* crops:

This work was initiated from 2nd week of October immediately and continued during November. The secondary tillage operations were carried out to achieve required soil tilth. Layout preparation like flatbed preparation and ridges and furrow were laid as per crop and experimental requirements. Sowing was done with the help of seed drill as well as dibbling/transplanting work was carried out manually. Out of 25 fields meant for crop research, 17 were occupied with one or other crop while remaining were kept ready for subsequent sowing. The crops standing in field as of date include sugarcane, pigeon pea, chickpea and vegetables like chilly and brinjal. Newly sown crops are wheat, chickpea, quinoa, chia, etc. Irrigation

Orchard management: After pruning activities like shoot thinning and spraying of GA 10ppm were carried out in grape Thomson seedless, Sharad seedless and Manjri Medika. Pomegranate (J3), guava (H4) and fig (H3) were pruned as scheduled. In dragon fruit orchard shoot thinning and pruning of unwanted branches was initiated as a part of canopy management. This important operation from the point of next crop expected from June month. With some artificial light interventions, efforts will be made to prepone the season as much possible. The pruned cuttings were used in nursery for generating planting material which has good demand now a days. Plant protection and nutrition management was done by following recommended schedules.

Malad farm activities: About 12 fields were kept ready for experimental sowing/plantation. In mid-November some showers were expected due to cyclone effect. Keeping this in view sowing of Ajwain in one field and chickpea in two fields was carried out. Spraying of pre-emergence herbicide (Pendimethalin) was carried out in chickpea to take care of weeds. Remaining fields were cultivated with the help of tractor drawn cultivator to get rid of weeds and keep the fields ready for sowing. Survey was made to identify the locations for exploring bore-well and construction of farm pond with connectivity to canal.



Quinoa- sowing date research field



Chickpea- sowing with seed-drill



Spraying of pre-emergence herbicide



Pruning in pomegranate orchards



Ample fruiting in sapota

The long period average (LPA) of November rainfall and average temperature at Baramati is 14.2 mm and 24.3 °C, respectively. The details of weather during the November 2021 has been listed in Table 1 and depicted in following figure.

Table 1. Summary of weather variables recorded during November, 2021.

Weather Parameters	Week				Monthly	Max.	Min.
	1 st	2 nd	3 rd	4 th			
T Max (°C)	31.4	30.6	30.2	30.2	30.4	32.4	26.6
T Min (°C)	20.2	15.2	21.6	18.8	18.8	22.7	11.4
T Avg (°C)	25.8	22.9	25.9	24.5	24.6	27.2	20.8
RH Mean (%)	64	59	81	70	68	90	51
WS (km/h)	6.1	6.1	6.6	4.1	5.8	8.4	2.9
BSS (h)	5.6	6.3	3.0	6.0	4.9	9.3	0.0
Total PE (mm)	32.7	38.8	21.7	22.9	123.7	6.1	2.0
Total Rain (mm)	0.0	0.0	24.4	4.4	28.8	12.6	0.0

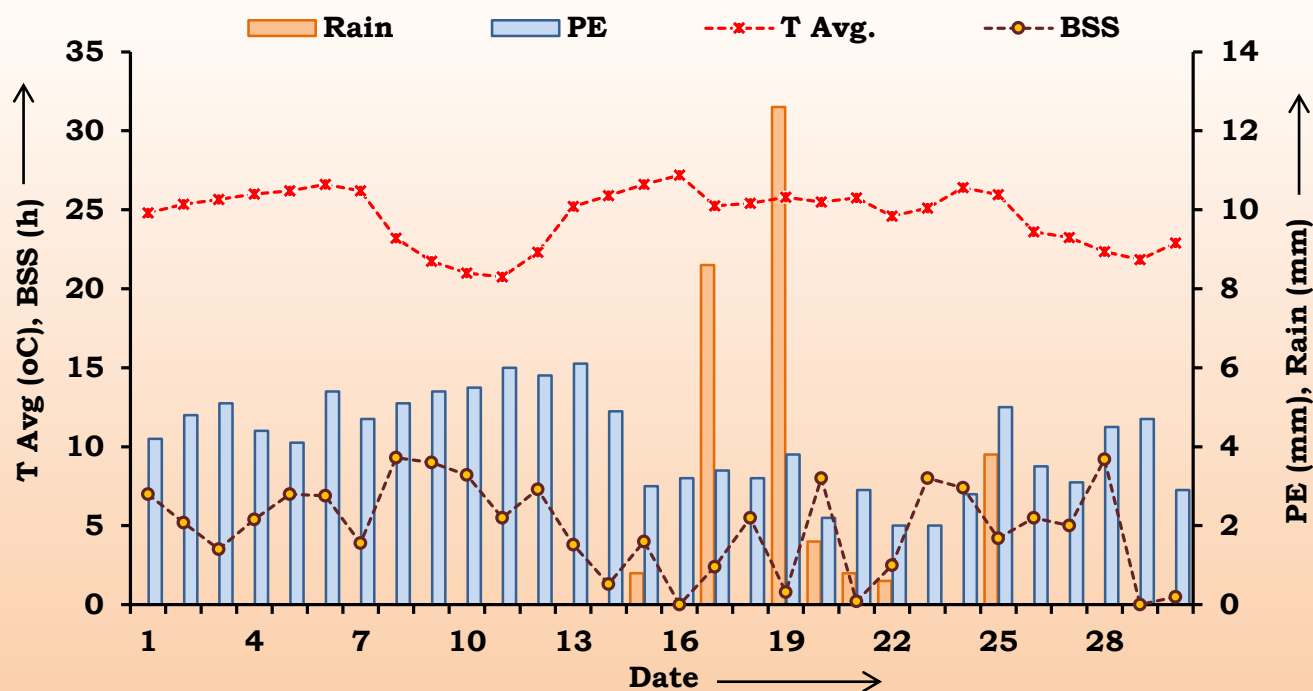


Fig 1. Variations of daily rainfall (Rain), pan evaporation (PE), mean temperature (T_{Avg}) and bright sunshine hours (BSS) during November, 2021 at ICAR-NIASM Baramati.



Rabi crops' maintenance: Sowing in all experimental fields will be completed by the first week. Maintenance of all these will be given priority for weed management, irrigation and plant protection. Layouts for micro-irrigation will be finalized to bring maximum fields under drip or sprinkler.

Orchard management practices: Due care of pomegranate and grape orchards that are in fruiting phase will be taken up for canopy management, nutrition, plant protection and irrigation. Sweet orange fruiting season will be over in next month and will be left on stress for some period as a part of bahar treatment. Dragon fruit training for opening up the canopy is in progress. It will be kept in stress for about a month and trials on advancing fruiting season will be started thereafter. All other orchards like guava, fig, mango, acid lime in resting phase will be managed through application of manure and fertilizers for improving performance.

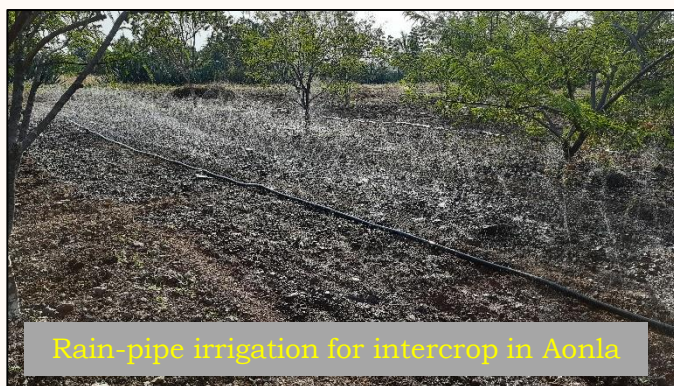
Malad farm activities: Maintenance of crops sown during rabi season will be the first priority. *Prosopis* shrubs in 2-3 remaining fields, road spaces and bunds to be removed for easy access in all the fields.

Plant protection: Due to prolonged rains as effect of cyclone, disease load in orchards have been increased. Prophylactic sprays for control of anthracnose, downy mildew and powdery mildew in grape, leaf spot in pomegranate are required during next month. Use of sticky traps, clean cultivation and sprays for sucking pest management are required at early stages. Preparations for mango flowering to be made by protecting foliage with pesticide sprays. Prophylactic spraying of pesticides will be carried out in dragon fruit to avoid infections through wound after pruning.

Weed management and waste disposal: This activity is a big issue due to intermittent rains and increased workload of sowing and orchard management activities. Integrated weed management has to be followed by use of machinery (mulcher, rotavator, and brush cutter), manual weeding and use of non-selective herbicides in open areas. The diseased biomass was disposed of by burning while other material need to be shredded and spread in orchards for in-situ decomposition.



Vegetable crop on drip irrigation



Rain-pipe irrigation for intercrop in Aonla



FYM application in fields



Field preparation at Malad Farm



Irrigation management thr' Malhar pond

Grape orchards at risk due to cyclonic disturbances

The cyclonic disturbances at Bay of Bengal and Arabian Sea, are badly influencing Indian agriculture every year. Particularly the showers due to cyclone during October to December months affect the Kharif harvests and Rabi sown crops. It has detrimental impact on orchards by directly interfering the horticultural practices or indirectly due to triggered disease load. Amongst the orchards, grapes are more sensitive during production phase. The stages after forward pruning are very critical and any such adversity causes heavy loss to the crop in terms of quality and quantity. Farmers make efforts to escape such situations by advancing or delaying pruning on the basis of historical evidences of these adverse conditions. However, year after year occurrence of cyclone showers is very frequent. Following are some challenges that grape growers are facing due to cyclonic disturbances;

- Showers at the time of pruning directly affect pruning activity and washes out the dormancy breaking paste leading to poor sprouting.
- After forward pruning, if rains persist it increases shoot vigour leading to conversion of bunch in to tendril
- Cloudy climate after bunch emergence creates confusion in use of pre-bloom Ga application because the recommended dose effect may exaggerate in cloudy/ rainy conditions.
- Risk of anthracnose and powdery mildew increases, requiring frequent use of costly agro-chemicals.
- Flowering stage is the most sensitive for drizzling rains. The floral parts are very hygroscopic and catch the water droplets making conditions congenial for downy mildew development devastating almost whole crop.

How to mitigate this stress?

- Adjusting pruning time to escape the cyclonic disturbances based on historical evidences.
- Use of protective covering to avoid direct entry of rain drops in flower bunch. But this is very costly remedy.
- Try to remove water from bunches at the earliest, manually, mechanically with air blast or by use of chemicals.
- Prophylactic spraying of systemic fungicides before rains while spraying of broad-spectrum fungicides during dry spell in between rainy days.



Flowering- the most sensitive stage



Downy mildew infection on bunch



Targeted spraying on grape bunches

Bahar Management in Pomegranate

Pomegranate flowers continuously if watered regularly. The plants in such situations may continue bearing flowers and fruits irregularly all the year round, which is not considered appropriate for commercial production. Therefore, trees are given *Bahar* treatment to bear flower and fruits when required.

As per patterns of rainfall, *Bahar* Treatment can be done three times in a year to induce flowering viz; June-July (*Mrig Bahar*), September-October (*Hasta Bahar*) or January-February (*Ambe Bahar*)

Mrig Bahar

- Usually this *bahar* is favoured as the flowering and fruiting period coincides with rainy season or immediately after rains, and the crop is taken without much irrigation.
- In this treatment, flowering is allowed at the beginning of monsoon. This treatment is well preferred by farmers from arid to semi-arid region where there are limited water resources available.
- This treatment has some advantages like exposure of tree to water stress becomes easy since plants are exposed to hot summer can get required water stress.
- However, disease and pest management becomes very critical in this treatment because of favourable conditions for the growth of micro-organism, insect and pest. Fungal diseases are predominant because of high humidity. Orchards in oily spot prone area, *mrig bahar* should be avoided.
- The *mrig bahar* crop is harvested in the month of December to February.

Hasta Bahar

- This is followed just after completion of rainy season i.e. during September to October. It has been observed that flower management during *Hasta Bahar* is very difficult because of rainy conditions for giving water stress to the plant. This leads to poor flowering and fruiting.
- Well drain soils may be considered to be suitable for managing this *bahar*.
- This *bahar* is popular because it gives assured price and high demand for the fruits in the market. The fruits from *hasta bahar* are harvested during the month of March to April.

Ambe Bahar

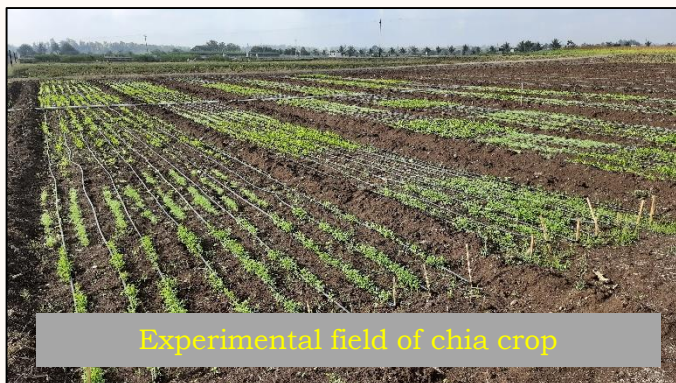
- In this case plants are exposed to water stress during December to February depending on variety.
- Special attention is required to control sun burn and cracking to the fruit in this treatment.
- *Ambe bahar* fruits are ready for harvest in the month of June to September.
- *Ambe bahar* can be taken only areas having assured irrigation facilities.

Steps in *Bahar* Treatment

1. In *Bahar* Treatment, the irrigation is withheld 45-60 days prior to the *bahar* followed by light pulverization of soil in the basin. This facilitates the shedding of leaves.
2. There are two methods used to expose trees against the stress, first by soil moisture stress while second is the chemical induced stress.
3. In first method, irrigation is completely or partially stopped for 45-60 days depending on the soil type and environmental conditions. In this method 50-70% leaf defoliation is expected and considered to be an ideal stage of stress.
4. In second method, Ethephone (Ethrel) is used to spray at 3-5 ml L⁻¹ concentration over the foliage of the tree. In this method 90-100% leaf defoliation is observed.
5. The trees are then medium pruned. The recommended doses of fertilizers are applied immediately after pruning and irrigation is resumed. This leads to profuse flowering and fruiting.



Flowering & fruit set in pomegranate



Experimental field of chia crop



Experimental field of chilli



Mango- good growth after heavy pruning



Grape- shoot development after pruning



Guava- pruning in progress



Tamarind- ample fruiting



Napier grass- growth on drip irrigation



Sugarcane- CRPC project field



Indoor garden at admin building



Lawn development at Phenomics facility

प्रगति के पथ पर

पहले पन्ने पर दिख रही अंगूर के गुच्छे की उभरती हुई छवि अच्छे उत्पाद मौसम के लिए आशा की किरण दर्शाती है। लेकिन फिर भी पोषण प्रबंधन के मामले में विशेष रूप से खाद के उपयोग के माध्यम से स्थितियों में काफी सुधार करना होगा। सभी बागों के पौधे बड़े हो गए हैं और पोषण, सिंचाई और छत्र प्रबंधन पर अधिक ध्यान देने की आवश्यकता है। तदुसार साल दर साल बेहतर प्रदर्शन के लिए योजनाओं को आखा और क्रियान्वित किया जा रहा है। फूलों की अवस्था के दौरान प्रतिकूल मौसम की स्थिति से बचने के लिए अंगूर में फल हेतु छंटाई में जानबूझकर देरी की गई। हालांकि, नवंबर के मध्य में परिसर में बारिश हुई और दिसंबर की शुरुआत में और अधिक बारिश की भविष्यवाणी की गई है। इसलिए, डाउनी फफूंदी संक्रमण को नियंत्रित करने के लिए नई पीढ़ी के प्रणातीगत कवकनाशी के रोगनिरोधी छिड़काव द्वारा उचित देखभाल की गई थी। अनार में आंबे बहार के लिए छंटाई के बाद, फूलों की सुरक्षा और फलों को बढ़ाने के साथ-साथ कवक और जीवाणु संक्रमण की देखभाल के लिए उचित देखभाल की आवश्यकता जरूरी है। ड्रैगन फ्रूट की छंटाई मुख्य रूप से अवांछित वलैडोड को हटाने और बेहतर वेंटिलेशन और बाग में अंदर पहुंच की सुविधा के लिए चंदवा को विरल बनाने के लिए की गई थी। बेहतर प्रयोग और प्रदर्शन के लिए संबंधित नोडल अधिकारियों के परामर्श से सभी बागों के लिए बागवानी प्रथाओं को डिजाइन किया जाएगा।

रबी फसलों की बुवाई लगभग पूरी हो चुकी है और दिसंबर के पहले सप्ताह में समाप्त होने की योजना है। परिसर में पर्याप्त भंडारण सुविधा उपलब्ध होने के कारण सिंचाई के पानी की कोई समस्या नहीं होगी, लेकिन फसल उगाने के शुरुआती चरण में खरपतवार प्रबंधन को प्राथमिकता दी जानी जाएगी। मलद फार्म में अजवाइन और चना की बुवाई की गई। झाड़ियों को हटाकर और जुताई के संचालन से नौ अन्य क्षेत्रों को प्रायोगिक परीक्षणों के लिए तैयार रखा गया है। आंतरिक सड़कों और शेष खेतों को मशीनरी के उपयोग से अच्छी स्थिति में लाया जाएगा। सिंचाई सुविधा का विकास सभी गतिविधियों में केंद्रित है। मुख्य खेत के साथ-साथ मलद फार्म में भी सभी नए विकास के लिए ठोस योजनाएँ तैयार की जा रही हैं।

Plan For Progress

The emerging grape bunch image on front page depicts the ray of hope for good production season. But still the conditions have to be improved much in terms of nutrition management especially through application of manures. All the orchard plants have grown big and need more attention for nutrition, irrigation and canopy management. Accordingly plans are being chalked down and implemented for better performance year after year. Forward pruning in grape was delayed purposely to escape from the adverse weather conditions during flowering stage. However, the campus received showers in mid-November and more are predicted in early December. Therefore, due care was taken up by prophylactic spraying of new generation systemic fungicides to control downy mildew infections. In pomegranate after pruning for *ambe bahar*, due care is required to protect flowers and increase fruit set and simultaneously taking care of fungal and bacterial infections. Pruning in dragon fruit was taken up mainly for removing the unwanted cladodes and make the canopy sparse enough to facilitate better ventilation and access to the orchard. Horticultural practices will be designed for all the orchards in consultation with the respective nodal officers for better experimentation and performance.

Rabi crops' sowing has been almost completed and planned to finish up in first week of December. Irrigation water will not be an issue due to ample storage facility available at campus but the weed management in early phase of crop grow need to be given a priority. Sowing of ajwain and chickpea was done at Malad farm. Nine other fields have been kept ready for experimental trials by removing shrubs and tillage operations. Internal roads and remaining fields will be brought into good shape by use of machinery. The development of irrigation facility is at focus of all the activities. Concrete plans are being prepared for all the new developments at main farm as well as at Malad farm.

