



FARM COORDINATOR

... कृषि तकनीकी समन्वय पत्र



भाकृअनुप - राष्ट्रीय अजैविक स्ट्रेस प्रबंधन संस्थान

ICAR-NATIONAL INSTITUTE OF ABIOTIC STRESS MANAGEMENT

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निदेशक के लेखनी से...

'फार्म समन्वयक' अनुसंधान प्रक्षेत्र प्रबंधन की प्रक्रिया में अनुभवों, योजनाओं और उपलब्धियों का संग्रह है। यह प्रक्षेत्र की गतिविधियों में अंतर्दृष्टि प्रदान करते हुए मौसम के मानकों, चुनौतियों और बेहतर खेती प्रथाओं के लिए तकनीकी जानकारी प्रदान करता है।

अगस्त का महीना खरीफ फसलों के रखरखाव, भंडारण तालाबों को भरने के साथ-साथ सिंचाई गतिविधियों की योजना बनाने, बागों में खेती के तरीकों के प्रबंधन, खरपतवार प्रबंधन और उचित कृषि-अपशिष्ट निपटान में व्यस्त था। परिसर के सौंदर्य में सुधार के लिए मुख्य प्रवेश बिंदु और केंद्रीय त्रिभुज भाग पर नए वृक्षांशण किए गए। इसी तरह सितंबर माह के लिए भी भरपूर योजनाएँ तैयार हैं। खरी सीजन की तैयारी शुरू करने की जरूरत है। अगस्त में 'हस्त बहार' के मामले में आईपीएम प्रथाओं पर ध्यान देना होगा। बेहतर फसल उत्पादकता और गुणवत्ता के लिए किसानों के लाभ के लिए 7-9 वर्षों के अनुभव पर आधारित प्रौद्योगिकियों पर ध्यान केंद्रित करने की आवश्यकता है।

कृषि गतिविधियों के प्रबंधन और सुधार के लिए 'फार्म समन्वयक' एक उपयोगी प्रकाशन पाया जा रहा है। प्रकाशन की विषय-वस्तु में महीने दर महीने सुधार हो रहा है। तस्वीरें उच्च गुणवत्ता की हैं जो खेत की स्थिति और किए जा रहे विभिन्न खेत अनुसंधानों का उत्कृष्टता से विश्लेषण करते हैं। इस महत्वपूर्ण प्रकाशन को नियमित रूप से प्रकाशित करने में समर्पण और निरंतरता के लिए डॉ. प्रविण तावरे और उनके पूरी टीम को मैं धन्यवाद देता हूँ।

From Director's Desk...

'Farm Coordinator' is the collection of experiences, plans and achievements in the process of research farm management. It gives an insight into the activities at farm along with background information on weather parameters, challenges and technical information for improved cultivation practices.

The month of August was busy with maintenance of *kharif* crops, planning irrigation activities along with filling up storage ponds, managing cultivation practices in orchards, weed management and proper agro-waste disposal. To improve aesthetics of the campus new plantations were carried out at main entry point and central triangle portion. Likewise, there is a sound plan for the month of September. Preparations for *rabi* season need to be initiated. In case of '*Hast bahar*' in pomegranate due attention have to be given on IPM practices. The technologies based on 7-9 years' experience need to be focused for the benefit of farmers for improved crop productivity and quality.

'Farm Coordinator' is found to be a useful publication for managing and improving the farm activities. The content and the get-up of the publication is also improving month by month. The photographs are of very high quality giving an excellent idea of the condition of the farm and the various experiments being carried out. I thank the whole team led by Dr. Pravin Taware for their dedication and sincerity in bringing out this important publication very regularly.



Pravin

अगस्त / August 31, 2021

हिमांशु पाठक / Himanshu Pathak

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Kharif crops maintenance: During initial 3-weeks very little rainfall (total 10-12mm) was received and as against the PE was very high. Therefore, lifesaving irrigation was must which was continued on priority. Fortunately, canal water was available from the second week onwards and the irrigation could be managed easily. Simultaneously, hand-weeding operations were continued to keep the research crop fields weed free. The Kharif sowing was over but still some different date experimental sowing was carried out (C3- moong bean, cowpea, D3- chia, E5-groundnut, E6-cluster bean, chili, C9- Fodder maize). As a part of field preparation, green manure incorporation (in B3, B4 and C6 fields) was carried out.

Orchard management practices: Sweet orange, acid lime, dragon fruit, guava and pomegranate orchards were in production phase. Protection of fruits from pest was looked after carefully. Farm Yard Manure as well as fertilizer application was carried out in these orchards. Foliar application of nutrients through Potassium sulphate, Magnesium sulphate and micronutrients was preferred to fulfill urgent nutritional requirements. It was required for enhancing cane maturity and keep the leaves healthy. Harvesting and disposal of produce was managed after completing research sampling and data recording.

Malad farm activities: Soybean crop was sown in 6 fields at Malad farm during June 2021. Due to intermittent rains crop growth was good and post-emergent herbicide spray thereafter gave good control of weeds too. However, in later phase during August 2021, there was Parthenium weed growth in some of the fields. Therefore, manual weeding activity was carried out to rough out the weeds. The roadsides were sprayed with non-selective herbicide (Glyphosate) to get rid of weeds and make area free for fencing work.

Plant Protection: Broad spectrum fungicides like copper oxychloride, mancozeb were used in orchards for control of common diseases. Spraying was done as a preventive measure in grape, pomegranate, sweet orange, guava and dragon fruit. Fruit borer and fruit fly were important pests to be managed during the month. Azadirachtin and Deltamethrin were sprayed in guava, pomegranate and dragon fruit orchards.



Sunflower Field



Intercrop in Tamarind-Sandalwood Field



Earthing-up Operation in Dragon Fruit

Irrigation Management: Canal water was available from the second week. While managing the irrigation requirements in various crops, preference was given to fill the ponds on priority. The plastic lining of Manas pond was damaged at few locations leading to leakages and not allowing to fill it at full capacity. Therefore, the plastic repairing work was carried out by through technician. To avoid soil erosion from roadside bund of Malhar pond, stone pitching was carried out on the slope.

Weed Management: The drizzling monsoon showers were led to development of weeds in and around the fields, roadsides and open areas. Manual weeding was preferred in experimental fields while selective herbicides were used in general area. Application of Glyphosate was done along road sides and in open areas.

The long period average (LPA) rainfall and average temperature of August at Baramati is 68.6 mm and 26.0 °C, respectively. The details of weather during the August 2021 has been listed in Table 1 and depicted in following figure.

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

Weather Parameters	Week				Monthly	Max.	Min.
	1 st	2 nd	3 rd	4 th			
T Max (°C)	30.0	31.0	28.1	31.7	30.1	34.2	26.4
T Min (°C)	21.4	20.9	21.3	21.1	21.2	22.2	19.7
T Avg (°C)	25.7	26.0	24.7	26.4	25.7	28.0	23.6
RH Mean (%)	75	74	82	71	76	88	64
WS (km/h)	15.0	10.9	10.3	7.9	10.8	18.2	5.5
BSS (h)	4.2	4.8	0.8	8.0	4.1	10.4	0.0
Total PE (mm)	40.3	42.6	25.1	36.9	154.1	7.1	2.0
Total Rain (mm)	0.4	5.4	5.6	19.6	40.6	12.6	0.0

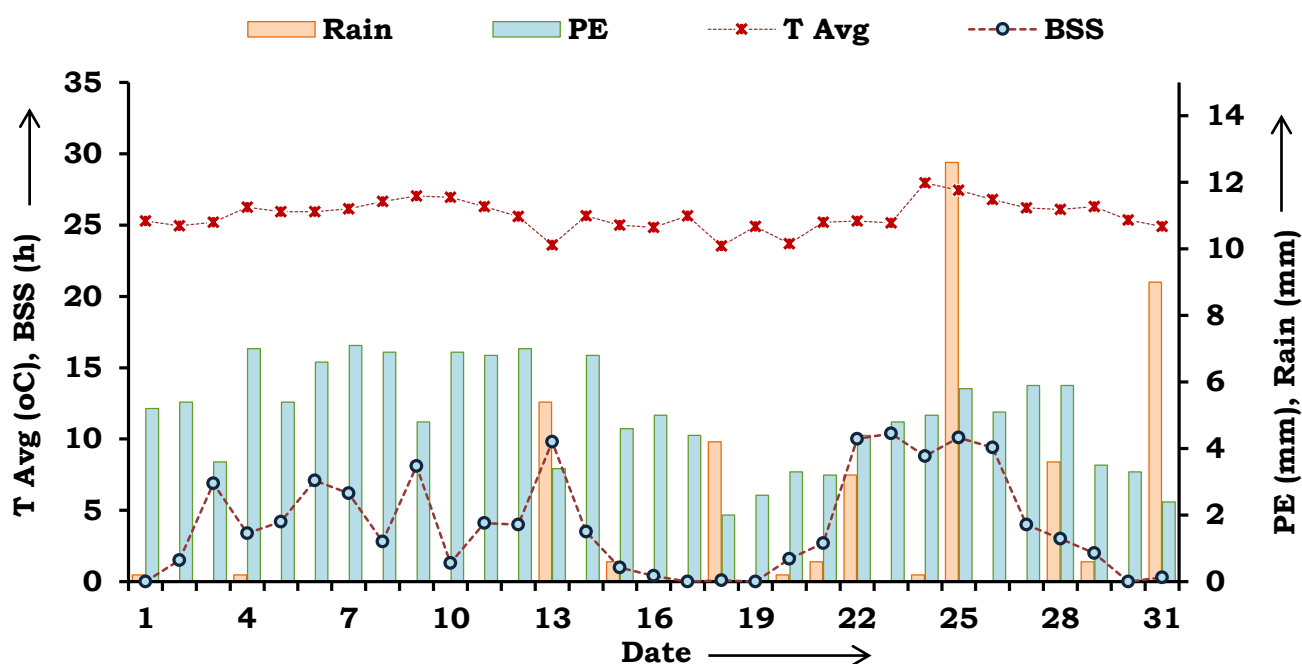


Fig 1. Variations of daily rainfall (Rain), pan evaporation (PE), mean temperature (T_{Avg}) and bright sunshine hours (BSS) during August, 2021 at ICAR-NIASM Baramati.



South farm activities: Soybean crop is at pod setting stage while other *kharif* crops are also at flowering to maturity. Plant protection and research treatments will be carried out as per the requirements of the project leaders. Rain showers are delayed and it is expected that there will be high intensity rainfall during September month. Therefore, care is required to manage the runoff to be diverted away from crops and orchards. Therefore, cleaning of drainage water channels is pre-requisite during first fortnight. Preparations for rabi season have to be started to facilitate early rabi sowing.

Orchard maintenance: Preparation for Hasta bahar in pomegranate (J3) and forward pruning in grape have to be started this month. Due to rains, Pomegranate will experience pre-pruning stress required for induced flowering. Therefore, defoliation will be carried out by spraying of Potassium nitrate followed by Ethephon. Pruning will be carried out after required defoliation. Manure and fertilizers will be applied during these pre-pruning activities. Similarly, the preparations for forward pruning in grape are to be started. Proper cane maturity is necessary before deciding for pruning that can be achieved through foliar application of nutrients. New shoot growth will be removed time to time to avoid depletion of food storage in the grapevines. Canopy management activities in sweet orange, dragon fruit, guava and fig need to be continued during next month. Abundant flowering in dragon fruit has been observed therefore fruit thinning and nutrition management is required for better fruit size. Various research trials are going on in dragon fruit to address different issues so it is necessary facilitate requirements of the project leaders for treatment imposition, sampling and harvesting.

Malad farm works: Fencing activity along roadside is to be completed during September month. New fields have to be prepared to fulfil the requirements of research workers. Possibility of farm pond for water storage is to be explored so as to provide life-saving irrigation to the crops.

Plant protection: Due to increase in humidity diseases like *Cercospora* spot and bacterial blight in pomegranate, downy mildew and anthracnose in grape, rotting in



Field layout ready for crop sowing



Mango canopy development after pruning



Ample flowering in Drumstick

dragon fruit and other orchards create a havoc. Likewise, some pests like lemon butterfly in citrus, leaf eating caterpillars in drumstick, stem borer in mango and grape, fruit borer and fruit flies in various fruits. Prophylactic spraying for disease control and ETL based spraying for management of insect pests are required. Various traps as well as spraying of biopesticides and biological control agents will be carried out as a part of integrated pest management.

Nutrition management: Application of fertilizers in field crops and orchards will be done through soil application/ fertigation as per the recommendations. Due to rains irrigation may be required, under such condition foliar application of various soluble grades (0-0-50, 13-0-45, 0-52-34) and micronutrient mixtures will be implemented.

Preparations for *Hast Bahar* in Pomegranate

Oily spot disease has made havoc in pomegranate cultivation. Lot of efforts are being made to control the disease but still it infects the orchards sporadically. Selection of season is the first step in integrated management of this disease. *Mrig bahar* coincides with monsoon led increased humidity which very congenial for oily spot proliferation. Therefore, *Hast bahar* is always suggested for avoiding the disease as during later phase of growth the climate bit dry. But there are many difficulties in going for this *bahar* too.

1. As a part of *bahar* treatment, water stress is required to be imposed for induce flowering. However, the monsoon rains don't allow for water stress. The defoliation is required to be carried out with the help of chemicals like ethephon. But still the flowering is not uniform as desired that affects badly the fruit set too.
2. Infestation of fruit borer in initial phases is more that need extra attention.
3. As the monsoon scenario is changing, the delayed monsoon may lead to the occurrence of *Cercospora* leaf spot and oily spot disease during early phase of fruit growth.
4. If flowering delays due any one of the reasons, the harvesting period fall in increased temperature period hindering development of aril and rind colour.
5. Clean cultivation is one of the important solution get rid of pests and diseases as it develops micro-climate congenial for causal organisms. Also most of the time they harbour them as secondary host. Similarly removal of infected biomass, fruits and its proper disposal for mitigating these biotic stresses. If rain persists it becomes difficult to implement .



Care needed to protect Pomegranate



Following proper spray schedule

Recommendation fo Farm Advisory Committee

FAC in a meeting on August 20, 2021 narrated following recommendations for improvement.

- Micro-irrigation facility to be preferred and extended to all fields in South farm. The general needs of the scientists having field experiments to be compiled and procurement to be made through farm.
- Expert advice to be taken to improve Pomegranate orchard conditions.
- Explore feasibility of open well/ bore well/ farm pond at Malad farm to provide life-saving irrigation during canal closure period.
- Develop the entry point near main road by planting ornamental shrubs.
- Triangle development to be completed by planting perennial shrubs and seasonal flowering plants.
- Survey to be made to locate the coconut trees supposed to touch over-head electric wires and those to be removed by taking proper care by requesting for temporary power shut down. Small trees or shrubs to be selected for planting at these locations.
- Thorough plan to be made for repairing bunds and replacing polythene lining of Manas pond. Alternate arrangements to be made prior to go for repairing work so as to continue uninterrupted water supply to orchards and other establishments.
- The area near school buildings to be developed to facilitate the requirements of land to maintain biodiversity and plantation of new hybrids of dragon fruit.
- The intended activity of water budgeting to be completed on urgent basis for implementation of judicial water management at the campus.

Forward Pruning in Grape: Pre-pruning Activities

Grape and pomegranate are originally temperate fruit crops that are adopted to sub-tropical and tropical areas with certain modifications in cultivation practices. Tropical grapevines do not undergo dormancy as in temperate climate and experience continuous growth. Therefore, forced rest is imposed through double pruning practice. Back pruning which is carried out around April month is basically for giving rest the vines. The grapevines are pruned back, leaving only framework and during further growth generally no crop is allowed. The developing shoots undergo fruit bud differentiation and food storage work which builds foundation for the production after Forward pruning. Forward pruning is carried around October month as it is now the period to prepare for this pruning.

The foundation phase of grape orchard is at final phase and it required to go for pre-pruning practices as follows;

- Cane maturity is an indication of better food storage in the grapevines and its readiness to go for pruning. Therefore, its required to look for the maturity of canes through physical examination. Sometimes, due to cloudy weather and drizzling rains from June to August period the cane maturity is hampered. In this case spraying of Potassium sulphate 3-5g L⁻¹, Magnesium sulphate 3-5g L⁻¹ and micronutrient mixture at 7-10 days interval, enhances the cane maturity.
- Avoid early defoliation: Due to anthracnose and downy mildew diseases in these weather conditions may lead to early defoliation. Consequently, the buds in the ails of fallen leaves start sprouting which has direct implications on yield due to loss of fruitful buds and stored food depletion. Therefore, use of copper fungicides is recommended as broad spectrum spray to control diseases and the defoliation.
- Removal of unwanted growth: As the canes mature the apical shoots continue growing depleting the cane food storage. These apical shoots are removed by leaving only one eye-bud on the main cane. Timely removal of unwanted growth is essential for maintaining the health of the canes in good conditions.
- Pre-pruning water stress and defoliation: Before pruning 10-15 days water stress is recommended according to soil type. The purpose of the stress is to initiate senescence of the leaves leading to defoliation for swelling of buds. This helps in easy sprouting after pruning. If water stress is not possible due to rains, the

leaves are to be removed manually or with help of chemicals.

- Application of manures and fertilizers: As a pre-pruning operation the manure application by taking shallow trench is to be initiated during this period. Basal dose of fertilizers is also added and mixed with manure before closing the trenches.
- Sample testing of canes for fruitfulness: The cane samples (20-25 ha⁻¹) are collected randomly and tested in labs for fruitfulness. This helps to know the fruitful zone on the cane helps as a guideline during pruning. Generally the buds from 6 to 10 exhibit fruit bud differentiation which is influenced by variety, growth and weather parameters. Therefore, it is important to know the fruitfulness zone so as to not to lose the fruitful bud while pruning.
- Decision on pruning time: The pruning can be staggered keeping in view the market and local weather conditions. Period of pruning is decided on the basis of desired harvesting schedule and prevailing weather conditions. On an average the grape bunch matures in 130-140 days after pruning. Accordingly the date of pruning can be determined. Prevailing climate and predictions at the time of harvest need to be considered.



Grape orchard after back pruning



Pigeon pea Germplasm Collection



Growth of Soybean under drip irrigation



Kharif Rajamash trial



Kharif Chickpea trial



Finger millet crop growth



Tamarind germplasm trial



Preparing Dragon fruit nursery



Soybean based cropping system



Roadside Bael in fruiting



Cactus flowers resemble Dragon fruit

प्रगति के पथ पर

अगस्त 2021 की शुरुआत 'उच्च उत्पादकता, लाभप्रदता और संसाधन-उपयोग दक्षता' के लिए 'अच्छे कृषि अभ्यास (जीएपी)' पर कठोर प्रशिक्षण के साथ हुई। यह 15 दिवसीय प्रशिक्षण एग्रोनॉमी डिवीजन, आईएआरआई, नई दिल्ली द्वारा ऑनलाइन मोड में आयोजित किया गया था। यह बहुत जानकारीपूर्ण था और आधुनिक परिप्रेक्ष्य में मूल बातें फिरसे समझ में आयी। निःसंदेह यह ज्ञान भाकृअनुप-नियामक अनुसंधान फार्म में प्रगति की योजना बनाने की प्रक्रिया में सहायक होगा। प्रगति के पथ पर आगे बढ़ते हुए नए अवसर खुल रहे हैं और साथ ही नई चुनौतियां भी सामने आ रही हैं। अनुसंधान प्रक्षेत्र प्रबंधन दिन-ब-दिन इतना व्यस्त और दिलचस्प होता जा रहा है कि महीने अधिक गति से लेकिन पर्याप्त उत्पादन के साथ बीत रहे हैं। 'फार्म समन्वयक' के रूप में एक साथ बंधे हुए ये सभी अनुभव प्रगति के इस पथ की स्थायी छाप छोड़ने वाले हैं।

खरीफ फसलों के रख-रखाव के साथ रबी सीजन की तैयारी, अनार में 'हस्त बहार' की तैयारी, अंगूर में छंटाई पूर्व तैयारी, एकीकृत कीट और रोग प्रबंधन और खरपतवार प्रबंधन अगले महीने की चुनौती होगी। ड्रैगन फ्रूट अनुसंधान में वैज्ञानिकों की रुचि बढ़ रही है, जिस पर उनकी आवश्यकताओं को पूरा करने के लिए अधिक ध्यान देने की भी आवश्यकता है। सीमित संसाधनों के बावजूद इन सबके लिए ठोस योजना हमारे अगले महीने का प्रगति का पथ है।

Plan For Progress

August 2021 started with rigorous training on 'Good Agricultural Practices (GAPs) for Higher Productivity, Profitability and Resource-Use Efficiency'. This 15-days training was organized by Agronomy Division, IARI, New Delhi in online mode. It was very informative and refreshed the basics in modern perspective. No doubt this knowledge will be helpful in the process of planning for progress at ICAR-NIASM research farm. While moving ahead on a path of progress, new opportunities are opening-up and likewise new challenges are standing ahead. The job of research farm management is becoming so busy and interesting day by day that the months are passing by with more pace but with ample outputs. All these experiences bound together in the form of monthly issues of 'Farm Coordinator' are going to make permanent impression of this path towards progress.

Challenges for next month would be preparations for rabi season along with maintenance of Kharif crops, preparations for 'Hasta bahar' in Pomegranate, pre-pruning preparations in grape, integrated pest and disease management and weed management. Scientists' interest in dragon fruit research is increasing which needs more attention to facilitate their requirements. There is concrete plan ready for all this in spite of limited resources. And that is our plan for progress for the next month.



Synchronous Pre-bloom and Fruit Development Stages of Dragon Fruit

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