

Issue 19











FARM COORDINATOR

... कृषि तकनीकी समन्वय पत्र

भाकृअनुप – राष्ट्रीय अजैविक स्ट्रैस प्रबंधन संस्थान ICAR-NATIONAL INSTITUTE OF ABIOTIC STRESS MANAGEMENT बारामती, पुणे - 413 115, महाराष्ट्र, भारत Baramati, Pune – 413 115, Maharashtra, India

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Dr. Himanshu Pathak Director ICAR- National Institute of Abiotic Stress Management, Baramati, Pune- 413115, Maharashtra

Contributors

Dr. Pravin Bhimdeo Taware, Senior Technical Officer (Farm) & Farm Manager Mr. Rushikesh Shivaji Gophane, Senior Technical Assistant (Hort) Mr. Patwaru Ranbhid Chahande, Senior Technical Assistant (Agril) Mr. Sunil Vishnu Potekar, Senior Technical Assistant (Agro.Met.) Mr. Aniket Tukaram More, Senior Technician (Farm) Mr. Pravin Hari More, Senior Technical Assistant (Computer)

Compiled and edited by

Dr. Pravin Bhimdeo Taware, Senior Technical Officer (Farm) & 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

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निदेशक के लेखनी से...

अक्टूबर के महीने से बारिश के मौसम का सर्दी के मौसम में संक्रमण प्रदर्शित होता है। लेकिन मानसून की वापसी में देरी हो रही है और बंगाल की खाड़ी और अरब सागर में लगातार कम दबाव के विक्षोभ के कारण रुक-रुक कर बारिश हो रही है।

यह वक्त खरीफ से रबी मौसम में संक्रमण का भी हैं। जल्दी और समय पर बोर्ड गर्ड फसलें परिपक्विता तक पहुंच रही हैं और कटाई के लिए तैयार हैं। खरीफ फसलों की कटाई और थ्रेसिंग में कृषि कर्मियों के साथ-साथ फील्ड प्रोजेक्ट से जुड़े कर्मचारी भी व्यस्त रहेंगे। साथ ही उन्हें हलकी जुताई, लेआउट तैयार करने और रबी फसलों की बुवाई के लिए सूखे कालावधि की पहचान करनी होगी। अगले महीने के लक्ष्य में अंगूर में 'फॉरवर्ड प्रूनिंग', अनार में 'हरूत बहार' उपचार और अन्य बगीचों में नियमित छंटाई ऑपरेशन शामिल हैं। बारिश के बाद सबसे पहला लक्ष्य परिसर को हानिकारक खरपतवारों से मुक्त करना होना चाहिए। कम्पोस्टिंग के माध्यम से कृषि-अपशिष्ट और छंटे हुए बायोमास उपयोग के प्रयासों को और अधिक गति मिलनी चाहिए। मलद फार्म में नियोजित गतिविधियों को तेज करने की आवश्यकता है और उम्मीद है कि इस सीजन से वहां नई परियोजनाएं शुरू होंगी।

कृषि गतिविधियों के प्रबंधन और सुधार के लिए 'प्रक्षेत्र समन्वयक' बहुत उपयोगी और अच्छा प्रकाशन रहा है। इसकी विषय-वस्तु और रचना में महीने दर महीने सुधार हो रहा है। तस्वीरें बहुत उच्च गुणवत्ता की हैं जो खेत की स्थिति और किए जा रहे विभिन्न प्रयोगों का एक उत्कृष्ट आयाम प्रस्तुत करती हैं। मैं डॉ. प्रवीण तावरे के नेतृत्व वाली टीम को इस महत्वपूर्ण प्रकाशन को नियमित रूप से प्रकाशित करने में उनके समर्पण और निरंतरता के लिए धन्यवाद देता हूं। From Director's Desk...

The month of October is to exhibit transition from rainy season to winter. But the withdrawal of monsoon is getting delayed and frequent low-pressure disturbances at Bay of Bengal and Arabian sea are resulting into intermittent shower.



It's a transition from Kharif to Rabi season too. The early and timely sown crops are reaching maturity and ready to harvest. The staff associated with the field projects along with farm personnel will be busy in harvesting and threshing of the Kharif crops. At the same time, they have to identify a dry window for completing secondary tillage, layout preparation and sowing of Rabi crops. The targets for next month include 'Forward pruning' in grape, 'Hasta bahar' treatments in pomegranate and regular training-pruning operations in other orchards. After the rains, the first target should be to make the campus free from noxious weeds. The efforts of agrowaste and pruned biomass utilization through composting should get more pace. The planned activities at Malad farm need to be accelerated and hope to start new projects there, this season onwards.

'Farm Coordinator' has been very useful and handy 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 team led by Dr. Pravin Taware for their dedication and sincerity in bringing out this important publication very regularly.

P . Q .

सितंबर / September 30, 2021

हिमांशु पाठक / Himanshu Pathak

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Kharif crops maintenance: Intermittent rains during the month was good from the point of crops' development. However, it was congenial for weed growth that needed frequent weeding activities. The early sown Kharif crops reached maturity and harvesting of soybean and maize (C5) and chickpea and rajamash (D2) was carried out during this period. Sowing of maize (C4) was completed and chickpea (C3 and D2) was also initiated after harvest of previous crop. The irrigation requirement were minimal which was managed as per the requirements. Also facilitated the drip installation work in C7 and field preparation activities in B3, B4 and B6 for sowing of Rabi crops.

Orchard management: The fresh lot of farm yard manure (FYM) was received during first fortnight. Application of FYM was started from north-west area. Application of manure in aonla (G3) and dragon fruit (H5) has been completed. The dragon fruit orchards were in fruiting stage and one lot is harvested every month. This time also there was good flush of flowers appeared around 5th September. The pomegranate (K5) pruned during July month has reached flower initiation stage while J4 orchard was being made ready for bahar pruning. There is good Hasta development of canes in grape orchard that are at maturity. Harvesting of fruits like sweet orange, acid lime, dragon fruit, etc. was carried out. The guava fruits exhibited severe infestation with fruit borer, therefore the infected fruits were disposed of by burying. Copper oxychloride, mancozeb and carbendezim were used to spray in Sweet orange, guava, pomegranate, dragon fruit, mango and grape. To enhance cane maturity in grape, foliar application of sulphate of potash and magnesium sulphate was done.

Malad farm activities: Soybean crop sown in 6 fields has reached maturity. Due to intermittent rains, no irrigation required and crop growth was good. Though selective herbicide was used to take care of weeds there was much growth weeds. Therefore, manual roughing of weeds was carried to get rid of *Parthenium* grass in the fields. Another spray of non-selective systemic herbicide (Glyphosate) was carried out to control weed growth in open fields. Proposal for fencing work has been approved and quotations for the same are called to initiate the work.



Weed Management and waste disposal: Integrated weed management practices were implemented to get rid of flourishing weeds due to intermittent rains. Second spray of Glyphosate was undertaken along periphery and orchard bunds. Paraquat dichloride was used at sensitive places like area in between plants in 'Naxatra Udyan', grape orchards and south farm bunds. Manual weeding continued was simultaneously where ever herbicide could not be used. But still there was lot pressure especially of weed control in the experimental fields where no any selective herbicide was used. The weed material was used for compost preparation. The thorny biomass was disposed of by burning while the coconut leaves thin branches were passed through shredder for enhancing decomposition.

The long period average (LPA) rainfall and average temperature of September at Baramati is 162.3 mm and 26.4 °C, respectively. The details of weather during the September 2021 has been listed in Table 1 and depicted in following figure. **Table 1.** Summary of weather variables recorded during September, 2021.

Weather	Week				Monthly	Mox	Min
Parameters	1 st	2^{nd}	3rd	4 th	Montiny	Max.	M1111.
T Max (°C)	30.1	29.6	31.1	29.6	30.1	33.1	26.5
T Min (°C)	21.3	21.4	20.3	21.1	21.0	22.1	19.2
T Avg (°C)	25.7	25.5	25.7	25.3	25.5	27.4	23.9
RH Mean (%)	78	80	74	83	78	95	66
WS (km/h)	8.7	9.3	8.3	6.9	8.3	13.2	4.8
BSS (h)	3.3	4.4	5.0	1.8	3.7	9.0	0.0
Total PE (mm)	27.6	24.1	33.9	19.7	113.9	6.0	1.5
Total Rain (mm)	32.0	26.8	6.0	36.4	101.2	25.8	0.0



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



Farm Coordinator

South farm activities: Harvesting of early sown crops is already started. It will be continued with simultaneous threshing. The produce from unit treatments is less, manual threshing only will be performed. As the fields get cleared one by one, these will be made ready for Rabi experimentation by secondary tillage & layout preparation. As per predictions there are chances of return showers during monsoon next month. therefore it required to make efficient use of

dry spell window to complete these activities. Orchard maintenance: Important targets for the month of October are to initiate the Hasta bahar in pomegranate (J4) and forward pruning in grape. Pre-pruning pruning activities in both orchards require some stress but due to rains defoliation will be achieved by use of chemicals. Pruning will be carried out manually by employing trained workers. In grape pasting with bud break solution is required. Post pruning mandatory operations include shoot thinning in grape and prophylactic spraying activities. Hard pruning in guava will also be done to initiate new flush and off season fruiting. Recut in fig is also needed to remove infected branches and keep the plant at manageable height. Training and gap filling dragon fruit orchard will be taken up on priority and the cut portion will be used selectively for nursery raising.

Malad farm works: Harvesting of standing soybean crop will be done looking into maturity and dry spell period. The field will be prepared for Rabi crop sowing where chickpea and/or jowar is to be sown. Fencing on road-side will be executed as the work has been approved already. The Prosophis shrubs hindering cultivation practices will be removed manually or by use of tractor. Source for life-saving irrigation for crops is to be explored. A project related to forestry research to be initiated.

Plant protection: For field crops no much issue of pest and diseases will be there but while planning Rabi crops' sowing use of preemergence herbicides id to be explored for better stand of the crops. The orchards already in fruiting stage will need protection from fruit borer and fruit fly, which will be managed through use of Azadirachtin and Deltamethrin. During dry period incidence of thrips have to be managed in pomegranate



and grape on new shoots and bloom after pruning. Looking into intermittent rains humid weather and broad spectrum fungicides need to be utilized. After pruning prophylactic some spraying will be mandatory for disease management in grape and pomegranate. Use of biological control agents will be explored.

Nutrition management: Application of FYM in various orchards as well as in peripheral plantations will be continued. Soil application of fertilizers along with fertigation activities will be carried out to fulfil nutrition needs of the orchards and rabi crops. Procurement of various fertilizers and agrochemicals is to be initiated for upkeeping the farm store. Exsitu and in-situ decomposition of agrowastes and pruned biomass will be improved through use of microbial cultures.

Consequences of delayed return monsoon conditions

Since last few years it has been observed that the return monsoon showers get delayed due to low pressure disturbances in Bay of Bengal. Further, the untimely rains may continue till the month of December. This has large impact on farm activities in both field crops and orchards.

Field crops: The month of October is a transition period between Kharif and Rabi seasons. A dry period is must during this to complete harvesting and threshing of Kharif crops followed by preparations for sowing of Rabi crops. But the delayed monsoon showers may spoil the efforts of Kharif cultivation because the harvestable produce being dry, absorbs moisture causing sprouting and mold development. Sometime the intensity of rain remains much high causing waterlogging and submergence of the crop ready for harvest. So catching the proper dry period window and completing the harvesting and threshing on priority becomes mandatory. In case of preparation for Rabi crop only secondary tillage operations have to be followed for layout preparation to conserve available soil moisture for Rabi crops. However, most of the time the more soil moisture due to untimely rains hampers preparatory tillage, consequently delaying the sowing operations. At NIASM campus



Orchards: In fruit crops too, management of desired horticultural practices is a challenge under delayed monsoon or untimely shower Particularly conditions. in grape, after forward pruning dry is expected to allow application of bud break solution, shoot thinning, use of GA for bunch elongation, etc. If there is a rainy and humid weather during early phase of shoot growth after pruning, anthracnose and downy mildew diseases are of more concern. The frequency of mandatory prophylactic sprays goes on increasing adding to the cost on agrochemicals. Likewise, in pomegranate, when Hasta bahar is suggested to avoid oily spot disease. But due to lack of pre-pruning stress the flowering may not enough. Further, waterlogging in field increases the risk of drying of plants due to root rot. In case of other orchards in fruiting stage, the menace of fruit fly have been found more if rains persist. The flowering in mango may also delay due to continue high soil moisture. Proper drainage, use of growth retardants and integrated disease and pest management are the prerequisites to mitigate these conditions.



Lessons for Integrated Weed Management

Manual weeding attracts lot of manpower input which otherwise can be utilized in precision in other agricultural practices. Therefore, it is necessary to use permissible herbicides in all the crops. While deciding for sowing of any crop one should be ready with a concrete plan for weed management by using pre-emergence as well as selective post-emergence herbicides. Many of them are proved to be safe for use in weed management in field crops like soybean, mung bean, groundnut, maize, wheat, sugarcane, etc. An exercise to be made to identify safe herbicides for specific crop and it should become a mandatory practice while proceeding for field crops' experimentation.

Forward Pruning in Grape: The Production Phase

October pruning of grape is aptly called as 'Forward pruning' of 'Fruit pruning', because it is staggered from August to November to avoid glut in market after harvest. Forward pruning initiates the production phase of annual growth cycle of grape. It is represented with the following stages; pre-pruning practices, pruning and shoot growth, flowering to shattering stage, berry set and development stage, *veraison* to maturity and harvesting and disposal.

Pre-pruning practices

- Application of FYM 25 tons per hectare, along with manure, basal dose of fertilizers containing single super phosphate to be provided by opening shallow trenches in between two vines or along the rows.
- Water stress to be given at least 7-days before pruning in light soil and 15-days in heavy soil.
- Defoliation to be carried out at least 6-8 days before pruning to enhance bud swelling and better sprouting after pruning.

Pruning and Shoot Growth (0 to 40 days)

- The pruning is to be carried out based on identified fruitful zone on cane or following thumb rules; in case of sub-cane, prune the canes just ahead of the knot so as to exploit 'tiger bud' and in case of straight cane, prune between 6-10 buds where inter-node length is reduced.
- For uniform bud sprouting use Hydrogen cyanamide @ 1-2% to paste the desired buds.
- The vineyard should be sprayed with 1.0% Bordeaux mixture 1% within 48 hours of pruning.
- The vineyard should be irrigated at 4200 L per ha per mm of PAN evaporation during first 40 days after pruning.
- 30% of the annual dose of nitrogen to be given during this period.
- During bud swelling stage spraying Imidachloprid 0.8 ml per L or Azadirachtin 1% @ 1.0 ml per L to be done to tackle flea beetle infestation.
- At leaf emergence stage, spraying of Carbendezim 1.0 g per L be done to prevent anthracnose.
- During initial phase of shoot growth prophylactic spraying of systemic along with broad spectrum fungicides for downy mildew control is mandatory.
- Shoot and bunch thinning should be done as soon as the bunch becomes visible. Only one bunch to be retained per square

feet area. Extra shoots and bunches should be removed keeping in view the uniformity in the vineyard.

- GA3 @ 10 ppm to be sprayed at parrot green clour stage (pre-bloom stage about 21 days after pruning) of bunch. This helps increasing length of primary and secondary rachis.
- Second spray of GA3 @ 15 ppm is given 3-4 days after first spray. If proper bunch elongation is not achieved, bunches to be dipped in GA3 20ppm solution after 5-6 days of second spray.

Flowering and Berry Shattering Stage (41 - 60 days)

- Mild water stress is required at this stage for reducing fruit set up to 30%.
- Spraying of Thiamethoxam @ 0.25 g per L during berry set helps to control thrips incidence.
- For uniform green colour of a bunch, 10-12 leaves above the bunch on bearing shoot required. This is generally achieved till berry setting. But in some cases berry drop is experienced due to excess shoot growth. To avoid this, shoots tip to be pinched after required number of leaves.

Berry Growth (61 to 90 days)

• First dip of GA3 is given at 3-4 mm berry stage in Thompson seedless. GA3 @ 40 ppm along with CPPU 1 ppm is given to increase the berry size. There are few grape varieties which doesn't require GA3 application.

(Continued on page 7)









(Contd. From page 6...)

- Berry thinning is carried out manually after the first dip. Approx. 80 to 100 berries are retained in the bunch to achieve desired berry size.
- The second dip of GA3 @ 30 ppm along with 6BA @ 10 ppm is carried out at 4-6 mm berry size.
- This is also a stage for girdling operation. However, due to use of rootstocks, girdling is not practiced now-a-days.

Veraison to Maturity (91 to 140 days):

- At veraison, berry softening starts indicating ripening initiation. Sugar accumulation in grape berry starts and in colour grape the development of colour is observed.
- For proper berry development and berry ripening, 4200 L per ha water per mm PAN evaporation is required.







- During this stage, application of 30% dose of nitrogen and potassium is to be done for better berry development. This is followed by the second dose of 30% potassium from 106th day.
- It is necessary to spray the vineyards for powdery mildew control at this stage.

Harvesting

- Grape is non-climacteric fruit and there is no change in maturity after harvest, therefore the harvesting at right time is important.
- Grapes are to be harvested at TSS more than 18°Brix. Proper Sugar to acid ratio of 20-30 is also considered for harvesting. In case of coloured grapes proper colour development is also a sign of maturity.
- Grapes are to be harvested in morning session from above the knot on rachis to minimize physiological loss in weight.

प्रगति के पथ पर

प्रगति के पथ पर

कृषि प्रबंधन में हमेशा सीमित संसाधनों से सामना होता है। बल्कि उद्देश्य उपलब्ध संसाधनों के चलते प्रतिबद्ध लक्ष्यों को प्राप्त करने को ही प्रक्षेत्र प्रबंधन कहा जा सकता है। इसीलिए कृषि प्रक्रिया में किसी कमी के लिए हमे किसी को एक या अन्य मुद्दों को या किसी व्यक्ति को जिम्मेदार नहीं ठहरना नहीं चाहिए।

कृषि प्रबंधन एक सतत प्रक्रिया है और विभिन्न प्राकृतिक और मानव निर्मित कारकों पर निर्भर रहती है। इसलिए, इसे हमेशा 'एकीकृत प्रबंधन' शब्द से परिभाषित किया जाता है । उदाहरण के लिए. जब कोई किसी फसल पर क्षेत्र अनुसंधान की योजना बनाता है, तो उसे प्रारंभिक योजना के लिए खेती की प्रथाओं से संबंधित बुनियादी जानकारी और कार्यप्रणाली तैयार रखने का प्रयास करना चाहिए । निस्संदेह, फसल की बेहतर स्थिति के लिए खरपतवार प्रबंधन महत्वपूर्ण हैं | लेकिन क्या होगा अगर कोई उपायुक्त साधनों, पूर्व या बाद में प्रयोग वाली आकनाशी के प्रयोग की योजना नहीं बनाता है और केवल हाथ से निराई पर जोर देता है? अच्छी कृषि पद्धतियों के एक भाग के रूप में एकीकृत खरपतवार प्रबंधन, जिसमे उपयुक्त, मैनुअत और साथ ही रासायनिक तरीके को शामिल करने का सुझाव दिया जाता है । सौभाग्य से, आजकल कई फसलों की विशिष्ट चुनिंदा शाकनाशी उपतब्ध हैं और सिफारिशों के अनुसार उपयोग किए जाने पर सुरक्षित भी हैं | यही बात भूमि की तैयारी, बुवाई, कटाई, थ्रेसिंग आदि जैसे कार्यों पर लागू होती हैं । एकीकृत कीट प्रबंधन, पोषक तत्व प्रबंधन और जल प्रबंधन भी इस प्रणाली का हिस्सा हैं और इसका ध्यान रखा जाना चाहिए । इसलिए. उपलब्ध संसाधनों के साथ फसतों की खेती के लिए अच्छी योजना ही एक जरूरत होती हैं। तो इस महीने की प्रगति की योजना यही है कि इन सभी एकीकत प्रथाओं से हम परिचित हो जाएँ।

Plan For Progress

Farm management is always accompanied with resource limitations. Rather farm management deals with achieving the committed targets with available resources. One should not always point out towards one or other issues or to other entity responsible for shortfalls in the process.

Farm management is a continuous process and depends on various natural and manmade factors. Therefore, it is always defined with the term 'Integrated Management'. For example, when one plans field research on any crop, one should try to keep ready the basic information and SOPs related to cultivation practices for early planning. No doubt, the weed management is crucial for better stand of the crop. But what if one never plans for cultural means, pre- or post-emergence herbicide application and insists only for manual weeding frequently? Integrated weed management as a part of Good Agricultural Practices, suggest involving cultural, manual as well as chemical way for weed management together. Fortunately, now lot many crops' specific selective days, а herbicides are available and are safe too, when used as per recommendations. The same thing with the operations applies all like land preparation, sowing, harvesting, threshing, etc. Integrated Pest Management, Nutrient Management and Water Management are also the part of this system and should be taken care of. Therefore, through planning is a prerequisite for the crops' cultivation with available resources. So the plan for progress for this month is to get acquainted with all these integrated practices.

