अक्तूबर / October 2021

Issue

20

भाकृअनुप
ICAR

राअस्ट्रैप्रसं
NIASM

FARM COORDINATOR

... कृषि तकनीकी समन्वय पत्र

भाकृअनुप – राष्ट्रीय अजैविक स्ट्रैस प्रबंधन संस्थान

ICAR-NATIONAL INSTITUTE OF ABIOTIC STRESS MANAGEMENT

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निदेशक के लेखनी से...

त्योहारी माहोल और अक्टूबर के पहले पखवाड़े के दौरान लगातार बारिश के बावजूद, खरीफ फसलों की कटाई, थ्रेशिंग और मुख्य खेत के साथ-साथ मलद फार्म में भूमि तैयार करने की गतिविधियों को लक्ष्य के अनुसार पूरा कर लिया गया है। इस सीजन में सोयाबीन और सूरजमुखी की फसलों के मामले में अच्छी फसल उत्पाद का अनुभव किया गया। हालांकि लगातार बारिश की बौछारों की वजह से खेतों, बगीचों और परिदृश्य उद्यान क्षेत्रों में खरपतवार का भार बढ़ता पाया है।

शुरुआती महीनों के दौरान मानसून का प्रदर्शन बहुत खराब रहा और 1 जनवरी से कुल वर्षा केवल 438.8 मिमी तक ही रिकार्ड हुयी। नवंबर के महीने में भी कुछ बारिश की संभावना है। तदनुसार, रबी की बुआई के लिए कुशल योजना की आवश्यकता है। अधिक क्षेत्रों को सूक्ष्म सिंचाई के अंतर्गत लाने के प्रयासों में तेजी लानी होगी। इसके साथ ही, मलद फार्म में अनुसंधान प्रकल्पों की शुरुआत पर अधिक ध्यान देने की आवश्यकता है ताकि काली मिट्टी की खेत की आवश्यकताओं को पूरा किया जा सके क्योंकि मुख्य परिसर में काली मिट्टी के खेतों की उपलब्धता सीमित हैं। सिंचाई सुविधा और पानी की कम लागत वालें फसलों का पता लगाना आवश्यक है और मिट्टी के तनाव से संबंधित प्रयोग को अधिमानतः मलद फार्म में लगाना चाहिए। इसे देखते हुए मौसम के हिसाब से कुछ अधिक भूखंडों को कृषि योग्य बनाया जाना चाहिए। मृदा सुधार लक्ष्यों को ध्यान में रखते हुए, अधिक से अधिक कृषि-कचरे को खाद के माध्यम से पुनर्चक्रित करने की आवश्यकता है।

फार्म समन्वयक का यह अंक, प्रगति की योजना बनाने के लिए उपलब्धियों की बेहतर समझ और आगे के लक्ष्यों की अंतर्दृष्टि प्रदान करता है। कृषि गतिविधियों में सुधार के लिए यह प्रकाशन बहुत उपयोगी रहा है।

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...

In spite of festive season and frequent showers during the first fortnight of October, harvesting and threshing of *Kharif* crops and land preparation activities at main farm and at Malad farm have been completed as targeted. Good crop stand in case of soybean and sunflower crops was experienced this season. The frequent rain showers, however increased weed load in crop fields, orchards, and landscape garden areas.

The performance of monsoon was very poor during initial months and the total rainfall could reach only up to 438.8 mm since January 1. Some showers are expected during month of November. Accordingly, efficient planning is required for *Rabi* experimentation. Efforts to bring more fields under micro-irrigation have to be accelerated. Simultaneously, experimentation at Malad farm need more attention to fulfil black soil field requirements because there are limited black soil fields available at main campus. It is necessary to explore irrigation facility and rainfed crops' and soil stress related experimentation should preferably be diverted to Malad farm. In view of this, few more plots should be made arable, season by season. Looking in to soil improvement targets, more and more agro-wastes need to be recycled through composting.

This issue of Farm Coordinator, gives better understanding of achievements and insight of targets ahead for planning progress. The publication has been very useful for improving the farm activities.

I thank the team led by Dr. Pravin Taware for their dedication and sincerity in bringing out this important publication very regularly..

अक्टूबर / October 31, 2021

हिमांशु पाठक / Himanshu Pathak

Harvesting and threshing of Kharif crops: The first fortnight of October experience frequent showers of return monsoon and in this background harvesting of Kharif crops especially Soybean was due. Therefore, the manual harvesting in experimental and general fields was carried out looking in to dry period. Sun-drying of the harvested crops was managed by use of covers whenever required. After proper drying, threshing was done with the help of machine. Produce for better performing fields have been segregated and preserved as a seed material.

Field Preparation for Rabi season: Immediately after harvesting of Kharif crops, field preparation was initiated for Rabi crop sowing. Only secondary tillage operations like cultivator operation were carried out to reach fine tilth. Layout preparation like flatbed preparation and ridges and furrow were laid as per crop and experimental requirements. Sowing/ transplanting work was also initiated covering B3 (Sugarcane), B4 (Brinjal), C3 (Chia), D2 (Wheat), etc. Other fields have been kept ready for further sowing of various Rabi crops.

Orchard management: Important activity of this month was preparing for forward pruning in Grape. Spraying of Ethephon 0.1% was carried out for ease in defoliation. Pruning in Sharad seedless and Thomson seedless was carried out in last week followed by pasting with Hydrogen cyanamide 2% solution. Through care was taken to maintain precision in pruning and pasting work. This month's work also included roughing and destroying wilted plants of pomegranate and imposing stress as a part of *bahar* treatment. Soil pulverizing, manure application and tillage in between plant to get rid of weeds were performed immediately after rains.

Malad farm activities: Harvesting of soybean was managed looking in to crop maturity and dry spells window. The raw produce was brought to main campus for sun-drying and subsequent threshing. The threshed material was again sun-dried and stored for further disposal. The field preparation was started as soon as the soil moisture allowed use of tractor movement. Additional 5 fields have been prepared by using mulcher and rotavator. As on date total 13 fields are ready for sowing.

Maha-Navami pooja: expressing grattitude

Forward pruning in grape

Mulcher operation in open field

Pitting for fencing and tree plantation along the north side boundary was initiated. Planting of trees of Tacoma and Bougainvillea was carried out with the hands of the Director and other colleagues.

Weed management and waste disposal: Due to frequent shower during the first fortnight, there was heavy weed load all over the farm, road-sides and open areas. Integrated approach by use of machinery (cultivator, mulcher and brush-cutter), herbicides and manual weeding was concentrated for getting rid of weeds. All the weed biomass was used for composting. The agro-waste collected after threshing of soybean was provided for livestock feeding. Thorny and diseased material from orchards was disposed of by burning. The coconut leaves and other biomass was shredded for use in orchards as green mulch and for composting.

The long period average (LPA) rainfall and average temperature of October at Baramati is 106.3 mm and 26.4 °C, respectively. The details of weather during the October 2021 have been listed in Table 1 and depicted in following figure.

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

Weather Parameters	Week				Monthly	Max.	Min.
	1st	2nd	3rd	4th			
T Max (°C)	32.4	31.6	32.0	32.1	31.9	33.6	30.3
T Min (°C)	21.1	20.6	18.6	16.3	18.9	22.6	14.7
T Avg (°C)	26.7	26.1	25.3	24.2	25.4	27.5	23.3
RH Mean (%)	75	73	60	56	64	82	48
WS (km/h)	5.5	4.8	6.0	4.5	5.3	9.0	3.7
BSS (h)	7.4	7.0	8.0	8.9	7.8	9.8	3.5
Total PE (mm)	32.2	28.3	32.7	34.9	145.7	6.6	2.7
Total Rain (mm)	59.8	54.8	0.0	0.0	114.6	39.2	0.0

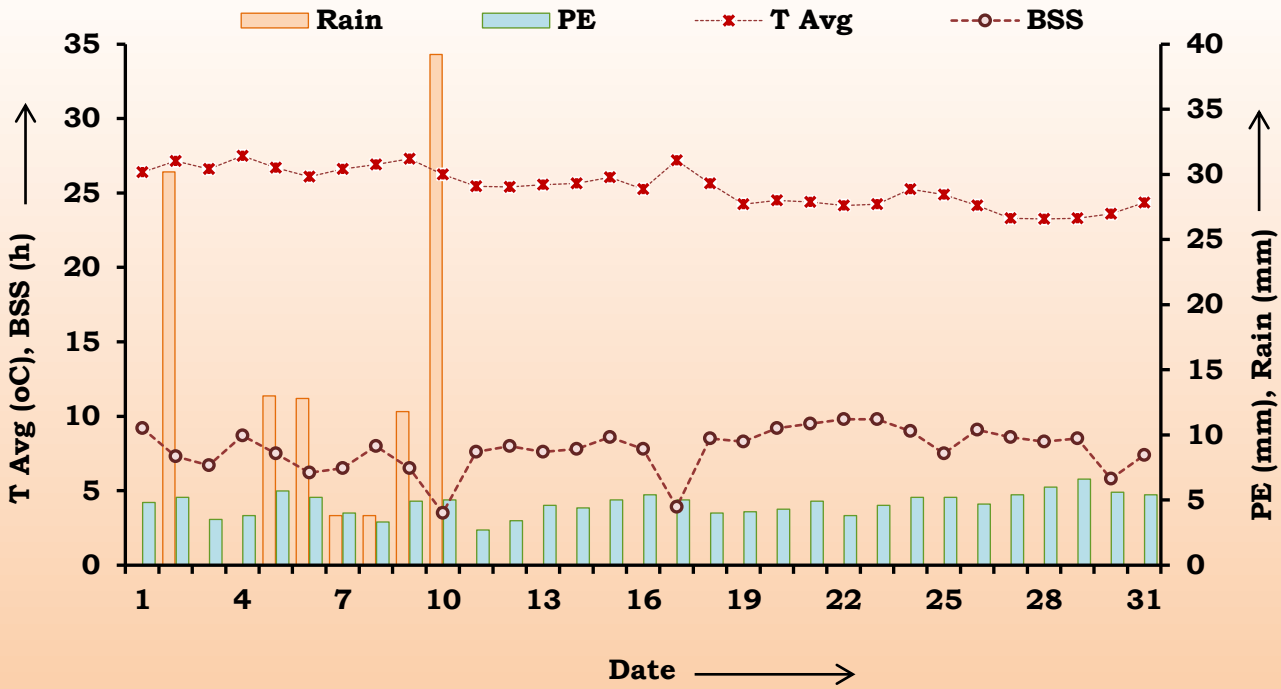
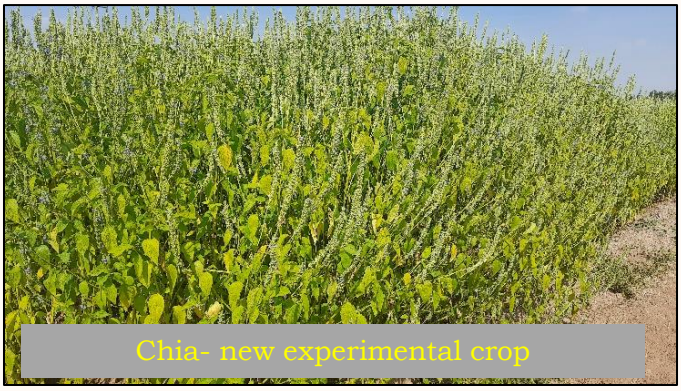


Fig 1. Variations of daily rainfall (Rain), pan evaporation (PE), mean temperature (T_{Avg}) and bright sunshine hours (BSS) during October 2021 at ICAR-NIASM Baramati.

Kharif sunflower and its threshing with machine

Rabi crops' sowing: Field preparation rabi sowing has been started already which is to be continued in the month of November. The important crops planned for this Rabi season are chickpea, sunflower, chia, quinoa, rajamah and vegetables. Some of these are already sown and it is targeted to complete all sowing operations in the first fortnight except crops planned for different dates of sowing. Though there will be a canal closure period, ample water is available in farm ponds to support the initial irrigation requirements. Planning of drip irrigation facility for few more fields is to be initiated for procurement.



Chia- new experimental crop

Pit digging at Malad Farm

Secondary tillage for *Rabi* crops

Orchard management practices: The sprouting and shoot growth will start in grape as forward pruning was done during last week of October. There are some sensitive stages expected during next month wherein sincere efforts are required from management point view. Mandatory sprays for downy mildew control will be required at 3-leaf and 5-leaf stages. Shoot thinning have to be done as soon as the bunch inflorescence is visible. Pre-bloom GA application stage need to be captured perfectly for bunch elongation. In pomegranate, defoliation has been started and pruning is required in second week of November. Recut or back pruning in fig is also in the target list for next month. Weed management need a finishing hand from clean cultivation in orchards to get rid of various sucking pests.

Malad farm activities: Developments at Malad farm require more pace to make the land arable. Fields are ready but provision for irrigation need to be explored at the earliest. It is necessary to explore various options like bore well, Open well, farm pond and source from canal to fulfil irrigation water requirements. Fencing and boundary side plantation activities that are already initiated need to be completed in next two months.

Plant protection: There are sensitive stages arriving after forward pruning in grape. Prophylactic mandatory sprays for downy mildew control need to be taken up during this month. Use of sticky traps, clean cultivation and sprays for sucking pest management are required at early stages. As suggested, roughing and destroying of wilting plants in pomegranate to be done on priority. After pruning spraying of broad-spectrum fungicides and systemic insecticides is needed for management of diseases and pests. Preparations for mango flowering to be made by protecting foliage with sprays. Simultaneously, in field crops also recommended sprays are prerequisite for early protection.

Nutrition management: Nutrition management through soil application of manure and fertilizers is to be continued as per the recommendations and availability. Fertigation and foliar application will be targeted to meet the urgent and stage-wise requirements in field crops and orchards. Requirement of fertilizers & agrochemicals for future use to be complled and procurement procedure to be initiated to maintain the farm store fully up-keeped.

Issues Related to Wilt in Pomegranate

There is challenge of plant protection in Pomegranate orchards due to oily spot and wilt caused by pest and pathogens. A field visit during workshop on pest and diseases in pomegranate on October 14, 2021 chalked down following points for resolving issues related to wilting of plants.

- The fully damaged plants were already removed but it was suggested that partially damaged plants also to be roughed out. The plan debris to be destroyed by burning away from orchard.
- Avoid soil displacement from diseased locations to healthy plants during cultivation to get rid of inoculum spread.
- Soil solarization at roughed out plants to be carried by covering the area with transparent plastic.
- Healthy plants to be drenched with Propiconazole fungicide.
- Biological control measure in the form of *Aspergillus niger* culture along with FYM to be done prior to gap filling or planting of new saplings.
- Recommended spacing to be maintained during planting of new orchard.
- Drippers to be placed away from the plants on canopy periphery.
- If more number of plants found to be affected, soil sterilization in whole orchard is required before new plantation.

Fruits protection needs near maturity

Prioritizing Developments at Malad Farm

Ddiscussion on development at Malad farm

Tree plantation at Malad farm

Soil at main campus field is shallow, very light, and stony/ murum type. While the soil at Malad farm is deep black type representing black cotton soils of Maharashtra. Therefore, importance of development of this farm is pretty high. A field visit and meeting was held at Malad farm on 26th October 2021 for discussing progress and development plan. Following points were highlighted during the field visit.

- Six fields of 1 acre each were developed and sown with soybean during Kharif season 2021. It performed well under without any irrigation due to timely intermittent monsoon shower.
- After showers, some new fields are being developed and total 12 fields are almost ready for sowing.
- Irrigation facility need to be developed for which options like bore well, open well, farm pond and source from canal have to explore on priority.
- Sound plan for experimentation to be prepared particularly from soil stress school and initially crops requiring low water to be grown.
- The pit digging along canal road side was already started for fencing and plantation.
- Tree plantation was carried out to inculcate the interest of all in developments at farm.

Training- Pruning & *Bahar* Management in Sweet Orange

Citrus cultivation in India is plagued with various problems due to limiting growing conditions, limiting water resources and high incidence of pests and diseases warranting great care from planting till the plants come to bearing in order to sustain a productive life of a minimum of 15-20 years. There is growing interest/awareness among the citrus growers for adoption of latest technologies for commercial cultivation of citrus.

In sweet orange, bearing starts from fourth year onwards. There are two main crops in sweet oranges. One is called as *Ambia bahar* (mango flowering) the flowering of which occurs in the month of January (at the time of flowering of mango hence the name *Ambia*) the fruits of which are available in the months of October-December. The other crop is *Mrig bahar* (Monsoon bloom) the flowering of which occurs in the month of June-July and the fruits are harvested during February-April. Sweet oranges normally take 240- 280 days to arrive at maturity. Mature fruits at colour break stage are picked up in 2 - 3 intervals of 10-15 days. Spraying of Potassium Nitrate @ 5-10gm/ℓ at marble size and one before harvest not only improve improve the fruit size but also juice content and smooth shiny rind. For imparting uniform yellow-orange colour to the fruit, application of ethephon @ 250 ppm along with 1 % calcium acetate as foliar spray at maturity stage is recommended. Average yield in Sweet orange is 16-20 t/acre (1200-1600 fruits).

Nutrition management of sweet orange can be fulfilled by following manures/ fertilizers per plant per year.

Manures & Fertilizers	1st year	Annual increase	From 6th year onwards
FYM	10 Kg	5 Kg	30 Kg
Nitrogen	200 g	100 g	600 g
P2O5	100 g	25 g	200 g
K2O	100 g	40 g	300 g
ZnSO4	25 g	25 g	150 g
FeSO4	25 g	25 g	150 g
MnSO4	25 g	25 g	150 g

Nitrogen has to be applied in two doses during March and October. However, Farm yard manure, Phosphorous and Potash are to be applied in October. Manures are applied in the basin 75 cm away from the trunk and incorporated in the soil. Spray solution containing Zinc sulphate (0.5%), Manganese (0.05%), Iron (0.25%), Magnesium (0,5%), Boron (0.1%) and Molybdenum (0.003%) once in 3-months at the time of new flush production. To control little leaf malady, spraying Zinc sulphate at 1.0 per cent solution + Teepol 1 ml/lit of solution at various stages i.e. new flush, one month after, at flowering and fruit set.

Sweet orange fruit in J2 orchard

Pests and Diseases Management

Important insect-pests of citrus are citrus black fly and whitefly, citrus psylla, Citrus thrips, leaf miner, scale insects, bark eating caterpillar/trunk borer, fruit fly, fruit sucking moth, mites, etc.

Control measures:

Leaf miner: Spray with quinalphos 1.25 ml or fenvalerate 0.5 ml or monocrotophos 1.0 ml per litre at weekly interval on new flush as soon as infestation is noticed.

Citrus black fly & white fly: One spray against adults and two at 50% egg hatching stage (1st half of April & Dec and 2nd fortnight of July) at 15 days interval either with acephate 1.25 g or quinalphos 1.5 ml or imidacloprid 0.5 ml per litre.

Citrus psylla: Foliar spray either with quinalphos 1.0 ml or acephate 1.0 g or monocrotophos 0.5 ml per litre at bud burst stage or as and when infestation is noticed during Feb - Mar, Jun - Jul & Oct - Nov.

Citrus thrips: Spray either with dimethoate 1.5 ml or monocrotophos 1 ml per L of water at bud burst stage and berry size fruits.

(Contd. on page 7)


Soyben crop at maturity


Manual harvesting of soybean crop


Sun drying of harvested soybean


Soybean threshing with machine


Sun-drying of threshed soybean


Shade-drying for seed purpose

From page 6-

Scale insects: Spray dimethoate 150 ml and 250 ml kerosene oil in 100 litre or malathion @ 0.1 % or carbaryl @ 0.05% plus oil 1 %.
Trunk borer: Swabbing of tunnel either with dichlorvos (0.1%) or carbaryl (1%) or monocrotophos (0.02%) kills the grub.
Bark eating caterpillar: Plugging of larval tunnels with cotton wad soaked either in dichlorvos (0.1%) or carbaryl (1%) or monocrotophos (0.01%).

The important diseases of citrus are Phytophthora gummosis, citrus tristeza virus, citrus greening, citrus canker, powdery mildew, anthracnose, etc.
Control measures:
Phytophthora Gummosis: Scrap affected area & apply Bordeaux paste or copper oxifluoride paste or ridomil + carbendazim.
Citrus greening (HLB--Huang Long Bing): Removal of infected branches/unproductive trees and replacement by disease-free plants. Meticulous control of citrus psylla vector.
Citrus tristeza virus: Control of aphids and use of cross protected grafts and shoot tip grafted plants or disease free grafts are recommended.
Citrus canker: Cutting of infected twigs followed by spraying of 1 % Bordeaux mixture or copper fungicide. Foliar spray application of 100 ppm streptomycin sulphate is also effective.
Powdery mildew: Pruning of dead twigs followed by foliar spray of wettable sulphur @ 2 g, copper oxychloride @ 3 g per L in April and October.
Anthracnose: Pruning of dead twigs followed by two foliar sprays of carbendazim @ 1 g or copper oxychloride - 3 g per L at fortnightly interval.

प्रगति के पथ पर

वार्षिक खेती चक्रों के साथ मौसमी कृषि गतिविधियाँ निरंतर होती रहती हैं। हालांकि, साल दर साल स्थितियां इतनी अलग रहती हैं कि हर बार विभिन्न विकल्पों में से सही निर्णय लेना होता है। फसलों का चयन बहुत अधिक भिन्न नहीं होता है, बल्कि विशिष्ट परिस्थितियों के आधार पर खेती के तरीकों में समायोजन करना पड़ता है। इसलिए, फसलों की खेती वायुमंडलीय, मिट्टी और पानी के तनाव के संबंध में मामूली बदलाव प्रदर्शित करती है। कृषि प्रबंधन के माध्यम से विभिन्न सकारात्मक और नकारात्मक मुद्दों के इस जंगल में प्रगति के पथ का चयन करना होता है, जो कभी स्थायी नहीं होता है, यह महत्वपूर्ण है।

खरीफ से रबी मौसम में संक्रमण के दौरान कटाई, थ्रेसिंग, जमीन की तैयारी, बुवाई आदि कई गतिविधियां मिश्रित हो जाती हैं। मानसून की बारिश के बाद खरपतवार प्रबंधन भी एक चुनौती बन जाता है जिसे एकीकृत तरीके से प्रबंधित करने की आवश्यकता होती है। अंगूर में फल हेतु छटाई पूरी हो चुकी है और आगे महत्वपूर्ण चरणों की पहचान करने और विशिष्ट छिड़काव और चंदवा प्रबंधन गतिविधियों को लागू करने के लिए देखभाल की आवश्यकता है। अनार की छंटाई और समय पर पौध संरक्षण कार्य आगे की योजना में सबसे महत्वपूर्ण लक्ष्य हैं। चक्रीय तरीके से एक अस्थायी कार्य योजना तैयार करना आवश्यक है।

मलद फार्म की कृषि गतिविधियों को गति मिल रही है और क्षेत्र की तैयारी की अधिकांश गतिविधियाँ पहले ही पूरी हो चुकी हैं। परंतु यहाँ क्षेत्र प्रयोग में सहायता के लिए सिंचाई जल सुविधा का पता लगाने की तत्काल आवश्यकता है।

Plan For Progress

Farm activities are continuous due to seasonal annual cultivation cycles. However, situations remain so different year after year that every time we have make correct decision from various options. Though crops' selection doesn't vary much, adjustments in cultivation practices depending on specific situations. Therefore, cultivation of crops exhibit minute differences with respect to atmospheric, soil and water stresses. The selection of path for progress, which is never permanent, through this jungle of various positive and negative issues is important in farm management.

During the transition from Kharif to Rabi season lot of activities like harvesting, threshing, land preparation, sowing, etc. get mixed up. After the monsoon showers the weed management also becomes a challenge which is required to be managed in integrated manner. Forward pruning is grape is complete and care is required to identify critical stages and to implement specific spraying and canopy management activities. Pomegranate pruning and timely plant protection operations are the most important targets in the plan ahead. It is necessary to chalk down a tentative plan of action in cyclic manner.

Malad farm activities are getting pace and much of the field preparation activities are already completed. What is urgently needed is to explore the irrigation water facility to support field experimentation.