



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...

रबी सीजन से संबंधी प्रक्षेत्र प्रयोग पुरे हो चुके हैं और क्षेत्र को खरीफ सीजन के लिए तैयार किया जा रहा है। फल बागानों, विभिन्न वृक्षारोपणों, गन्ने और चारे की फसलों की सिंचाई की पानी की आवश्यकता अप्रैल से जून महीनों के दौरान अपने चरम पर पहुँच जाती है। बड़ी हुई मांगों को पूरा करने के लिए, गर्मी के मौसम में अधिकांश खेतों को परती खेती के तहत लाया जाता है। इस बीच, ये क्षेत्र जून के दूसरे पखवाड़े से प्रस्तावित खरीफ की बुवाई के लिए तैयार रहने के लिए प्राथमिक और साथ ही माध्यमिक जुताई कार्यों से गुजरते हैं। इस अवधि के दौरान खेतों और बागों में जैविक खाद का उपयोग भी एक महत्वपूर्ण कार्य है। अंगूर में अप्रैल छंटाई पूरी हो गई है और अब पूरी सटीकता से चंदवा प्रबंधन की ओर ध्यान देने की आवश्यकता है। मोसमी, आम और मुनगा फलने की अवस्था में हैं। सेब-बेर के बागान छंटाई के बाद अच्छे फूल रहे हैं। सिंचाई जल प्रबंधन के संबंध में अच्छी देखभाल की जानी चाहिए क्योंकि गर्मी के महीनों में हवा और मिट्टी का तापमान धीरे-धीरे बढ़ रहा है।

क्षेत्र में कोविड-19 महामारी की बढ़ती गंभीरता की पृष्ठभूमि पर पूर्णता हेतु काफी सारे लक्ष्य हैं। यह सलाह दी जाती है कि कार्यबल को श्रृंखला को तोड़ने के लिए काम करते समय सरकार द्वारा दिए गए कोविड मानदंडों का सख्ती से पालन करें।

‘फार्म समन्वयक’, हर माह, नियासम फार्म के गतिविधियों, उपलब्धियों और भविष्य की योजना को पेश करता है। मैं डॉ. प्रवीण तावरे और टीम को इस उपयोगी और समयबद्ध प्रकाशन में उनके समर्पण और लगन के लिए धन्यवाद देता हूँ।

From Director's Desk...

The field experimentations on *rabi* season are completed and it is time to get them ready for *kharif* season. The irrigation water requirements of orchards, various plantations, perennial crops like sugarcane and fodder reaches at its peak during April to June months. To fulfill the increased demands, most of the fields are brought under fallow cultivation during the summer season. Application of organic manure in the fields and orchards is also an important task being performed during this period. Back pruning in grape have been completed and needs attention towards thorough canopy management. Sweet orange, mango and drumstick are in fruiting stage. Apple-ber plantation is exhibiting good flowering after pruning. Good care has to be taken for irrigation as the air and soil temperatures are increasing gradually.

There are many targets to accomplish on the background of increased severity of COVID-19 pandemic in the area. It is advised to strictly follow the COVID norms given by the Government while dealing the work force to ‘break the chain’.

‘Farm Coordinator’, as earlier, continues to present the activities, achievements and future plan for the NIASM farm. I thank Dr. Pravin Taware and the team for their dedication and sincerity in bringing out this useful and timely publication.



Himanshu Pathak

अप्रैल / April 30, 2021

हिमांशु पाठक / Himanshu Pathak

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Jack fruit bearing tree

- Harvesting of experimental wheat germplasms in C7 & C8 was completed. Samples of wheat and chickpea were separated out for manual threshing and general material was pooled together for machine threshing. Harvesting and threshing of Quinoa and Chia crops from biodiversity project was also facilitated.
- Primary tillage operations were done in fields after harvesting. Farm yard manure application in native soil fields was carried out by spreading manure manually in respective fields. This work was carried out in D1, D4, D5 and D6 fields. Application in other fields is to be continued followed by harrowing to cover the manure. Manure application was started in the orchards too by shallow trenching and covering it with soil after application.
- Back pruning in Sharad seedless, Thomson seedless and five varieties of vineyards have been completed during second fortnight of April 2021. Pruning was carried out by leaving 1-2 buds of canes on cordons.
- Installation of night lighting to enhance flowering in dragon fruit is being tried on few plants. The LED bulbs (18 & 27 watt) and Argon bulbs (60 & 100 watt) were fixed on nine plants to provide light during night to dragon fruit, which are long-day plant with respect to flowering.
- Harvesting and disposal of various fruits like tender coconut, tamarind, amla, and sapota was done. Disposal of farm produce like onion, chickpea, etc. was started after revision of prices through Price Fixation Committee of the Institute.
- Supply of irrigation water was managed through operation of electric motors at old as well new lift project because only one pump in new lift sump-well was working. The pumps were operated day/ night due to load shedding. Internal distribution was managed through operation of both the pumps at Malhar pond. Orchard irrigation, landscape and other plantation watering was facilitated through operation of respective pumps as per requirements.
- Two rounds of peripheral plants' maintenance were taken up by training of plants, weeding and watering.



Wheat field after harvesting



Spreading FYM in field



Field ploughing in action



Night lighting in Dragon fruit orchard



Custard apple orchard at flowering

Weather Summary of April 2021 at ICAR-NIASM

Mr. Sunil V. Potekar & Mr. R.N. Singh

The long period average (LPA) of April rainfall and average temperature at Baramati is 7.1 mm and 30.2 °C, respectively. The details of weather during the April 2021 has been listed in Table 1 and depicted in Fig. 1.

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

Weather Parameters	Week				Monthly	Max.	Min.
	1 st	2 nd	3 rd	4 th			
T Max (°C)	38.4	36.6	36.9	37.8	37.5	39.1	33.5
T Min (°C)	18.9	21.4	20.0	20.2	20.2	23.3	14.8
T Avg (°C)	28.7	29.0	28.4	29.0	28.8	30.9	25.4
RH Mean (%)	38	46	41	41	42	60	28
WS (km/h)	6.8	6.8	6.6	6.3	6.7	9.6	4.5
BSS (h)	8.6	6.0	9.4	8.8	8.2	10.0	2.0
Total PE (mm)	71.9	59.9	62.1	65.0	273.5	13.6	5.7
Total Rain (mm)	0.0	1.8	0.4	1.0	3.2	1.8	0.0

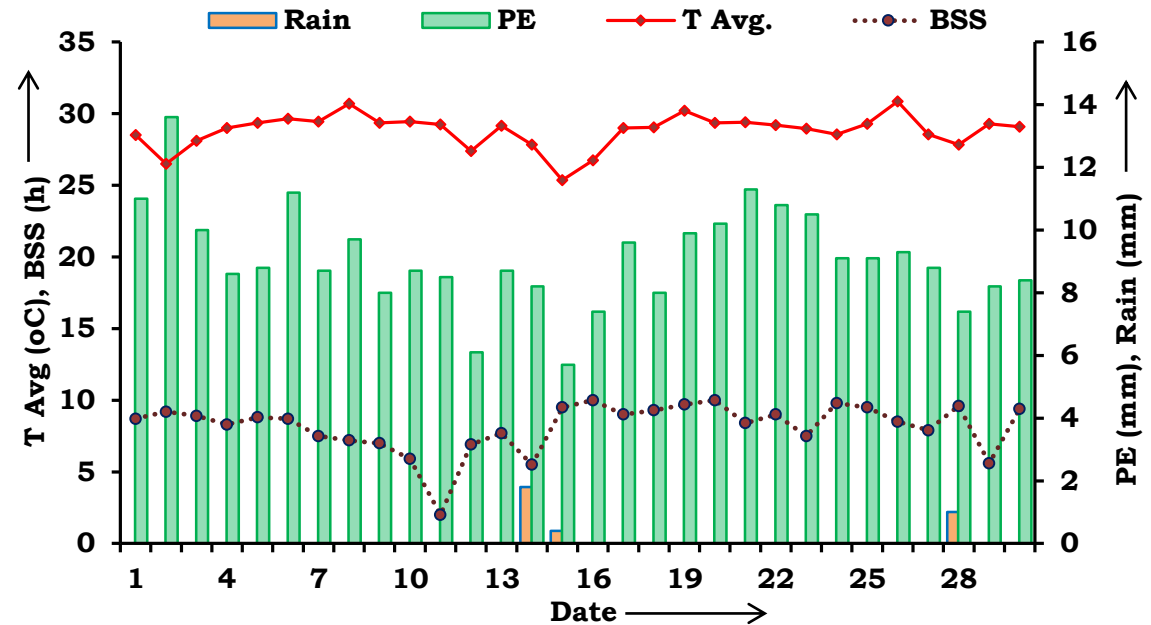
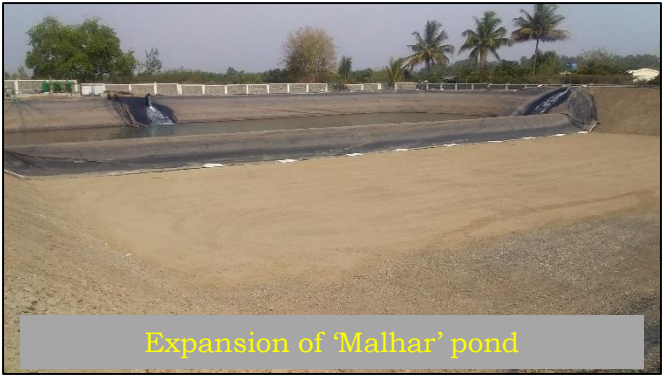


Fig. 1. Variations of daily rainfall (Rain), pan evaporation (PE), mean temperature (T_{Avg}) and bright sunshine hours (BSS) during April, 2021 at ICAR-NIASM Baramati.



'Manas' pond



Expansion of 'Malhar' pond

- Primary tillage operations, spreading of farm yard manure in fields and harrowing to turn it down are the important activities in south farm. Most of the fields except the perennial one will be left fallow during summer to reduce water demand. Preparations for *kharif* sowings will be initiated to achieve timely sowing.
- Trial commissioning of micro-irrigation system for field crops is pending and have to be completed during this month so as to make efficient use of available water.
- Training and pruning in guava, fig and dragon fruit will be carried out to remove dried and unnecessary branches to maintain good canopy architecture. Plant size of guava will be maintained optimum by considering the soil strata on which orchard stands.
- Harvesting of mango will be followed by annual pruning activities to make the orchard well-ventilated and ready for next season growth.
- Plant protection: Major issue related to plant health to be taken care of during this month will be sucking pests like lemon butterfly damage in citrus crops, fruit borer in pomegranate, leaf eating caterpillar in drumstick and sucking pests like thrips in various fruit crops. In case preventive sprays for gummosis in citrus, oily spot in pomegranate and secondary infections associated with sunburn in dragon fruit have to be taken care of by spraying of copper fungicides.
- Farm yard manure application in orchards along basal doses of fertilizers will be done by band or ring placement under drip system followed by closing it with soil.
- Plastic laying work for Malhar Pond: The earth work of Malhar Pond expansion has been completed during March 2021 and the finishing with fine soil is in progress and to be continued further to make it ready for laying HDPE paper lining.
- Mulching with agro-waste or dried grass will be done in Sweet orange orchard and mango and ber plantations near overhead tank to minimize moisture loss.
- All the agro-waste, grasses and coconut fronds will be put through shredder machine and used for composting purpose. Biological control agents will be use along with decomposer to enrich the compost.



Summer fallow after primary tillage



Sugarcane- Conservation Agriculture



Drumstick fruiting



Guava shrubs need training



Mango fruit development stage

Managing Multiple Stresses for Enhancing Fruitfulness in Grape

Back pruning in grape have been completed during second fortnight of April 2021. The period is marked with 'Foundation Phase' because foundation of next season production is laid down after back pruning which is aptly called as 'Foundation Pruning'. To be precise it is the first stage of annual production cycle of grape. However, last few seasons it has been observed that all these orchards exhibited poor fruitfulness. When the analysis of factors limiting fruitfulness was carried out, following points can be narrated down:

The high temperature stress after back pruning, affects sprouting after pruning and results into uneven sprouting and shoot growth. To mitigate this stress spraying of water for 6 days after pruning twice during afternoon was practiced last year. This helped in uniform and early sprouting.

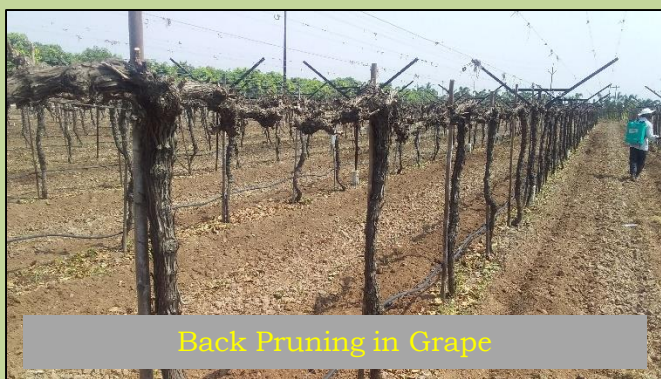
During shoot growth at 40 to 60 days after pruning fruit bud differentiation occurs in the buds. At this stage litter moisture stress is required but too much water stress hampers the process of bud differentiation. Unfortunately, this period generally in the month of June, is marked with scarcity of irrigation water at campus due canal closure. This leads to damage to flower buds at formation stage itself. Therefore, it has been decided this to fulfill the irrigation water

requirement critically and also to use increase water use efficiency by addition of organic manure to soil. An experiment on use of different type of mulches is also to be imposed to tackle this situation.

The third stage of foundation phase is of storage of food in grapevine parts that is formed by the leaves during later shoot growth. The challenge at this stage is to maintain the leaves photosynthetically active and efficient under the conditions of temperature, moisture and edaphic stress conditions.

Sub-cane technique is always recommended to increase fruitfulness when shoot vigour is normal. However, in our conditions it has been observed that when pinching of vigorous shoots for sub-cane is performed, the emerging sub-cane remains very weak. Due to this the target fruit buds remain weak and consequently remain unfruitful after forward pruning. Therefore, it has been decided to concentrate on improving shoot vigour by the way of manuring, water management and mulching for white root development.

Spraying of some stress relieving compounds like antistress, hormones and silicon based formulations will be tried to mitigate the high temperature and moisture stress.



Back Pruning in Grape



Efforts to enhance sprouting



Sprouting after pruning



Pinching for sub-cane

Tillage Implements - III

Harrows

Heavy duty harrows are used for primary tillage and light harrows for secondary tillage, seedbed preparation, summer fallowing, chemical incorporation or to cover broadcast seed or fertilizer, disking after ploughing to break the lumps and weed control.

There are four types of harrows:

- Disk harrow
- Spike tooth harrow
- Spring tine harrow
- Roller harrow or packer

Disk Harrow: The disk's construction varies to meet specific requirement. Most disk harrows come in two distinct classes, tractor mounted and trailed type. Within each of these two classes are four types viz., single action, double off-set, offset and ploughing disks.

Disk harrows are used to:

- Pulverize soil and break clods by cutting and throwing actions
- Cut the chaff and trash or crop residues in field
- Incorporate chemicals, fertilizers and manure in the soil
- Destroy or control weeds
- Provide primary tillage where ploughing is difficult, such as rocky fields or where ploughing is not recommended because of shallow sub-soil.
- In case the trash has long stalks, the disk harrow is used before ploughing so that trash is cut into smaller pieces and loose soils helps in providing better trash to soil contact.
- Demolish ridges and provide even surface

The harrow has blades, whose type, size and spacing determine functions they perform.

Spike Tooth Harrow

This is a secondary tillage equipment used for final seedbed preparation, when basal fertilizer needs to be incorporated in the soil and planting on flat ground is required. It is mounted type of implement and can be operated by light tractor up to 40HP. It has spikes in different rows on frame. The angle of spike adjustable on each frame can vary penetration. The implement is lowered and dragged on soil after disk harrowing to smoothen soil surface, incorporate broadcasted fertilizer and kill small weeds.

Spring Tine Harrow

This is secondary tillage tool related to lighter types of field finishing implements. The harrow works 3" to 6" deep, loosens soil, breaks clods and pulls out stones, roots and grass effectively. By loosening the soil, it accelerates soil drying to make way for other heavier operations at a later stage. It can also be used where heavier operations are not possible due to excessive moisture.

Roller Harrow and Packer

This is a specialized field-finishing implement which has a horizontal bladed cutter-head in the front and heavy-duty spring teeth staggered on three beams. The cutter head breaks clods and pulverizes soil while the spring teeth loosen the soil up to 3" to 6" deep and uproot weeds and shallow roots. It is generally used after disking and is preferred for finer tilth.

Factors in efficient & uniform operations:

- The field should have an even and level surface after the operation
- The soil below the loose soil should be level
- There should be no ridges & furrows in field
- No area should be left uncultivated at the corners or in the field



Spike Tooth Harrow at Work



Offset Disc Harrow



Pomegranate fruit development



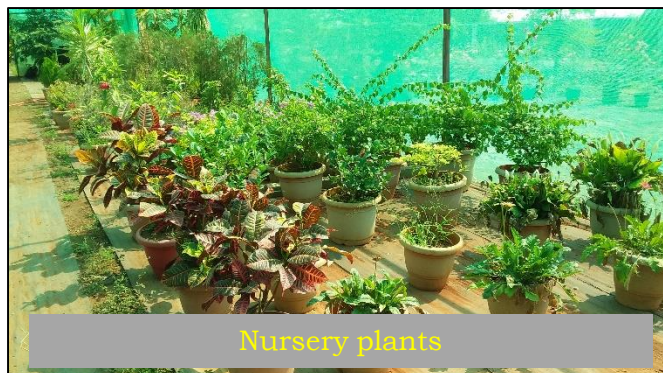
Custard apple biodiversity block



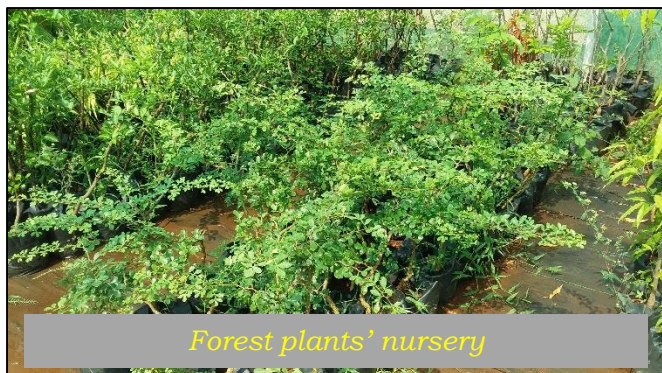
Karonda- development after recut



Sweet Orange- fruit development



Nursery plants



Forest plants' nursery



Bael fruit- bearing plant



Nursery area



Sapota orchard



Peripheral plantations

प्रगति के पथ पर

अप्रैल से जून महीनों तक की अवधि में उच्च तापमान, बढ़ा हुआ पैन-वाष्पीकरण, पानी की कमी और साथ-साथ बागानों के कठोर बेसाल्ट चट्टानी आधार के तपने जैसे अजैविक तनाव के कारण बढ़ती चुनौतियों के साथ विहित किया जाता है। पौधों के अस्तित्व, विकास और उत्पादन पर इन सारे तनावों के प्रभाव को कम करने के लिए एकीकृत प्रयास किए जाने की आवश्यकता होती है। इनमें खाद और अन्य मिट्टी की नमी रखने वाली सामग्री, शहतूत और तनाव से राहत देने वाले रसायनों का छिड़काव शामिल है। अधिकांश बागों में पानी की आवश्यकता चरम सीमा पर होती है और किसी भी नमी के तनाव से गुणवत्ता और उत्पादन की मात्रा कम हो सकती है। अनार की 'हस्त बहार' की फसल, नींबू प्रजाति की फसलों में 'अम्बे बहार', आम के फल का विकास, और मुनगा, सीताफल, अंगूर के बगीचे चरम ग्रोथ स्टेज पर हैं। इसलिए सिंचाई के पानी का प्रबंधन बहुत ही विवेकपूर्ण तरीके से किया जाना चाहिए। परिसर में बारहमासी फसलों की आवश्यकताओं को पूरा करने के लिए, चारे की फसलों और पशु इकाई और अन्य प्रतिष्ठानों की पानी की आवश्यकताओं की आपूर्ति हेतु मौसमी फसलों के खेतों में से अधिकांश, खरी फसलों की कटाई तथा प्राथमिक जुताई के बाद बिना बोए रखा जाता है। बढ़ते तापमान के साथ, नहर से पानी पंप करने के लिए विद्युत भार की बंद अवधि बढ़ जाती है। इसलिए, पानी की कमी से निपटने हेतु इन पंपों का दिन - रात संचालन का प्रबंधन किया जाता है।

Plan For Progress

The period during April to June is marked with increasing challenges due to abiotic stressors like high temperature, enhanced PAN-evaporation, water scarcity and simultaneous heating of hard basalt rocky base of the plantations. Integrated efforts need to be made to alleviate the effect of these multiple stresses on plants' survival, growth and production. These include use of manures and other moisture holding soil amendments, mulching and spraying of stress relieving compounds. Most of the orchards are in peak water requirement stage and any moisture stress may adversely affect the quality and quantity of produce. 'Hasta bahar' crop of pomegranate, 'ambe bahar' in citrus crops, mango fruit development, and orchards like drumstick, custard apple, grape are at grand growth stage. Therefore, management of irrigation water required to be very judicious. To meet the requirements of perennial crops at the campus, fodder crops and utility water requirements of animal unit and other establishments, most of the fields meant for seasonal crops, are retained fallow after primary tillage after harvest of rabi crops. With increasing temperature, the electrical load shedding period increases allowing less hours for pumping water from canal. Therefore, day and night operation of these pumps is managed to address these challenges.



Ber plant growth after pruning



1-year old Mango plantation

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