भाकृअनुप ICAR

FARM COORDINATOR

... the in-house newsletter

राअस्ट्रैप्रसं NIASM

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From the Director's Desk

The research farm of ICAR-NIASM, Baramati, spreading over an area of 41 ha, is unique for its development, layout and maintenance. The farm demonstrates soil and water conservation technologies suitable for semi-arid regions. The farm is divided into two blocks i.e., South Block with 37 fields to study the impact of abiotic stresses on crop production, livestock and fisheries and their mitigation strategies and North Block with 19 fields for demonstrating planting techniques, soil mixtures and irrigation techniques for profitability and sustainability of orchards on basaltic-murum soils. All the experiments are well-planned and nicely maintained generating valuable information about abiotic stress management in agriculture.

The Newsletter provides detailed information regarding works done during the last month and plan of work for the coming month. I sincerely hope that the Newsletter will help the scientists and the farm personnel to improve the coordination among scientists, technical, administrative and farm staff for implementing the planned activities.

February 21, 2020

(Himanshu Pathak)

Contents

Hope For The Best

There is profuse flowering in mango this year. However, the flowering was delayed almost by a month due to prolonged monsoon and mild winter. The intermittent cloudy climate there is threat of disease and pests. It was mandatory to protect it from powdery mildew disease (*Oidium mangiferae*) and hopper (*Idioscopus* sp.) incidence. Therefore, prophylactic sprays are being taken up at 15-days interval. Simultaneously, good care of nutrition and irrigation requirements is being taken care of. We hope to receive uninterrupted supply of water from *Nira* canal. So it is expected to have very good mango fruit production this year. However, delayed flowering will lead to delay in harvesting coinciding with monsoon showers. Therefore, we have to be prepared for challenge of stone weevil (*Sternochetus mangiferae*) presence at ripening. Also looking in to past experience it will require to follow IPM for reducing damage due to fruit fly (*Bactrocera dorsalis*).

Rabi season is at its end now and in spite of very mild winter it is expected to have bumper production of wheat. Due late winter and canal closure time, the sowing of rabi field crops was also delayed by 15 to 21 days. The grain filling stage in wheat coincides with the increase in temperature. Therefore, it will be important to observe its effect on quality of the produce. Last year there was ample fruiting on Aonla and harvesting period was also very wide i.e. 5-months from September to January. It was also observed that the next season flowering started while there was some produce was yet to be harvested.

Achievements Jan-Feb 2020 (South Block)

Wheat cultivation: Rabi wheat sowing in general fields D-5,6 (var. HD 2189) and E-5 (var. LOK-1) was carried out in Nov19. However, due canal closure during this period led to delay experimental wheat crop. Experimental wheat sowing was carried out in Dec 2019 in C-4 and C-8. General wheat crop is near to maturity will be ready for harvesting in first week of March 2020. While the experimental wheat is at grain filling stage and may get affected by increasing temperature.

Chickpea cultivation: General chickpea (Var- Digvijay) sowing was done by dibbling along both sides of 60cm wide ridges in native soil field B-8 in Nov 2019. While the sowing was done tractor drawn seed drill in Sara layout in another native soil field E-7,8. These general crops are ready for harvest now. The experimental chickpea sowing was also carried out by dibbling in B-7 in ridge and furrow layout. Open area in fishery section (A-5,6) was also brought under general chickpea in Jan 2020.

Maize crop: The layout preparation and dibbling of maize along ridges was carried out in C-3 for a project on Integrated Management of Army Worm in Maize. The fields under development E-3,4 were prepared and converted int ridges and furrows for cultivation maize. The part of the field E-3 was utilized for experiment on propagation of dragon fruit through cuttings under field condition. Different IBA concentrations were utilized as treatment for enhancing rooting.

Experimental Groundnut: After harvest of experimental maize crop from C-6 field, it was to be prepared for experiment on summer groundnut. Therefore, the field was ploughed, rotavated twice and layout in the form of ridges 90cm wide was prepared with help of ridger. The shaping of layout and channels was carried out manually as desired by the PI. The sowing for experiment on groundnut was carried out by dibbling on sides of the ridges followed by irrigation.

Preparatory Tillage Operations: Some of the fields remained uncultivated due to unavailability of irrigation water or the field were under development. The native soil fields E-3 and E-4 were were under grasses for long which were prepared for crops by ploughing and converted in to ridges and furrows for maize sowing. Fallow cultivation was carried out in field C1, D-1,2 and E-9 with the help of cultivator to rough out weeds. Blank field borders were also cultivated with tractor to make weed free.

Irrigation activities: During canal water availability irrigation in south farm fields was facilitated through operation of diesel engine pump during electrical load shedding period (Monday to Thursday) and flood irrigation was targeted on need base. The electric pump at canal was operated from Friday to Sunday during availability of electrical supply. This period was utilized to collect water in 'Water Balancing Tank' near admin building to be utilized for orchards and lanscape gardens and lawns.

Achievements Jan-Feb 2020 (North Block)

Aonla tree pruning: Amla trees in G3 field and along north-west peripheral road were pruned during January 2020. The intention of pruning was to maintain the height manageable and increasing the fruiting units with developed canopy. The height of the trees was restricted at 8-ft and lateral branches were also pruned to achieve balanced canopy architecture. The pruning was followed by the prophylactic spray of Lambda- cyahalothrin and Carbendezim was given to protect the new growth.

Pomegranate bahar treatment: During hasta bahar there was heavy rainfall for longer period causing flower drop. Therefore, it was decided to initiate bahar treatment again and get ready for early Mrig bahar. Irrigation was withhold during Jan 2010 till date and the plants are showing sufficient stress to go for next steps of bahar treatment. Plants will need light pruning and low concentration spray for defoliation followed by manure, fertilizer application and irrigation.

Custard apple block: While planting of custard apple in diversity block, the stones removed from the pits were arranged around the basins for ornamental purpose. However, these were obstructing all the cultivation practices and irrigation work there. Therefore, these rocks were removed outside and the block was cleaned. The soil pulverization and basin preparation was followed by watering with the help of tanker. The plants were pruned to give it required shape for fruiting.

Plant Protection: Plant protection measures were required in amla, drumstick, citrus fruits, mango, grapes and sapota. Incidence of aphids was seen in amla and caterpillar damage in drumstick. To manage this spraying neem based insecticide Neemazal was carried out @ 1ml/l.

Attack of lemon butterfly was noticed in citrus orchards along with deficiency symptoms. Therefore, spraying of emamectin benzoate alon with multiflex micronutrient solution was carried out.

Spraying of wettable sulphur and neemazal was done in mango to control powdery mildew disease and hoppers.

In Thomson seedless grape for powdery mildew spraying of Myclobutanil along with Potassium bi carbonate was done.

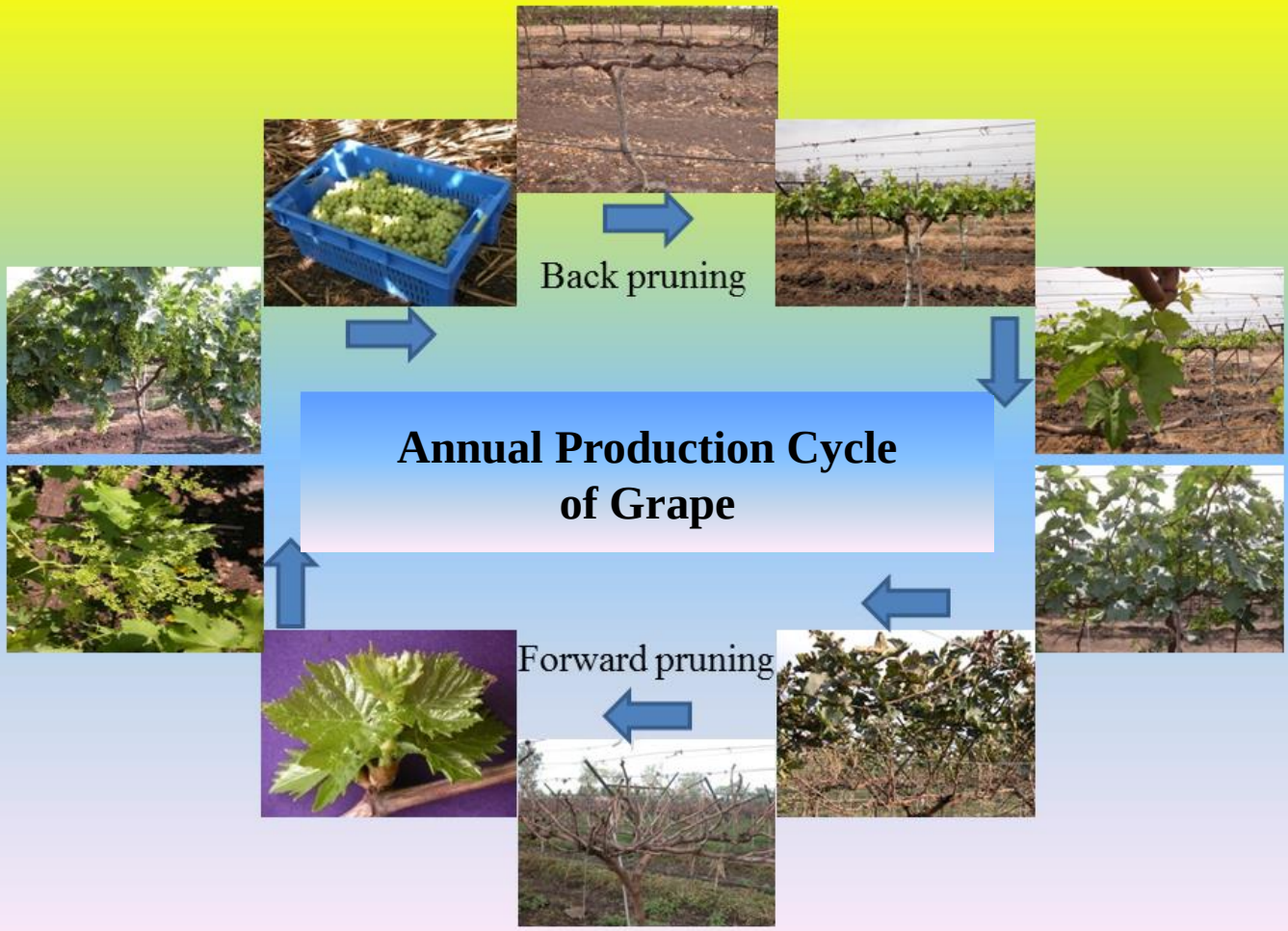
Insecticide and fungicide spray was also given in sapota to control larval incidence and spots visible on leaves.

Secondary fertilizers along with zinc and boron were applied through soil in mango citrus and sapota.

Irrigation management: In first fortnight of January there was canal closure. Therefore, water for life saving was procured from outside in tankers and used either through drip or direct application. With the availability of water drip system is operated for 3-day for orchards and 3-days for landscape gardens. Orchard irrigation was carried out every Mon, Wed and Friday. Magensium sulphate, Urea, 12:61:0 and 0:0:50 fertilizers were given through fertigation technique.

Field No.	Work Plan Feb-Mar 2020 (South Block)
A1 B1 B2 B3 C2 C10	Land preparation after harvest: The standing crop being ratoon sugarcane that is to be replaced in the process of crop rotation. Therefore, the field will be ploughed and allowed open to sun for 15-days before fine tillage operations like rotavating
A3A4	Filling water in fishery tanks for future use
A5A6	Observing the performance of late sowed chickpea under sandy soil conditions and its irrigation requirements.
B4	Continue facilitating irrigation and weeding operations in experimental onion
B5B6	Re-establishment of cropping system as per the planned layout. Fist the layout will be fixed manually for preparation of channels and bunds and then requisite sowing and planting operations will be carried out. The existing plantations will be made weed free and missing places will be gap-filled.
B7	Continue facilitating irrigation and weeding operations in experimental chickpea crop
B8 E7, 8	The crop at the stage of maturity and will be ready for harvesting in 15-days. Harvesting and threshing activities are targeted at the end of Feb 20.
C1	Looking for irrigation water availability green manure crop will be sown as a general activity
C3	Continue facilitating irrigation and weeding operations in experimental maize crop
C4	Continue facilitating irrigation and weeding operations in experimental wheat crop
C5	Fallow cultivation of the field by ploughing
C6	Facilitating fertilizer treatments imposition, weeding and irrigation of the experimental groundnut crop.
C7	Continue facilitating irrigation and weeding operations in experimental Quinoa crop
C8	Continue facilitating irrigation and weeding operations in experimental wheat crop
C9	Continue facilitating irrigation operations in fodder maize crop for Animal unit
C10, 11	Facilitating irrigation, weeding and machinery inputs to the farming system unit
D1D2	Preparation of layout for general plantation of summer mungbean crop. Ridges and furrows of 90cm width will be prepared and seed sowing will be done by maintaining 45cm distance between rows with plant to plant distance of 22.5cm by dibbling method on both sides of the ridges.
D3	Continue facilitating irrigation and weeding operations in experimental turmeric crop
D4	With the availability of seeds with PI the sowing of the experimental groundnut sowing will be carried out as desired by the PI followed by irriation.
D5D6	The crop will be ready for harvesting during 2nd fortnight of March 2020. The harvesting and threshing will be carried out as soon as the maturity reached.
D9	Continue facilitating irrigation operations in animal unit's fodder crop
D10D11	Continue facilitating irrigation and weeding operations in farming system's various crops
E2	Continue managing weeds in and around the field
E3	Weeding and irrigation activities will be carried out for better growth of the maize.
E4	Weeding and irrigation activities will be carried out for better growth of the maize.
E5	The crop will be ready for harvesting during 2nd fortnight of March 2020. The harvesting and threshing will be carried out as soon as the maturity reached.
E6	Continue facilitating irrigation and weeding operations in experimental Quinoa crop
E7E8	The crop at the stage of maturity and will be ready for harvesting in 15-days. Harvesting and threshing activities are targeted at the end of Feb 20.
E10	Continue facilitating irrigation to the fodder crop
F2,3,4	Preparation of basins and lifesaving watering to be carried out with the help of water tanker.
F5	Continue facilitating supply of agro wastes and water for preparation of compost

Field No.	Work Plan Feb-Mar 2020 (North Block Orchards & Other)
G3	Soil pulverizing and fertilizer application to be done to achieve better growth. Spraying of Neem based insecticide to be done for management of aphid and mealy bug pest. Pasting stems by lime with insecticide for take care of bark eating caterpillar.
G4	Training required for canopy development, fertilizer application and soil pulverization. Spraying of neem based insecticide and Trichoderma for control of powdery mildew and mealy bug
G5	Tree plantation around playground is to be carried out.
G6	Training of the plants by removal of rootstalk growth and cris-cross branches is required for better size and shape of the plants. Fertilizer application (secondary and micronutrients) and spraying of insecticide for control of fruit borer.
H1, J7	Removal of lower dried leaves, soil pulverization and fertilizer application.
H2	Spraying of insecticide Azadiractin or Emamectin benzoate, soil pulverizing and fertilizer application
H3	Pruning- removal of extra suckes and topping of the branches to be done for manageable canopy size.
H4	Soil pulverization, fertilizer application and pruning of plants for shaping the plants
H5	Tying drip line to the concrete poles, training of shoots on to poles and earthing up along with manure/ fertilizer application
I2	Spraying of Fipronil and Carbendezim for pest and disease management, irrigation and fertigation
I3, J1,2	Reducing number of fruits by manually thinning, spraying of Fipronil and Carbendezim for pest and disease management, irrigation and fertigation
I4	Training and pruning of shoots, manure application and earthing up
I5	Gap filling, training of plants and fertilizer application
J3, K5	Defoliation to be done by spraying Ethephon followed by light pruning, soil pulverization and fertilizer application. Spraying for pest and disease management and growth regulator for enhancing sprouting.
J4	Spraying of neem based insecticide and fungicide for control of insect pest and powdery mildew disease.
J5	Spraying of Trichoderma as biological control to be carried out for fruit rot in later stages and during post-harvest period. Fertigation with SOP is to be continued. Harvesting of Sharad seedless grapes will be started during 1st fortnight of Mar 20. As temperature is increasing irrigation will be taken care f and cleaning of drip system will be done to maintain regular flow rate.
J6	Pruning of plants to remove weak and dried branches and fruits, soil pulverizing and manure/ fertilizer application. Spraying of biological agent Trichoderma.
K6	Soil pulverization, fertilizer application and pruning of plants for shaping the plants
K7	Spraying of Trichoderma for general plant health, secondary nutrients application and SOP through drip irrigation.
Peripheral Plantation	Soil pulverization, fertilizer application and basin watering of coconut plants to be done. Same operations are to be carried out in case of other plants along periphery.
Custard Apple Biodiversity	Manure/ fertilizer application, soil pulverization and basin water followed by drip laying and training of plants by removing branched up to 30cm height from ground. Pruning of plants to remove weak and dried branches and spraying of biological agent Trichoderma.
Tree Plantation	Cleaning of the area by removing weeds and stones, gap filling, soil pulverizing from the basins and watering through tanker
Play Ground Area	Cleaning of the area by removing weeds and stones, gap filling, soil pulverizing from the basins and watering through tanker
Avenue	Removal of dried branches of plants and cleaning of the area by removing weeds soil pulverizing from the basins and watering through tanker/ drip system.



Grape is a native of temperate region where the vine enters dormancy during cold season. However, it has been established in tropical regions with some modifications in viticulture practices. As the vine doesn't undergo dormancy, it grows all the year round. To overcome this situation grapes in Tropical region are pruned twice a year viz., Back pruning and Forward pruning as against the temperate conditions where single pruning is practiced.

The period after back pruning is marked with shoot development and simultaneous fruit bud differentiation in growing shoot. Also, the accumulated photosynthates during this period fulfil the nutrition requirements of the bearing vines after forward pruning. Therefore, period after this pruning is known as ' Foundation Phase' for the production then after, as the foundation of preceding crop is laid down during this period.

'Forward Pruning' was earlier used to be called as 'October Pruning' or 'Sweet Pruning'. This pruning is carried out after completion of foundation phase by giving rest to the grapevines. Defoliation is followed by pruning by identifying the fruiting zone based on fruit bud differentiation. To enhance sprouting of selective buds dormancy breaking solution Hydrogen cyanamide is used @ 1.5 to 2.0 per cent. After sprouting grapevine undergoes various developmental stages of shoot and fruit growth viz., flowering, fruit setting, fruit development, veraison and maturity. The grape becomes ready for harvest in about 125 to 140 days after pruning. Various treatments of growth regulators and other viticulture practices are very stage specific and at most care is required to execute the operations in scheduled time. Canopy management is also an important aspect because it has highly manipulated canopy architecture. This season heavy rains after forward pruning affected Maharashtra grapes severely with downy mildew disease due to continuous humid conditions.

Drumstick – a miracle tree:

• Drumstick is a small or medium sized perennial tree which can reach up to 10 to 12 m height

• Usually, it is grown for its nutrient rich tender but full grown pods, leaves and flowers which are used in culinary preparations

• These vegetables contain good amounts of vitamins and minerals. It has excellent health benefits along with the industrial uses.

•It is grown mainly in dry and arid climatic conditions.

• PKM-1, PKM-2, Odissi, etc. are popular annual varieties under cultivation

• An annual types of drumstick trees are propagated by seeds whereas the perennial one through cuttings.

• To facilitate side branches erect growing shoot should be nipped off when at the height of 70-75 cm.

• After harvest of main crop, annual types are cut back to 1m height from ground level for ratooning. Newly developed shoots start bearing 4-5 months after pruning.

• Preferred sowing time in July o October where in the harvesting can be done during March to August.

• Staggered sowing/ pruning can be practiced to harvest off season to achieve higher cost-benefit ratio.

Shoot growth after pruning for ratoon in drumstick

Diseases & Pests in mango after flowering:

• Powdery mildew and anthracnose are important diseases to be looked after at this stage. Powdery mildew attacks the inflorescence and young fruits rendering in its shedding. While anthracnose pathogen causes leaf spot/ blight, wither tip, blossom blight and fruit rots.

• Malformation caused by *Fusarium subglutinans* can be seen, that transforms flower buds into witches' broom.

• Hoppers puncture & suck sap of tender parts, particularly destroying inflorescence and cause fruit drop

• Mealy bug nymphs settle on inflorescence causing fruit drop & due to excretion of honey like substance it facilitates development of sooty mold.

• Midge larva tunnels the axis of inflorescence & destroy it completely. Second attack starts at fruit setting as young maggots bore into tender fruits to fall down.

• Fruit fly female punctures outer wall of mature fruits with pointed ovipositor & inserts eggs inside mesocarp of mature fruits. On hatching the maggots feed on fruit pulp & the fruit starts rotting.

• Stone weevil egg laying on pericarp occurs when fruits are of marble size and after hatching the grubs bore through pulp and damage seed where it pupates.

• Nutirtional disorders- Potassium, zinc and iron deficiencies may lead to various physiological disorders in mango.

• Spraying of neem based insecticide and fungicides like wettable sulphur and carbendezim at 15-days interval.

• When the fruits are of lemon size, spraying of deltamethrin 1ml/l to be carried out to manage stone weevil problem.

Powdery mildew of Mango

Sowing of maize with seed drill in B-9 field for Animal unit

Basin preparation & watering of Tamarind with tanker

Rooting trial on planting of dragon fruit cuttings in field

Collection of cactus genotypes at NIASM farm

Ornamental plants' nursery maintenance at farm office

Landscape maintenance activities at campus

Karonda at flowering stage in I1 terrace of orchard

Tamarind tree pruning along north-west peripheral road

Quinoa field trial in native soil at South Block

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