



BIMONTHLY POMEGRANATE ADVISORY FOR BEARING ORCHARDS (APRIL- MAY 2023)

**Jyotsana sharma, Ashis Maity, N V Singh, Somnath Pokhare,
Mallikarjun, Manjunatha N. and Mahadev Gogaon**

I. Bahar: Mrig (May-Jun Crop regulation)

CURRENT STAGE OF THE ORCHARD: Late stage of rest period or stress period or crop regulation at May end)

A. Horticultural Practices:

- **Crop under rest period and bahar regulation May last week:** Depending on the soil texture, stop irrigation for stress induction (heavy black cotton soil 5-6 weeks or light soil 3-4 weeks).
- Defoliation should be done using Ethephon 39% SL. Quantity of Ethephon should be adjusted based on yellowing of leaves:
 - (i) If natural defoliation occurs; Ethephon spray is not required; One can take Ethephon 39% SL @ 20 ml per 100 liters of water (0.2 ml/L) after leaf opening for good flowering.
 - (ii) If leaves are deep yellow, take one spray of Ethephon 39% SL @ 1 ml/L.
 - (iii) If leaves green / slight yellow; take 1-2 sprays of Ethephon 39% SL @ 0.5 ml/L and after 1 week, depending on yellowing take 2nd spray @ 1-1.5 ml/L.
- **NOTE:** Total quantity of Ethephon should not be more than 2.5 ml/L. Please add DAP (18:46:00) **OR** (MAP) 12:61:00 **OR** (MPP) 00:52:34 @ 5 g/L with each Ethephon spray for better defoliation.
- Defoliation should be followed by light pruning at the end of the May month (10 - 15 cm from top or refill thickness and partially removing thorns).
- Fallen leaves and debris in the orchard may be removed/ buried in soil at fertilizer application.

B. Nutrient Management:

- Apply following manures and bio-fertilizer after pruning, at the time of first irrigation or release of stress.
- Apply 25-30 kg Farm Yard Manure (FYM) **OR** 15-20 kg FYM + 2 kg Vermi-compost +

2 kg Neem-cake per plant **OR** 7.5 kg well decomposed Poultry manures + 2 kg Neem-cake per plant.

- Apply any or combination of the bio-formulation of *Azospirillum* sp. **OR** *Aspergillus niger* **OR** *Trichoderma viride* and *Penicillium pinophilum* after incubating separately in 1-1.5 feet high bed with well decomposed FYM for 15 days maintaining 60-70% moisture content in the mixture and alternate day stirring under shade. In about 15 days, these beneficial bacteria / fungi grow nicely in the compost.
- Before application, mix Arbuscular Mycorrhizal Fungi, AMF (*Glomus intraradices* syn. *Rhizophagus irregularis*) in the bio-formulation mixture and use this @ 10-20 g per plant. Give light irrigation immediately after manure application.

Note: Apply bio formulations 20-30 days after application of chemical fertilizers.

C. Insect Pest Management:

- Regular monitoring / observation should be done for stem borer, shot hole borer, termites, which are major pests during dry stress periods.
- **Stem pasting:** Stem pasting should be done with any of the below mentioned pastes:
 - (i) **Bordeaux paste 10%:** Mix 1 kg of Copper Sulphate + 1 kg hydrated Lime in 10 litres of water

OR

- (ii) **Red Soil Paste:** Mix the Red soil 4 kg + Copper oxychloride 50% WP @ 25 gram in 10 liters of water.

Note:

(a) In both Bordeaux and Red soil paste also add Chloropyrifos 20% EC @ 20 ml **OR** Emamectin benzoate 5% SG @ 20 g.

(b) Paste the stems up 2-2.5 ft. from the bottom.

(c) See this video for preparation - बोडो पेस्ट बनाने की विधि <https://youtu.be/JXwWBDiUdyA>). It also covers preparation of Bordeaux mixture 1% and 0.5%)

D. Disease Management:

- Sprays of freshly prepared 1% Bordeaux mixture (<https://youtu.be/JXwWBDiUdyA>) should be taken at 15 days' interval alternatively, Copper oxychloride 50% WP @ 2.5 g/L **OR** Copper hydroxide 53.8% @ 2.0-2.5 g/L along with spreader sticker @ 0.3 to 0.5 ml/L. This will take care of bacterial blight and fungal spots during rest / stress period.
- Wilt / borer affected plants, if any, should be removed carefully and burnt. The wilt treatments given at the end of the advisory should be taken if not taken in previous months.

II. Bahar: Hasta (Sep-Oct Crop regulation)

CURRENT STAGE OF THE ORCHARD: About to harvest and rest period after harvest

A. Horticultural Practices:

- If very late hasta bahar has been taken, then fruit bagging with White butter paper bags open at the bottom is recommended **OR** protective crop cover covering the entire row at the top and 1.5-3 ft. from top to sides is recommended to avoid sun burn /scald on fruits.
- The width of crop cover depends on the height and canopy of the plants and the side where sun is after 12 noon / sunset side should be covered 60% as that receives more sunlight by afternoon. This also protects fruits from abiotic fruit cracking to some extent.
- Bearing branches having optimum crop load may be staked and tied for support.
- After harvest of hasta bahar fruits, medium to deep pruning (removal of criss cross, diseased, broken and overcrowded branches) should be done and basal dose application of nutrition is recommended.



Before Pruning



After Pruning

Photos of main pruning just after fruit harvest

B. Nutrient Management:

(i) Crop stage is around 1 month to harvest:

- Fertigate urea @ 41.44 - 69.56 kg per ha per application; N:P:K::00:52:34 Mono-Potassium Phosphate @ 22.20 kg per ha per application and N:P₂O₅:K₂O::00:00:50 Potassium Sulphate @ 22.20 kg per ha per application. Give 4 applications at 7 days' interval through irrigation.
- Give three foliar application of 00:52:34 @ 5 - 6 g/L and two foliar application of Manganese sulphate @ 6 g/L at 10 days' interval.

(ii) Rest period:

- Immediately after harvest of fruits and pruning, Apply 15 - 20 kg FYM **OR** 10 - 15 kg

FYM + 2 kg Vermi-compost + 2 kg neem-cake per plant.

- Apply 225 - 280 g N (490 - 610 g Urea), 63 g P₂O₅ (395 g SSP), 200 g K₂O (335 g MOP), 488 g Ca (2.80 kg gypsum) and 80 g Mg (800 g MgSO₄) per plant depending on the age of the plant (lower dose of N for 5th year plants and higher dose for 6th and above years old plants) followed by light irrigation.
- Apply any or combination of bio-formulation of *Azospirillum* sp., *Aspergillus niger*, *Trichoderma viridae* and *Penicillium pinophilum* after incubating separately as mentioned previously.
- Just before application mix Arbuscular Mycorrhizal Fungi, AMF (*Glomas* sp.) in the FYM and apply @ 10-20 g per plant. Give light irrigation immediately after manures and bio-fertilizers application.
- During rest period do not give excess irrigation; irrigate only twice a week with 15-20 litre water depending on soil type
- **Note: Apply bio-formulations 20-30 days after application of chemical fertilizers.**

C. Insect Pest Management:

- Regular monitoring / observation should be done for stem borer, shot hole borer, termites, mites, leaf eating caterpillars and sucking pests (Mealy bugs, scale insects etc.).
- Depending on insect pest observed, take 2 - 3 sprays at 15 to 20 days' interval with any of the insecticides mentioned below:
- If low foliar insect pest infestation is observed, spray only Azadirachtin / Neem oil 1% (10000 ppm) @ 3 ml/L water. If harvesting of crops is due in 1 month avoid any insecticide spray, if any emergency, consult an expert before taking any spray.

Rest Period:

- Foliar Pests:** In rest period, if any foliar pest infestation observed is high, take spray with any of these insecticides Lambda cyhalothrin 5% EC @ 0.5-0.75 ml/L **OR** Indoxacarb 14.5% SC @ 0.75 ml/L **OR** Cyantranilprole 10.26% OD @ 0.75 ml/L **OR** Thiamethoxam 25% WG @ 0.5 g/L water.
- If shot hole /stem borer infestation** is observed in the orchard: Follow the advisory: <https://nrcpomegranate.icar.gov.in/files/Advisory/107.pdf>.
- Mealy bugs/scale insect:**
 - In Early infestation: Spray Azadirachtin / Neem oil 1% (10000 ppm) @ 3 ml/L + Pongamia oil @ 3 ml/L water.
 - If the infestation is at the late stage, spray Thiamethoxam 12.6% + Lambda-cyhalothrin 9.5% ZC @ 0.75 ml/L water.

d) Mite infestation:

- If mite infestation is observed at an early stage, take the spray with Azadirachtin / Neem oil 1% (10000 ppm) @ 3 ml/L water.
- If the infestation is at a late stage, take the spray with Fenazaquin 10% EC @ 1.5 ml/L **OR** Fenpyroximate 5% EC @ 0.4 ml/L **OR** Phosalone 35% EC @ 2 ml/L water.

D. Disease Management:

(i) Harvesting of crop due in 1 month: Avoid any sprays, if emergency, take 1 spray of Copper fungicide **OR** Sulphur 80% WP @ 2.5 g/L.

(ii) In rest period:

- **Wilt and Nematode affected plots** should take wilt treatment soon after harvest. Details given at the end of the advisory.
- Take following sprays during rest period at 10-15 days' interval depending on climate and individual crop problems - 1% Bordeaux mixture **OR** Copper oxychloride 50% WP @ 3 g/L **OR** Copper hydroxide 53.8% WP @ 2 g/L altered with 2-Bromo-2-nitropropane-1,3-diol (Bronopol 95%) @ 0.5 g/L. Still if any fungal disease observed, one spray can be taken using fungicide mentioned in Adhoc list of agrochemicals (<https://nrcpomegranate.icar.gov.in/files/Advisory/91.pdf>).

III. Bahar: Ambia (Jan-Feb Crop regulation)

CURRENT STAGE OF THE ORCHARD: Flowering, fruit set and fruit enlargement

A. Horticultural Practices:

- Shoot pinching if too much vegetative growth is there.
- Staking and support to the bearing trees and branches.
- When the fruit is lemon size or about 100 g fruit bagging or protective crop cover over the entire row is recommended to avoid sun scald.



Photos of Pomegranate orchards at flowering stage

B. Nutrient Management:

(i) Flowering:

- Foliar application of Naphthyl Acetic Acid (NAA) 4.5% @ 22.5 ml per 100 lit water for good flower induction.
- Foliar application of micronutrient mixture @ 1.0 - 1.5 kg/ha or @ 2 to 2.5 gram/L.
- Fertigate N:P₂O₅:K₂O::00:52:34 Mono-Potassium Phosphate @ 11 kg per ha per application and N:P₂O₅:K₂O::00:00:50 Potassium Sulphate @ 11 kg per ha per application. Give 4 applications at 7 days' interval through irrigation.
- Apply Gypsum @ 1.14 kg per plant and MgSO₄ @ 300 gram per plant followed by thorough mixing with the soil and watering.

(ii) Fruit setting and Enlargement

- Fertigate N:P:K::00:52:34 Mono-Potassium Phosphate @ 11 kg per ha per application and N:P₂O₅:K₂O::00:00:50 Potassium Sulphate @ 11 kg per ha per application. Give 4 applications through irrigation.
- Fertigate urea @ 13.70 - 23.13 kg per ha per application. Give 8 applications at 7 days' interval through irrigation.
- Foliar application of micronutrient mixture @ 1-2 kg/ha or @ 2 -2.5 gram/L.
- Two foliar application of pure Gibberellic acid @ 50 ppm (5 grams per 100 liter) at 15 days' interval.
- Apply Gypsum @ 640 gram per plant and MgSO₄ @ 400 gram per plant followed by thorough mixing with the soil and watering.
- Remove weeds from plant basin.

C. Insect Pest Management:

(i) Fruit borer (egg stage):

- If low infestation is observed, single spray may be taken and if higher infestation is observed take two sprays (1st single and 2nd combination) with Azadirachtin / Neem oil 1% (10000 ppm) @ 3 ml/L **OR** Pongamia oil @ 3 ml/L **OR** combination of both the above @ 3 + 3 ml/L water at 7-10 days' interval.
- Remove all the damaged fruits with holes and dispose them by burying in pit and take a spray with any one of the insecticide Cyantraniliprole 10.26% OD @ 0.75 ml/L **OR** Chlorantraniliprole 18.5% SC @ 0.75 ml/L **OR** Tolfenpyrad 15% EC @ 0.75ml/L **OR** Flonicamid 50% WG @ 0.75-1.0 ml/L water.



- a) Pomegranate fruit infested by Fruit Borer b) Mite infestation on leaves c) Pomegranate fruits heavily infested by mealy bugs

(ii) Mealybugs / Scale insect:

- **Early infestation:** Spray Azadirachtin / Neem oil 1% (10000 ppm) @ 3 ml/L + Pongamia oil @ 3 ml/L water.
- **Late stage:** If the infestation is at the late stage, spray Thiamethoxam 12.6% + Lambda- cyhalothrin 9.5% ZC @ 0.75 ml/L water.

(iii) Mite infestation:

- **Early infestation:** In early stages, take the spray with Azadirachtin / Neem oil 1% (10000 ppm) @ 3 ml/L water.
- **Late stage:** Take the spray with Fenazaquin 10% EC @ 1.5 ml/L **OR** Fenpyroximate 5% EC @ 0.4 ml/L **OR** Phosalone 35% EC @ 2 ml/L water.

D. Disease Management:

(i) Spray during crop season (Take sprays at 10-14 days' interval)

- Take 4 sprays of Salicylic acid (SA) @ 0.3 g/L and Micronutrient mixture @ 2 g/L each at 1-month interval from pre-flowering.
- Bordeaux mixture 0.5% **OR** Copper oxychloride 50% WP @ 2.5 g/L **OR** Copper hydroxide 53.8% WP @ 2.0-2.5 g/L along with spreader sticker @ 0.3 to 0.5 ml/L, altered with 2-bromo, 2-nitro propane-1, 3-diol (Bronopol 95%) @ 0.5 g/L at 10 days' interval.
- If orchard has bacterial blight history; take spray of Streptocycline (Streptomycin sulphate 90% + Tetracycline hydrochloride 10%) @ 0.5 g/L once a month and at 7-10 days' interval from 2-bromo, 2-nitro propane-1, 3-diol (Bronopol 95%).
- Avoid too many sprays, if rain is there; take an additional spray of Streptocycline + Copper based fungicide.
- Depending on fungal problems present in the orchard, Copper based formulations may be replaced with appropriate fungicides.

Some promising fungicides for Pomegranate Fungal Scab, Spots and Rots are:

Some promising fungicides for pomegranate fungal scab, spots and rots	
1. Mandipropamid 23.4% SC @ 1 ml/L.	8. Propiconazole 25% EC @ 1 ml/L.
2. Metiram 55% + Pyraclostrobin 5% EC @ 3 g/L.	9. Copper Oxychloride 45% + Kasugamycin 5% @ 2.5 g/L.
3. Propiconazole 25% EC @ 1 ml/L + Azoxystrobin @ 1 ml/L.	10. Zineb 68% + Hexaconazole 4% WP @ 2.5 g/L.
4. Azaoxystrobin 20% + Difenoconazole 12.5% SC @ 2 ml/L.	11. Tricyclazole 18% + Mancozeb 62% WP @ 2.5 g/L.
5. Chlorothalonil 50% + Metalaxyl M 3.75% @ 2 ml/L.	12. Fluopyram 17.7% + Tebuconazole 17.7% w/w SC @ 1 ml/L.
6. Bordeaux mixture @ 0.5%.	13. Tebuconazole 50% + Trifloxystrobin 25% w/w WG (75WG) @ 0.5g/L.
7. Chlorothalonil 75% WP @ 2 g/L.	

PLEASE NOTE:

- Remove rot infected fruits and destroy before each spray; do not dump or throw anywhere.
- Avoid spray if rain is expected on the spray day; Spraying after a few hours of rain is better and very important to prevent diseases.
- Spray pH should be checked and adjusted from 6.5-7 pH.
- Best results are obtained with 2-3 sprays starting during flowering and fruit setting stage at 15 days interval with any of the above. This will avoid several sprays at later stages.
- Always use spreader sticker with sprays except Bordeaux mixture.
- Need based sprays be used later.
- No pesticide should be used more than 2-3 times in a season except copper fungicides.
- Sprays can be taken in rotation as per pre-harvest interval for residue free production (<https://nrcpomegranate.icar.gov.in/files/Advisory/91.pdf>).

Fungal Wilt Management

DRENCHING FOR HEALTHY PLANTS SURROUNDING WILT AFFECTED PLANTS OR WHERE WILT JUST STARTED:

Prefer drenching soon after fruit harvest in rest period, or initial stage of crop regulation. One day before drenching, irrigate the soil properly; next day drench **with only one of the methods (I or II or III)** given below. Do not irrigate 2-3 days after drenching for best results.

- ❖ **Method I:** 1st drenching Propiconazole 25% EC @ 2 ml/L + Chlorpyrifos 20% EC @ 2 ml/L **OR** Thiamethoxam 25% WG @ 1-1.5 g/L (5 to 10 litre solution per plant depending on age of the plant). After 30 days of first application, 2nd drenching with *Aspergillus niger* AN 27 (New Packs have AN27 with IRAG07) fungus @ 5 g/plant with 2 Kg FYM/plant. 3rd application after 30 days of 2nd application - AMF fungus (Arbuscular Mycorrhizal Fungi - *Rhizophagus irregularis* @ 25 g/plant with 2 Kg FYM/plant).

OR

- ❖ **Method II:** Propiconazole 25% EC @ 2 ml/L + Chlorpyrifos 20% EC @ 2 ml/L (5 to 10 Liter solution per plant and 3 drenching's at 20 days' interval).

OR

- ❖ **Method III:** 1st and 3rd drenching Fosetyl Al 80% WP @ 6 g/plant (10 L solution per plant) while 2nd and 4th drenching with Tebuconazole 25.9 % w/w EC @ 3 ml/plant (10 L solution per plant). Drench at 20 days' interval.

TREATMENT FOR WILT (PARTIAL OR COMPLETE) AFFECTED PLANTS:

Remove the affected plants and destroy / dispose of carefully without spreading the sick soil on uprooted plants to healthy plants. Irrigate the soil and cover with transparent linear low-density polyethylene (LLDPE) 50-100 microns thick plastic for 6 weeks in hot months when no rains are there. Later new plants with recommended bio-formulation can be planted.

NOTE: The wilt pathogen survives for several years in affected soil or plant parts, hence proper disposal of wilted plants and soil treatment is important steps. **For complete details, method of drenching please see Wilt advisory on NRCP website**

Root Knot Nematode Infestation

The different bio-formulation used in **Method I** as mentioned in fungal wilt management are also effective against root knot nematode. Alternatively promising bio-formulations like *Paecilomyces* or *Trichoderma* or *Pochonia chlamydosporia* for nematode management may be added. In addition, intercrops like African marigold,

Dhaincha, Sunhemp should be preferred during rest period while many vegetable, tuber and pulse crops increase nematode infestation hence should not be grown in the orchard as inter-culture crops or prior crops before pomegranate plantation.

During rest period/ or just before bahar initiation: any one of the following methods should be used if the nematode infestation is very high visible as heavily galled white roots:

1. Apply **Fluensulfone 2% GR @ 10 gram per dripper** (Maximum dose of Fluensulfone should not exceed 40 g/plant). Make a small pit of 5-10 cm deep below each dripper, add 10 grams granular nematicide and cover it with soil, give light irrigation at crop initiation.
2. Alternatively, drenching can be done with **Fluopyrum 34.48% SC @ 2 ml per plant**. Plants should be sufficiently irrigated day before drenching. Mix 2 ml of the nematicide in two litre of water and pour 500 ml per dripper (4 drippers/plant) or 1000 ml per dripper (2 drippers/plant).

For detailed information and latest updates on different advisories please visit our website or use the link: <https://nrcpomegranate.icar.gov.in/Advisory>.
