



Bimonthly Pomegranate Advisory for Bearing Orchards (June- July 2021)

Jyotsana Sharma, Ashis Maity, NV Singh Mallikarjun H. and Somnath S Pokhare

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

CURRENT STAGE OF THE ORCHARD: (Crop regulation, flowering and fruit setting)

A. Horticultural Practices:

Crop (orchard) is under **stress period**, Those farmers who have planned to take early mrig bahar, defoliation might have been done using Ethephon 39 % SL followed by light pruning at the end of the May month. If it's not done yet, it should be done as early as possible to avoid flowering and fruit setting coincides with rain. Fallen leaves and debris in the orchard may be removed/ buried in soil at fertilizer application.

- (i) Break plant stress. Defoliation using ethephon can be done depending upon intensity of stress:
 - **Plant not under proper stress due to intermittent rains or other reasons:** Take two sprays of Ethephon 39 % SL, first spray @ 0.9 ml /L followed by second Ethephon spray @ 1 to 1.5 ml /L after 5 - 8 days depending on yellowing. Mix DAP OR 12:61:00 OR 00:52:34 @ 5 g/L with each Ethephon spray.
 - **Plants under proper stress with yellow leaves:** Take spray of Ethephon 39 % SL @ 1 ml /L + DAP OR 12:61:00 OR 00:52:34 @ 5 g/L.
 - **Plants under heavy stress with complete defoliation:** No defoliation sprays required.
- (ii) Remove water shoots and do light pruning by removing of shoots of refill thickness (up to 10 - 15 cm from top) and thinning out tertiaries if too many/very dense for proper sunlight and aeration.

B. Nutrient Management:

- (i) Apply 25 - 30 kg Farm Yard Manure (FYM) per plant **OR** 15 - 20 kg FYM + 2 kg vermicompost + 2 kg neem-cake per plant **OR** 7.5 kg well decomposed poultry manures + 2 kg neem-cake per plant.
- (ii) Apply 2.5 - 2.8 kg Gypsum and 800 g Magnesium sulphate per plant followed by mixing with rhizosphere soil.
- (iii) Application of bio formulations can be done 20 - 30 days after application of chemical fertilizers. Apply any or combinations of following bio-formulation like

Azospirillum sp. **OR** *Aspergillus niger* **OR** *Trichoderma viride* and *Penicillium pinophilum* after incubating separately with well decomposed farmyard manure for 12 - 15 days under shade maintaining 60 – 70 % moisture content in the mixture and alternate day stirring. In about 15 days, these helpful bacteria/fungi grow nicely in the compost. Before application, mix Arbuscular Mycorrhizal Fungi, AMF (*Glomus intraradices* syn. *Rhizophagus irregularis*) in the bioformulation mixture and use this enriched bioformulation mixture @ 10 - 20 g per plant.

- (iv) Give light irrigation immediately after the application of fertilizers and manures.
- (v) After new leaf and flower bud initiation give foliar application of Naphthyl Acetic Acid (NAA) 4.5 % @ 22.5 ml per 100 lit water for good flower induction.
- (vi) Foliar application of micronutrient mixture @ 1.0 - 1.5 kg/ha.
- (vii) Fertigate with N:P:K::00:52:34 (Mono-Potassium Phosphate) @ 8.5 kg/ha/application. Give 3 applications at 7 days interval through drip irrigation.

C. Insect Pest Management:

(i) Vegetative new leaf initiation stage:

- **First spray** preventive or curative spray of 1 % Azadirachtin/Neem oil (10000 ppm) @ 3.0 ml/L + 0.25 ml/L spreader sticker **OR** Pongamia oil @ 3 ml/L + 0.25 ml/L spreader sticker **OR** combination of both the above @ 3 + 3 ml/L with 0.25 ml/L spreader sticker.
- **Second spray 7 - 10 days after first spray:** Spray Cyantraniliprole @ 0.75 ml/L + 0.25 ml/L spreader sticker **OR** Thiamethoxam 25 % WG @ 0.5 g/L + 0.25 ml/L spreader sticker.

(ii) **Flower bud initiation/Flowering stage:** Spray Spinetoram 12 % SC @ 1.0 ml/L + 0.25 ml/L spreader sticker **OR** Spinosad 45 % SC @ 0.5 ml/L + 0.25 ml/L spreader sticker.

(iii) **Fruit setting stage:** Chlorantraniliprole 18.5 % EC @ 0.75 ml/L + 0.25 ml/L spreader sticker.

D. Disease Management:

- Take one spray of freshly prepared 1 % Bordeaux mixture just before defoliation.
- Take 4 sprays of each of Salicylic acid (SA) @ 0.3 g/L and Micronutrient mixture @ 2 g/L at 1 - month interval starting from pre-flowering.
- Spray of Bordeaux mixture 0.5 % **OR** Copper oxychloride 50 % WP @ 2.5 - 3.0 g/L **OR** Copper hydroxide 53.8 % @ 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 can be taken at 10 days interval.
- If orchard has bacterial blight history take spray of streptomycin sulphate 90 % + tetracycline hydrochloride 10 % (Streptocycline) @ 0.5 g/L once a month and at 7 - 10 days' interval from Bronopol. Avoid too many sprays, take an additional spray of Streptocycline + Copper based fungicide after rain.
- Depending on fungal problems present in the orchard, Copper based formulations may be replaced with appropriate fungicides as given in Table 1: **Some promising fungicides for pomegranate fungal scab, spots and rots** at the end of the advisory.

- **Wilt and Nematode Management:** Please follow the instructions given at the end of the advisory for wilt and nematode management in the pomegranate orchard.

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

CURRENT STAGE OF THE ORCHARD: Rest period/last harvest if crop regulation delayed due to unseasonal rains.

A. Horticultural Practices: Soon after harvest, heavy pruning should be done by removing branches up to pencil thickness (up to 60 cm from top), removal of broken, criss-cross or infected branches, removal of straight and fast growing water shoots from the center of the canopy to open the canopy for better light penetration. If harvesting and pruning done in May, then barar pruning not required.

B. Nutrient and Water Management:

- If rest period fertilizer dose has been applied in May, no need of fertilizer application now
- If harvesting delayed till June then take rest period fertilizer doses:
 - a. Immediately after harvest of fruits, apply 20 - 25 kg FYM per plant **OR** 13 - 15 kg FYM + 2 kg vermicompost + 2 kg neem-cake per plant **OR** 7.5 kg well decomposed poultry manures + 2 kg neem-cake per plant.
 - b. Apply 205 g N (446 g neem-coated urea/plant) 50 g P₂O₅ (315 g Single Super Phosphate/plant) and 152 g K₂O (254 g Murate of Potash or 304 g Sulphate of Potash per plant) followed by light Irrigation.
 - c. Bioformulation can be used 20 - 30 days after application of chemical fertilizers as mentioned in the Mrig bahar nutrient management.
- Ensure optimum soil moisture in the soil for utilization of applied nutrients. Irrigate the sandy soil 15 - 20 litres at 3 to 4 days intervals and in sandy loam soils 10 - 15 litres of water at weekly intervals. Do not irrigate after the rain for 2 - 5 days depending on rainfall received and soil type.

C. Insect Pest Management:

- **In crop where last harvest delayed** till June avoid any insecticide spray.
- **In rest period** 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.). (i) If low foliar insect pest infestation is observed, spray only Azadirachtin/Neem oil @ 3 ml/L + 0.25 ml/L spreader sticker. (ii) If infestation is moderate to high, depending on insect pest observed, take 2 - 3 sprays at 15 to 20 days' interval with any of the insecticides mentioned below:

(a) 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 + 0.25 ml/L spreader sticker **OR** Indoxacarb 14.5% SC @ 0.75 ml/L + 0.25 ml/L spreader sticker **OR** Cyantraniliprole 10.26% OD @ 0.75 ml/L + 0.25 ml/L spreader sticker **OR** Thiamethoxam 25% WG @ 0.5 g/L + 0.25 ml/L spreader sticker.

(b) If shot hole /stem borer infestation is observed in the orchard:

- **Stem pasting:** Make the paste by mixing the Red soil 4 kg + Chlorpyrifos 20 % EC 20 ml + Copper oxychloride 50 % WP 25 g in 10 litres of water and paste on a stem up 2 - 2.5 ft. from the bottom. **OR**
- **Drenching:** Thiamethoxam 25 % WG @ 10 - 15 g + Propiconazole 25 % EC @ 15 - 20 ml/10 litre of water.

(c) Mealy bugs/scale insect:

- **In Early infestation:** Spray 1 % Azadirachtin/Neem oil (10000 ppm) @ 3 ml/L + Pongamia oil @ 3 ml/L + 0.25 ml/L spreader sticker.
- If the infestation is at the late stage, spray Thiamethoxam 12.6 % + Lambda-cyhalothrin 9.5 % ZC @ 0.75 ml/L + 0.25 ml/L spreader sticker.

(d) Mite infestation:

- If mite infestation is observed at an early stage, take the spray with 1% Azadirachtin/Neem oil (10000 ppm) @ 3 ml/L + 0.25 ml/L spreader sticker.
- If the infestation is at a late stage, take the spray with Fenazaquin 10 % EC @ 1.5 ml/L + 0.25 ml/L spreader sticker **OR** Fenpyroximate 5 % EC @ 0.4 ml/L + 0.25 ml/L spreader sticker **OR** Phosalone 35 % EC @ 2 ml/L + 0.25 ml/L spreader sticker.

D. Disease and Nematode Management:

- (i) In plots where last harvest is expected within 15-20 days:** No sprays required.
- (ii) In plots where crop is in rest period:** 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 @ 2.5 – 3 g/L + 0.25 ml/L spreader sticker **OR** Copper hydroxide 53.8 % WP @ 2 g/L + 0.25 ml/L spreader sticker altered with 2-Bromo-2-nitropropane-1,3-diol (Bronopol 95%) @ 0.5 g/L. + 0.25 ml/L spreader sticker. Still if any fungal disease observed, one spray like Mancozeb 75 % WP @ 2 g/L + 0.25 ml/L spreader sticker or any other appropriate fungicide may be taken using fungicides mentioned in Adhoc list of agrochemicals (<https://nrcpomgranate.icar.gov.in/files/Advisory/91.pdf>).
- (iii) Wilt and Nematode Management:** Wilt and Nematode affected plots should take treatments soon after harvest. Details given at the end of the advisory.

III. BAHAR: AMBIA (JAN-FEB CROP REGULATION)

CURRENT STAGE OF THE ORCHARD: Fruit enlargement, development and maturity stage/ colour development

A. Horticultural Practices:

- Spray of amino acid @ 2 - 2.5 ml/L to partially offset high temperature stress.

- Tying of drooping branches (due to crop load) with jute strings on GI wire connected bamboo crotches or structures or supporting branches with GI/MS based structures connected with GI wires.

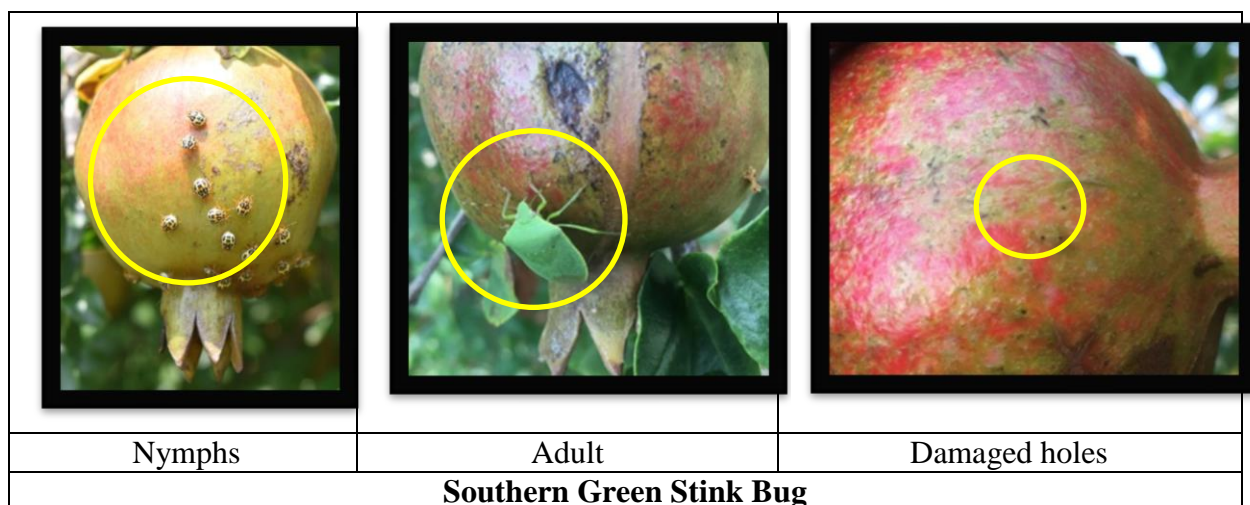
B. Nutrient Management:

- Give three foliar sprays of 00:52:34 (Mono-Potassium Phosphate) @ 7 - 10 g/L and two foliar sprays of Manganese sulphate @ 6 g/L at 10 - 15 days interval.
- Fertigate with N:P₂O₅:K₂O::00:52:34 (Mono-Potassium Phosphate), urea and 0:0:50 @ 12.80, 31.40 and 11.50 kg/ha/application respectively. Give 10 applications at 7 days interval through drip irrigation.
- Maintain optimum soil moisture as per local soil type and climatic conditions.

C. Insect Pest Management:

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 1 % Azadirachtin/Neem oil (10000 ppm) @ 3 ml/L + 0.25 ml/L spreader sticker **OR** Pongamia oil @ 3 ml/L + 0.25 ml/L spreader sticker **OR** combination of both the above @ 3 + 3 ml/L + 0.25 ml/L spreader sticker at 7-10 days' interval.
- **Fruits with big hole:** 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 + 0.25 ml/L spreader sticker **OR** Chlorantraniliprole 18.5 % SC @ 0.75 ml/L + 0.25 ml/L spreader sticker.
- **Fruit sucking bugs:** Spray Spinetoram 12 % SC @ 1.0 ml/L + 0.25 ml/L spreader sticker **OR** Spray Spinosad 45 % SC @ 0.5 + **OR** Chlorantraniliprole (18.5%EC) @ 0.75 ml/L + 0.25 ml/L spreader sticker.



D. Disease Management:

- Take remaining 1 - 2 sprays of Salicylic acid (SA) @ 0.3 g/L and Micronutrient mixture @ 2 g/L each at month's interval (Note: Take total 4 sprays of salicylic acid and micronutrient mixture at 1 month interval starting at pre-flowering).
- Bordeaux mixture 0.5 % **OR** Copper oxychloride 50 % WP @ 2.5 - 3.0 g/L + 0.25 ml/L spreader sticker or Copper hydroxide 53.8 % @ 2.0 - 2.5 g/L + 0.25 ml/L spreader sticker, altered with 2-bromo, 2-nitro propane-1, 3-diol (Bronopol 95%) @ 0.5 g/L + 0.25 ml/L spreader sticker at 10 days interval.
- If orchard has bacterial blight history, take spray of streptomycin sulphate 90 % + tetracycline hydrochloride 10 % (Streptocycline) @ 0.5 g/L + 0.25 ml/L spreader sticker once a month and at 7-10 days' interval from bronopol. Avoid too many sprays.
- 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 listed below:**

Table 1: Some promising fungicides for pomegranate fungal scab, spots and rots

1. Mandipropamid 23.4 % SC @ 1 ml/L.	6. Bordeaux mixture @ 0.5%.
2. Metiram 55 % + Pyraclostrobin 5 % EC @ 3 g /L.	7. Copper Oxychloride 45 % + Kasuamycin 5 % @ 2.5 g/L.
3. Propiconazole 25 % EC @ 1 ml/L + Azoxystrobin 23 % SC @ 1 ml/L.	8. Zineb 68 % + Hexaconazole 4 % WP @ 2.5 g/L.
4. Azaoxystrobin 20 % + Difenconazole 12.5 % SC @ 1 -2 ml/L.	9. Tricyclazole 18 % + Mancozeb 62 % WP @ 2.5 g/L.
5. Chlorothalonil 50 % + Metalaxyl M 3.75 % @ 2 ml/L.	10. Chlorothalonil 75 % WP @ 2 g/L.

Note: Best results are obtained with 2 - 3 sprays starting at flowering and fruit setting stage at 10 - 14 days' interval with any of the above. This will avoid several sprays at later stages. Always use spreader sticker with sprays except Bordeaux mixture. No fungicide should be used more than 2 times in a season except copper fungicides.

IV. WILT AND NEMATODE MANAGEMENT

Wilt Management: Fungal Wilt Management:

On observing first symptoms of wilt, first ascertain the cause/s that it is due to fungal pathogens *Ceratocystis*, *Fusarium*, etc. Wilt due to *Ceratocystis* fungi is most destructive. Identify the cause at first/initial symptoms of leaf yellowing. As soon as first symptoms observed, check roots of the affected branch. Remove and split open the roots; if deep yellow/brown/grey color and alcoholic/fruity smell is observed, the symptoms should be attributed to *Ceratocystis* fungi. Sometimes, other root rot fungi like *Rhizoctonia*, *Sclerotium* or *Phytophthora*, are also found to be associated with wilt. In the orchard with wilt disease, treat soil with only one of the following most promising protocols:

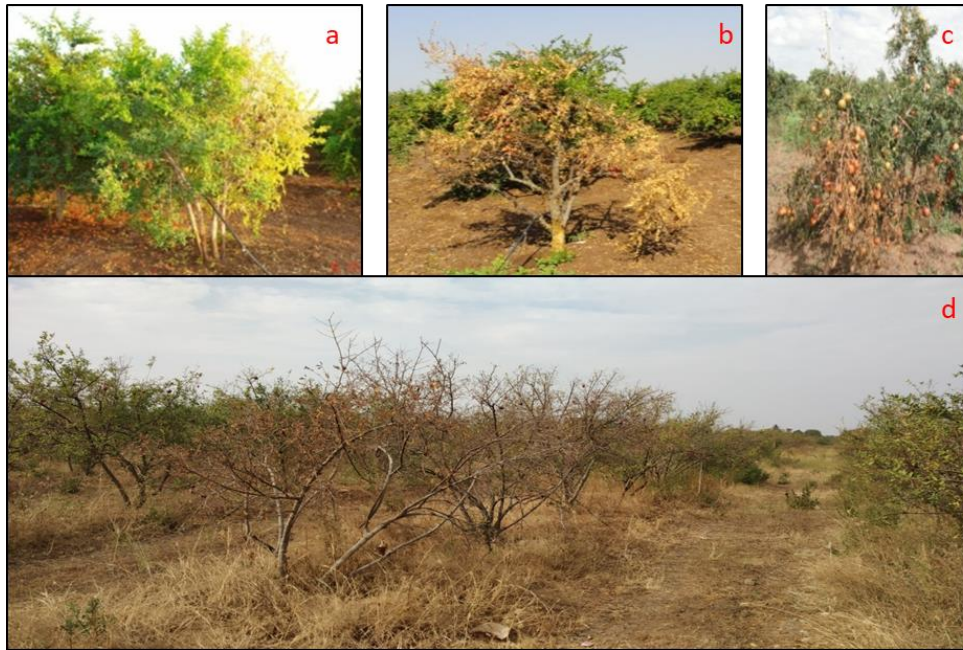


Photo: Wilted plants due to *Ceratocystis fimbriata* fungus. a) Initial yellowing of leaves. b & C) drying of one branch as disease progress d) wilting of plants in line.

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 (use 5 to 10 L solution/plant).
- After 30 days of first application 2nd drenching with *Aspergillus niger* AN 27 (New Packs have AN 27 with IRAG 07) fungus @ 5 g/plant with 2 Kg FYM/plant.
- 3rd application after 30 days of 2nd application - VAM fungus (Vesicular arbuscular mycorrhizae - *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 (3 drenching at 20 days interval).

OR









Method III:

- 1st and 3rd drenching Fosetyl Al 80 % WP @ 6 g/plant (10 L solution)]; [2nd and 4th drenching with Tebuconazole 25.9 % w/w EC @ 3 ml/plant (10 L solution)]. Drenching interval 20 days.

NOTE:

- Prefer drenching soon after harvest, in rest period or initial stage of crop regulation.

- For shot hole borer, Chlorpyrifos 20 % EC @ 2 ml/L may be taken along with above in first drenching.
 - Drenching with Metalaxyl 8 % + Mancozeb 64 % @ 2 - 2.5 g/L will be beneficial if *Phytophthora* is causing any loss.
 - Drench affected plant and surrounding 4 - 5 plants where infected soil might have spread.
 - For complete details about method of drenching, please see Wilt advisory on NRCP website.
- i. Use only one of the following methods.

			
First Symptoms	Yellowing	Complete drying of plants	
			
Yellowing of Split root	Gray/black/brown discoloration of Split stem	Shot hole borer with wilt	Rhizoctonia root rot
Symptoms of Wilt Infected Plant			

A. Nematode Management:

- If the orchard is known to have heavy nematode infestation (evident from the presence of galls on the root of the plant below the dripper



Symptoms of Nematode Infested Plants: a) Pomegranate plant showing the symptoms of nutrient deficiency. b) Small galls visible in early nematode infestation. c) Fully grown plants without flowers d) Large sized galls on the roots of heavily infested pomegranate plants.

- The bio control formulations used in Method I, in fungal wilt management also reduces the infestation of root knot nematode. Alternatively other promising bio formulations like *Paecilomyces* spp. **OR** *Pseudomonas* spp. or *Trichoderma* spp. may be added right from planting every 6 months in order to have sustainable nematode management. Application of these bioagents should be done twice a year

(once on start of rest period, second at crop regulation) in the soil helps in improving nutrient uptake, plant growth and biochemical resistance to diseases, and also checks pomegranate wilt.

- If infestation is high, any of the following nematicide should be applied during rest period or just before commencement of bahar in order to reduce the root knot population below the damage threshold without any residue in the fruits.
- Farmers can either use the granular nematicide Fluensulfone 2 % GR. In order to use the granular nematicide, make a small pit (5 - 10 cm) under the dripper and apply the granular chemical @ 10 gram per dripper (Maximum dose should not exceed 40 gram/plant); cover it with the soil and start watering.
- Drenching can also be done with another nematicide like fluopyrum 34.48 % SC @ 2 ml/plant. Plants should be sufficiently watered day before drenching. Mix 2 ml of the nematicide in 2 litre of water per plant and pour 500 ml per dripper (4 drippers/plant) or 1000 ml per dripper (2 drippers/plant).

For detailed advisory please see <https://nrcpomegranate.icar.gov.in/files/Advisory/86.pdf>