



‘SIX-STEPS to Manage Bacterial Blight Disease in Pomegranate’

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The ‘Six Step’ schedule to manage Bacterial Blight Disease (BBD) is for the farmers taking *mrig bahar* and *late mrig bahar* crop of pomegranate and facing losses due to BBD. It needs to be taken in community approach, wherein all the orchards in a locality having bacterial blight should follow the schedule simultaneously. If followed properly and by all farmers in community the pathogen will be eradicated and farmers can take the rainy season crop successfully. The major steps are given below.

- I. **Main Pruning:** Soon after harvesting of fruits in December end/to February mid, main pruning should be done, removing crowded branches, damaged and dry branches so that proper light penetration and aeration is there. Secondary and tertiary branches with BBD cankers should be cut 2-4 inches below the cankers and cut end should be pasted with 10% Bordeaux paste. Cankers on main stem should be pasted with Bordeaux paste. Also apply 10% Bordeaux paste on stem up to 1.5-2 feet from ground. All BBD affected stems and fruits should be destroyed or buried in soil for decomposition.
- II. **Rest period fertilizer dose and disease/insect pest protection:** Apply rest period dose of fertilizer according to the age of the plant. For plants of 2 years and above apply:
 - (a) 20 kg of well decomposed farm yard manure or 15 kg of manure + 2 kg of Vermicompost + 1-2 kg of neem cake per plant **OR** well decomposed poultry manure 7 kg + 2 kg of neem cake per plant.
 - (b) Nitrogen 205 grams (446 grams neem coated urea) + Phosphorus 50 grams (315 grams single super phosphate) + Potash 152 grams (254 g Murate of potash or 304 g sulphate of potash) per plant.
 - (c) After 20-30 days of chemical fertilizer application, apply bioformulations along with manure. Bioformulations like *Aspergillus niger* AN 27 (renamed IRAG07), Mycorrhiza (*Rhizophagus irregularis*/*Glomus irregularis*) and *penicillium pinophilum* @ 1 kg/acre. (Use of *Trichoderma viride* or *T. harzianum*, *Pseudomonas fluorescens*, *paecilomyces lilacinus* @1 kg/acre is optional) Each bioagent (except Mycorrhiza) should be multiplied separately under shade. Mixed 1kg of bioformulations with 1ton of well decomposed manure. Prepare 1 feet high bed for each formulation using well decomposed manure, mix bioformulation, maintain 50-60% moisture in these beds, cover it with gunny bags to maintain humidity and

rake/mix the soil every 2-3 days. Incubate for 10-15 days and apply @ 1kg of bioformulation/acre of plants along with other manures. At the time of application mix Mycorrhiza also. Application of these bio agents twice a year (once on start of rest, second at crop regulation) in the soil helps in improving nutrient uptake, plant growth and biochemical resistance to diseases, also checks pomegranate wilt.

- (d) After fertilizer application, start light (15-20 litres) irrigation twice (light soil) or once (heavy soil) in every 7-8 days. Keep the pomegranate orchard in the rest period for 2 to 4 months. The irrigation should be just enough for nutrient uptake in soil and increase storage in the plant.
- (e) **Pesticide sprays** should be carried out at 15 days interval. (i) Copper oxychloride @ 3 g/l or copper hydroxide @ 2 g/l or 1% Bordeaux mixture (freshly prepared) will check both bacterial and fungal diseases. Still if any fungal disease is observed then one or two sprays of mancozeb or any other fungicide can be taken. For any specific disease, chemicals from the adhoc list may be used (ii) Insecticide sprays may be taken as per need depending on pest observed. Azadirachtin 1% (10000 ppm) @ 3ml per litre once a month may be taken as preventive insecticide. If foliar pest infestation observed is high then only take spray with any of the following- Lambda cyhalothrin 5% EC @ 0.5-0.75 ml/l, Indoxacarb 14.5% SC @ 0.75 ml/l, Cyantraniliprole @ 0.75 ml/l or Thiamethoxam 25%WG@ 0.5g/L. If shot hole borer pests are observed drench with Thiamethoxam 25%WG @ 10g/10L water.
- (f) Farmers facing wilt and nematode problem may follow Wilt advisory on NRCP website.

III. Put crop on stress during hottest months for natural defoliation: Stop the irrigation from mid/end March to put crop on stress till 100% natural defoliation occurs. After complete defoliation, remove the cankers visible on the branches by cutting the branch 2-4 inches below the canker using secateurs and burn it outside the orchard.

IV. Expose defoliated stems to solar radiation: Expose defoliated naked stems to solar radiation for 15-20 days before crop initiation to kill bacteria in the nodes (**this is the latest modification and key step to eradicate the bacteria blight pathogen**). Monitor this period critically. As soon as 1-2 cm tip drying of stems is observed, first irrigation is to be given and farmer should not wait for 20 days.

V. Light pruning and fertilizer application: Go for light pruning of top 8-10 inches of branches. Remove the cankers if any as mentioned above. Go for pasting with 10% Bordeaux paste as detailed in step I.

VI. Follow crop season fertilizer and IDIPM spray schedule: Applying crop season fertilizer dose and irrigation.

- a. During crop season apply humic acid and sulphur 80 % @20 -30g per plant depending on soil pH (if soil pH is above 8 use 30g per plant) along with recommended fertilizer applications.
- b. After 20-30 days of chemical fertilizer application apply bioformulations *Aspergillus niger* AN 27 (renamed IRAG07), Mycorrhiza (*Rhizophagus irregularis*/*Glomus irregularis*), @ 1

kg/acre and *Penicillium pinophilum* @ 1 kg/acre. Use of *Trichoderma viride* or *T. harzianum*, *Pseudomonas fluorescens* @1 kg/acre is optional). Apply these bioformulations after multiplying in manure as described above in para II.c.

- c. Give 4 sprays of micronutrient mixture @ 2g/l and salicylic acid @ 300 ppm (30g in 100 litre) at 1 month interval starting pre-flowering stage.
- d. Take sprays of recommended fungicides and insecticides @ 7-10 days interval as per plot requirement for quality production.
- e. If the field is infested with Root-knot nematode, go for soil drenching with fluopyrum 38.48% SC @ 2 ml/plant or Fluensulfone 2% Gr @ 10 gram/dripper (Maximum dose should not exceed 40 gram/plant) at crop initiation.
- f. Harvest fruits when mature and ripe.



Plate-1: Symptoms of bacterial blight disease in pomegranate a) oily spots on young leaves b) BBD cankers on new branch c) oily spots on young fruits d) fruit cracking due to blight infestation.

Pictorial Six Steps in the management bacterial blight of pomegranate:



Step I - Main Pruning: After harvesting of fruits from December to February, main pruning should be done removing the secondary and tertiary branches with BBD cankers. All BBD affected stems and fruits should be destroyed or buried in soil for decomposition.



Step II – Rest period: After the main pruning is done, recommended dose of rest period fertilizers should be applied and sprays for disease/insect pest protection should be taken at regular intervals



Step III – Stress induction: Stop the irrigation from mid/end March to put crop on stress till 100% natural defoliation occurs. Remove the BBD cankers visible (if any) on naked branches



Step IV - Expose defoliated stems to solar radiation: Expose defoliated naked stems to solar radiation for 15-20 days before crop initiation to kill bacteria in the nodes. Monitor this period critically. As soon as 1-2 cm tip drying of stems is observed, first irrigation is to be given and farmer should not wait for 20 days.



Step V- Light pruning and fertilizer application: Light pruning of top 8-10 inches of branches should be done removing the cankers if any as mentioned above. Go for pasting with 10% Bordeaux paste as detailed in step I.

Step VI - IDIPM spray schedule: follow IDIPM schedule recommended by ICAR-NRCP for good pomegranate harvest.