



Advisory for pomegranate shot hole borer management (September-2021)

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Shot hole borer incidence in pomegranate is increasing in recent times and its infestation may lead to severe economic losses if timely proper management measures are not taken. Observe the plants in the orchards showing yellowing/drooping/drying of leaves/nutrient deficiency type symptoms in some of the branches or entire plant. You can confirm the cause based on diagnostic symptoms. This is necessary to decide the correct management practice.

What causes yellowing and drying of the pomegranate plant:

1. Nutritional (deficiencies/toxicities)
2. Imbalanced moisture due to (Deficit/excess) irrigation/rainfall
3. Infestation due to fungi, bacteria and Root-Knot nematode.
4. Pinholes observed on stem and branches (outer surface/inner wood) are due to shot hole borer.

Before taking management practices it's essential to know the cause for the problem if it's confirmed that the cause is shot hole borer then take appropriate management practices described below.

Nature of damage: Shot hole borer (*Xyleborus spp.*) is a small beetle that has become major pests infesting in the collar region and of the plant by making numerous pin or shot holes causing a discontinuity in the conducting vessels affecting the conduction of water and nutrients to the upper portion of the plant. consequently, the drying of the twigs became imminent. The drying progressed from the tip towards the base and in severe cases, the entire plant dried up.

Seasonal incidence and life cycle: Shot hole borer (*Xyleborus spp.*) will be active throughout the year with higher activity during the monsoon period. Adult female beetle attack freshly dead or dying plants and also colonize healthy trees and cause damage through mass accumulation. Adult females will usually disperse during the day and females tend to colonize stem, and branches, resulting in localized branch dieback. In pomegranate, the initial infestation is characterized by white dripping fluid from the beetle entrance holes. Females will typically make a divided or simple gallery encircling the stem, with a few longitudinal tunnels in small branches. Eggs are laid in small clusters once the entrance tunnel has been completed. The grubs, with typically three instars, feed entirely on symbiotic ambrosia fungi cultivated in longitudinal galleries of twigs. Pupation takes place inside the same communal gallery. Newly emerged females stay in the galleries for several days. Once mating occurs, females leave the gallery through the original entrance hole. Beetles feed on a cultivated fungus within the xylem of woody hosts. They have a specialized pocket-like structure called **mycangia** where they transport (Vector) fungi to newly colonized trees. The fungi are obligate symbionts of the beetles and serve as their source of nutrition. The symbiotic fungus invades the tree vascular tissue, causing cambial necrosis, sugar or gum exudates, branch dieback, and mortality host plant. Hence the shot hole borer management (Vector and primary cause for wilt) is very essential for the effective management of pomegranate wilt.

Alternate hosts: Castor, tea, coffee, mango, guava, teak etc.

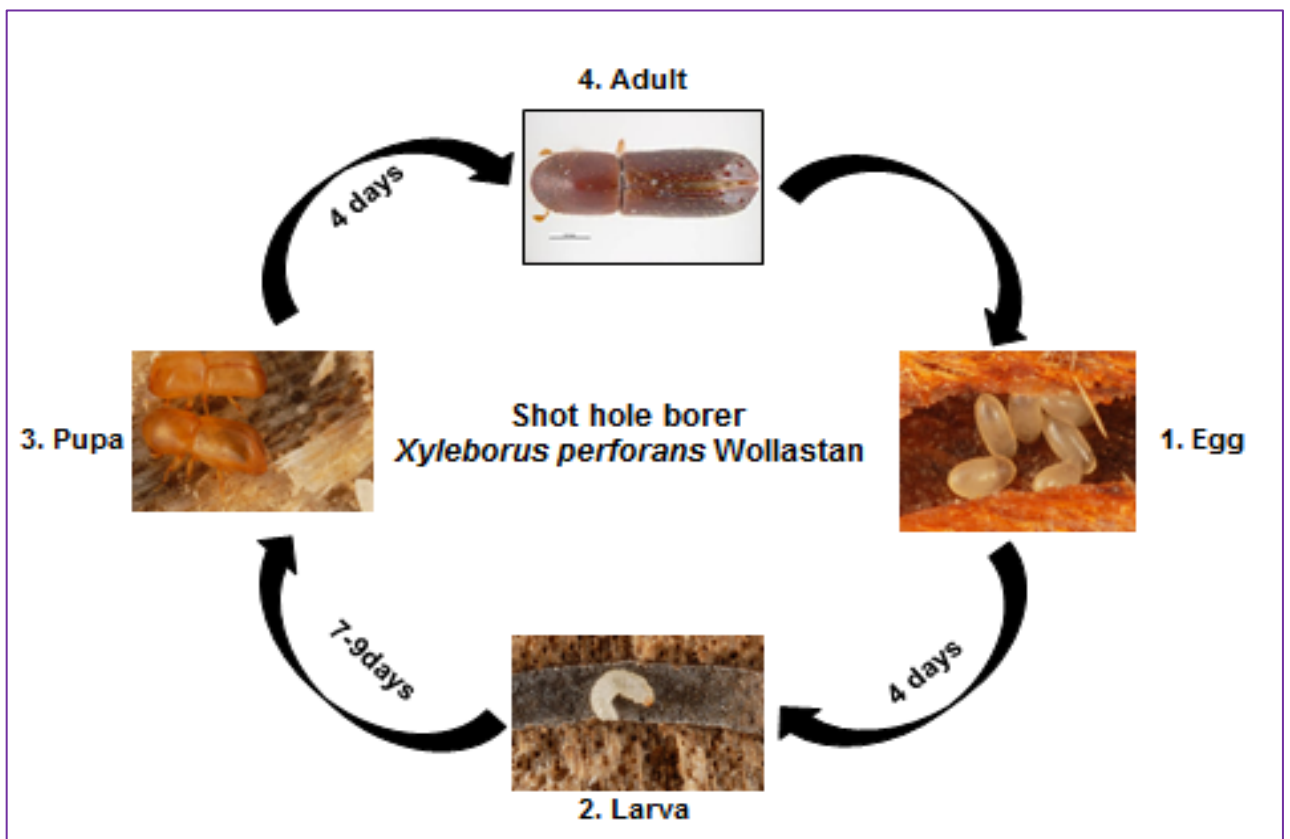


Fig. 1. The life cycle of the shot hole borer *Xyleborus perforans*

Symptoms of damage:

- Adult females bore into the basal part of the stem and exposed roots.
- Infestations are most easily detected by the presence of entry holes made by the attacking beetles, and the presence of frass produced during gallery construction.
- Causes small shot holes on exposed roots, stem, branches leading to yellowing partial wilting and finally leads to the death of the tree.



Fig. 2. Early symptoms of damage (gummosis) on young plants



Fig.3. Symptoms of damage by shot hole borer on old plants (>2 years)



Fig. 4. Progressive symptoms of wilting in pomegranate



Fig.5. Advanced stage of damage and complete wilting of pomegranate plants

Management:

Preventive measures:

1. Keep pomegranate plants as healthy as possible through proper horticulture.
2. Keep fields weed-free to reduce nutrient competition
3. Avoid waterlogging and detect early infestation by periodically looking out for drying branches especially after the receipt of the rainfall.
4. Infested branches should be removed and destroyed by burning or burying to prevent the further spread of these beetles.
5. Heavily infested trees need to be uprooted and destroyed by burning or burying.

6. Remove alternate host crops from the vicinity of pomegranate orchards to checks beetle populations.
7. Avoid the movement and piling of dead or uprooted wood within or near orchards as beetles breed on it and attack nearby pomegranate orchards.
8. Install the solar electronic light trap @ 1 trap/ha with the auto switch on after dusk.
9. Preventative insecticide sprays on the free area of the stem and branches with Emamectin benzoate 5% SG and followed by Azadirachtin 10000ppm @ 3ml/litre may be taken alternatively at monthly/bi-monthly intervals.
10. As a preventative measure: Drenching of Emamectin benzoate 5% SG + Propiconazole a 10% SC (2g/L+ 2ml/L) may be taken to reduced attack and colonization after receipt of the first rain.

Stem pasting:

Apply the paste from the 2nd year onwards before and after taking the *bahar* (Crop) and it needs to be applied up to 2 ft from the base on the free area of the stem and branches.

In 10 litres water preparation mix

Red Soil	4kg
Emamectin Benzoate 5SG	20ml
Copper Oxychloride (COC) 50WP	25g



Fig.6. Pasting on pomegranate stem and branches

Curative Measures:

Drenching:

1. **First drenching** with Emamectin benzoate 5% SG + Propiconazole a 10% SC (2g/L+ 2ml/L water)
2. **Second, drenching** 15-20 days after the first with Emamectin benzoate 5% SG + Carbendazim 50% WP (2g+1g/l) or Imidacloprid 17.8 % SL + Carbendazim 50% WP (2ml+2g/l) in a circular fashion and use 5-10L solution per tree.
3. **Third drenching** can be taken with chemicals of first drenching at 15-20 days after the second treatment based on the prevalence of the pest/severity of the problem.

Stem spray: Spray on free parts of the stem and branches with Thiamethoxam 25% WG @ 1–2 ml /L 0.5 ml spreader sticker/L water followed by Azadirachtin 10000ppm @ 3 ml/litre + 0.5 ml spreader sticker/L water



Fig.7. Drenching in pomegranate

Note:

1. Irrigate the plants well one day before treatment after chemical drenching irrigation should be stopped for 3-5 days and avoid the drenching during rainy days. If rain occurs on the same or next day of the treatment, then repeat the treatment.
2. Third drenching may be taken based on severity of the problem.
3. Sequence of treatment should be (Drenching + Stem spray+ Stem pasting need to be completed in 1-2 days).